

MEDICAL PATHOLOGY

TEACHER'S GUIDE SENIOR 5 ASSOCIATE NURSING PROGRAM

First Edition

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FOREWORD

Dear Teacher,

The Rwanda Basic Education Board is pleased to present this Teacher's Guide for the Associate Nursing Program. This guide is designed to support competence-based teaching and ensure consistency in delivering the Medical Pathology subject. The Rwandan educational philosophy aims to help student-associate nurses achieve their full potential, preparing them to address community health needs and pursue career opportunities.

To enhance education quality, the government of Rwanda emphasizes the alignment of teaching materials with the syllabus. Effective teaching relies on the relevance of content, pedagogical approaches, assessment strategies, and instructional materials. The guide focuses on activities that promote learning, allowing students to develop ideas and make discoveries.

In a competence-based curriculum, learning involves actively building knowledge and skills through activities, scenarios, and real-life applications. Your role as a teacher includes:

- Planning lessons and preparing teaching materials.
- Organizing group discussions and collaborative learning.
- Engaging students through active learning methods such as inquiry, research, and group work.
- Supporting and facilitating the learning process by valuing student contributions and guiding them towards integrating their findings.

This guide is divided into three parts:

1. Explains the book's structure and provides methodological guidance.
2. Offers sample lesson plans for reference.
3. Provides detailed teaching guidance for each concept in the student book.

Although the guide includes answers to student book activities, please review each question and activity before assessing student responses.

I extend my gratitude to everyone involved in developing this guide, including the Ministry of Health, University of Rwanda, and other institutions. Special thanks go to faculty members, nurses, midwives, teachers, illustrators, designers, Health Workforce development staff/MoH, and REB staff for their dedicated work.

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Director General of Rwanda Basic Education Board



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PART I. GENERAL INTRODUCTION

1.0. About the teacher's guide

This book is a teacher's guide for Integrated Science subject, Year five in Secondary School. It is designed to accompany student teacher's book and intends to help tutors in the implementation of competence based curriculum specifically Medical pathology. As the name says, it is a guide that teachers can refer to when preparing their lessons. Teachers may prefer to adopt the guidance provided but they are also expected to be more creative and consider their specific classes' contexts and prepare accordingly.

1.1. Structure of the guide

This section presents the overall structure, the unit and sub-heading structure to help teachers to understand the different sections of this guide and what they will find in each section.

Overall structure

The whole guide has three main parts as follows:

- **Part I: General Introduction.**

This part provides general guidance on how to develop the generic competences, how to integrate cross cutting issues, how to cater for students with special educational needs, active methods and guidance on assessment.

- **Part II: Sample lesson plan**

This part provides a sample lesson plan developed and designed to help the teacher develop their own lesson plans.

- **Part III: Unit development**

This is the core part of the guide. Each unit is developed following the structure below. The guide ends with references.

Each unit is made of the following sections:

- **Unit title:** from the syllabus
- **Key unit competence:** from the syllabus
- **Prerequisites** (knowledge, skills, attitudes and values)

This section indicates knowledge, skills and attitudes required for the success of the unit. The competence-based approach calls for connections between units/topics within a subject and interconnections between different subjects. The teacher will find an indication of those prerequisites and guidance on how to establish connections.

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Cross-cutting issues to be addressed

This section suggests cross cutting issues that can be addressed depending on the unit content. It provides guidance on how to come up with the integration of the issue. Note that the issue indicated is a suggestion; teachers are free to take another cross-cutting issue taking into consideration the learning environment.

Guidance on the introductory activity

Each unit starts with an introductory activity in the student-teacher's book. This section of the teacher's guide provides guidance on how to conduct this activity and related answers. Note that student-teachers may not be able to find the right solution but they are invited to predict possible solutions or answers. Solutions are provided by student-teachers gradually through discovery activities organized at the beginning of lessons or during the lesson.

List of lessons/sub-heading

This section presents in a table suggestion on the list of lessons, lesson objectives copied or adapted from the syllabus and duration for each lesson. Each lesson / subheading is then developed.

End of each unit

At the end of each unit the teacher's guide provides the following sections:

- Summary of the unit which provides the key points of content developed in the student-teacher's book.
- Additional information which, provides additional content compared to the student-teacher's book for the teacher to have a deeper understanding of the topic.
- End unit assessment which, provides answers to questions of the end unit assessment in the student-teacher's book and suggests additional questions and related answers to assess the key unit competence.
- Additional activities: (remedial, consolidation and extended activities). The purpose of these activities is to accommodate each student (slow, average and gifted) based on the end of unit assessment results.

Structure of each sub heading

Each lesson/sub-heading is made of the following sections:

Lesson / Sub heading title 1

- **Prerequisites / Revision / Introduction**

This section gives a clear instruction to tutor on how to start the lesson.

- **Teaching resources**

This section suggests the teaching aids or other resources needed in line with the activities to achieve the learning objectives. Teachers are encouraged to replace the suggested teaching aids by the available ones in their respective schools and based on learning environment.

– Learning activities

This section provides a short description of the methodology and any important aspect to consider. It provides also answers to learning activities with cross reference to student-teacher's book.

– Exercises/application activities

This provides questions and answers for exercises/ application activities.

1.2. Methodological guidance

1.2.1. Developing competences

Since 2015 Rwanda shifted from a knowledge based to a competence based curriculum for pre-primary, primary and general secondary education. For Secondary School, it is in 2019 that the competence based curriculum was embraced. This called for changing the way of learning by shifting from teacher centered to a learner centered approach. Teachers are not only responsible for knowledge transfer but also for fostering student-teacher's learning achievement, and creating safe and supportive learning environment. It implies also that a student-teacher has to demonstrate what he/she is able to do using the knowledge, skills, values and attitude acquired in a new or different or given situation. The competence-based curriculum employs an approach of teaching and learning based on discrete skills rather than dwelling on only knowledge or the cognitive domain of learning. It focuses on what learner can do rather than what learners know. Student teachers develop basic competences through specific subject unit competences with specific learning objectives broken down into knowledge, skills and attitudes. These competences are developed through learning activities disseminated in learner-centered rather than the traditional didactic approach. The student teachers are evaluated against set standards to achieve before moving on.

In addition to specific subject competences, student-teachers also develop generic competences which are transferable throughout a range of learning areas and situations in life. Below are examples of how generic competences can be developed in Medical Pathology.

Generic Competence	Examples of activities that develop generic competences
Critical thinking	Gathering the signs, symptoms and appearance in order to make differential medical diagnosis Demonstrate the abilities to manage different patients with medical pathology of respiratory system Demonstrate an understanding to provide health education to different patients with medical pathology of respiratory system
Research and problem solving	Discover the causes and risk factors contributing to different medical pathology of respiratory system
Communication	Organize and present in writing and verbally a complete and clear report during clinical attachment Conduct the health education by using different skills such as nonverbal and verbal communication
Cooperation, Personal and Interpersonal management and life skills	• Work in Pairs • Small group work • Large group work
Lifelong learning	Exploit all opportunities available to improve on knowledge and skills. Reading scientific journals to keep updated. Participate in medical round during clinical attachment and record the new medical terminology in short block note.

1.2.2. Addressing cross cutting issues

Among the changes in the competence-based curriculum is the integration of cross cutting issues as an integral part of the teaching learning process-as they relate to and must be considered within all subjects to be appropriately addressed. The eight cross cutting issues identified in the national curriculum framework are genocide studies, environment and sustainability, gender, Comprehensive Sexuality Education (CSE), Peace and Values Education, Financial Education, standardization Culture and Inclusive Education.

Some cross cutting issues may seem specific to particular learning areas or subjects but the tutor needs to address all of them whenever an opportunity arises. In addition, student teacher should always be given an opportunity during the learning process to address these cross cutting issues both within and out of the classroom to progressively develop related attitudes and values.

Below are examples on how crosscutting issues can be addressed in Medical Pathology:

Cross-cutting issues	Example on how to integrate the cross-cutting issues
Inclusive education	Involve all student, teachers in all activities without any bias. E.g. Allow a student, teacher with physical disability (using wheelchair) to take notes or lead the team during skills demonstration.
Gender	Involve both girls and boys in all activities: No activity is reserved only to girls or boys. Tutor should ensure equal participation of both girls and boys during experiments as well as during cleaning and tidying up related activities after experiments.
Peace and values education	During group activities, debates and presentations, the tutor will encourage student ,teachers to help each other and to respect opinions of colleagues.
Standardization culture	Some lessons involve carrying out skills demonstrations. Instruction should be clear for student, teachers to always check if they are not using checklist for specific procedure. • In addition, when performing skills student teachers have to record data accurately. • For tasks involving calculations, they have to always present accurate results.
Environment and Sustainability	In order to avoid the environment pollution, before, during or after skills lab demonstration student, teachers avoid throwing away waste anywhere; special places or appropriate containers (dust bin) should be used. • Student-teachers also have to be aware of the impacts of manipulation of different equipment of school, and make sure the hygiene of skills lab room demonstration
Financial Education	When performing skills demonstration, student, teachers are encouraged to avoid wasting and damage materials by using the quantities that are just required. They are required to also avoid spoiling equipment and other materials

1.2.3. Attention to special educational needs specific to each subject

In the classroom, students learn in different way depending to their learning pace, needs or any other special problem they might have. However, the teacher has the responsibility to know how to adopt his/her methodologies and approaches in order to meet the learning needs of each student in the classroom. In addition, teacher must understand that students with special needs need to be taught differently or need some accommodations to enhance the learning environment.

This will be done depending on the subject and the nature of the lesson. In order to create a well-rounded learning atmosphere, teacher needs to:

- Remember that student learn in different ways so they have to offer a variety of activities (e.g. role-play, storytelling, word games and quizzes, and outdoor activities).
- Maintain an organized classroom and limits distraction. This will help students with special needs to stay on track during lesson and follow instruction easily.
- Vary the pace of teaching to meet the needs of each student. Some students process information and learn more slowly than others learn.
- Break down instructions into smaller, manageable tasks. Students with special needs often have difficulty understanding long-winded or several instructions at once. It is better to use simple, concrete sentences in order to facilitate them understand what you are asking.
- Use clear consistent language to explain the meaning (and demonstrate o show pictures) if you introduce new words or concepts.
- Make full use of facial expressions, gestures and body language.
- Pair a student who has a disability with a friend. Let them do things together and learn from each other. Make sure the friend is not over protective and does not do everything for the student. Both student-teachers will benefit from this strategy
- Use multi-sensory strategies. As all students learn in different ways, it is important to make every lesson as multi-sensory as possible.
- Students with learning disabilities might have difficulty in one area, while they might excel in another. For example, use both visual and auditory cues.

Below are general strategies related to each main category of disabilities and how to deal with every situation that may arise in the classroom. However, the list is not exhaustive because each student is unique with different needs and that should be handled differently.

Strategy to help student with developmental impairment

- Use simple words and sentences when giving instructions.
- Use real objects that the student can feel and handle, rather than just working abstractly with pen and paper.
- Break a task down into small steps or learning objectives. The student teacher should start with an activity that s/he could do already before moving on to something that is more difficult.
- Gradually give the student less help.
- Let the student-teacher work in the same group with those without disability.

Strategy to help students with visual impairment

- Help students to use their other senses (hearing, touch, smell and taste) to play and carry out activities that will promote their learning and development.
- Use simple, clear and consistent language.
- Use tactile objects to help explain a concept.
- If the students have some sight, ask them what they can see. Get information from parents/caregivers on how the student manages their remaining sight at home.
- Make sure the student has a group of friends who are helpful and who allow the student to be as independent as possible.
- Plan activities so that student work in pairs or groups whenever possible.

Strategy to help student with hearing impairment:

Strategies to help student-teachers with hearing disabilities or communication difficulties

- Always get the student's attention before you begin to speak.
- Encourage the student to look at your face.
- Use gestures, body language and facial expressions.
- Use pictures and objects as much as possible.
- Ask the parents/caregivers to show you the signs they use at home for communication use the same signs yourself and encourage other students to use them.
- Keep background noise to a minimum.

Strategies to help children with physical disabilities or mobility difficulties:

- Adapt activities so that students who use wheelchairs or other mobility aids, or other students who have difficulty moving, can participate.

- Ask parents/caregivers to assist with adapting furniture e.g. the height of a table may need to be changed to make it easier for a student to reach it or fit their legs or wheelchair under.
- Encourage peer support friends can help friends.
- Get advice from parents or a health professional about assistive devices.

1.2.4. Guidance on assessment

Each unit in the tutor's guide provides additional activities to help student teachers achieve the key unit competence. Results from assessment inform the tutor which student-teacher needs remedial, consolidation or extension activities. These activities are designed to cater for the needs of all categories of learners; slow, average and gifted learners respectively.

Assessment is an integral part of teaching and learning process. The main purpose of assessment is for improvement. Assessment for learning/ Continuous/ formative assessment intends to improve student-teachers' learning and tutor's teaching whereas assessment of learning/summative assessment intends to improve the entire school's performance and education system in general.

Continuous/Formative Assessment

It is an ongoing process that arises out of interaction during teaching and learning process. It includes lesson evaluation and end of sub unit assessment. This formative assessment plays a big role in teaching and learning process.

The tutor should encourage individual, peer and group evaluation of the work done in the classroom and uses appropriate competence-based assessment approaches and methods.

In Year two textbook, formative assessment principles is applied through application activities that are planned in each lesson to ensure that lesson objectives are achieved before moving on. At the end of each unit, the end unit assessment is formative when it is done to give information on the progress of students and from there decide what adjustments need to be done. Assessment standards are taken into consideration when setting tasks.

Summative assessment

The assessment done at the end of the term, end of year, is considered as summative. The tutor, school and parents are informed on the achievement of educational objectives and think of improvement strategies. There is also end of level/ cycle assessment in form of national examinations.

1.2.5. Students' learning styles and strategies to conduct teaching and learning process

There are different teaching styles and techniques that should be catered for. The selection of teaching method should be done with the greatest care and some of the factors to be considered are: the uniqueness of subjects, the type of lessons, the particular learning objectives to be achieved, the allocated time to achieve the objective, instructional available materials, the physical/sitting arrangement of the classroom, individual student teachers' needs, abilities and learning styles.

There are mainly four different learning styles as explained below:

d) Active and reflective learners

Active learners tend to retain and understand information best by doing something active with it, discussing or applying it or explaining it to others. Reflective learners prefer to think about it quietly first.

e) Sensing and intuitive learners

Sensing learners tend to like learning facts while intuitive learners often prefer discovering possibilities and relationships. Sensors often like solving problems by well-established methods and dislike complications and surprises; intuitive learners like innovation and dislike repetition.

f) Visual and verbal learners

Visual learners remember best what they see (pictures, diagrams, flow charts, time lines, films, demonstrations, etc.); verbal learners get more out of words (written and spoken explanations).

g) Sequential and global learners

Sequential learners tend to gain understanding in linear steps, with each step following logically from the previous one. Global learners tend to learn in large jumps, absorbing material almost randomly without seeing connections, and then suddenly "getting it."

1.2.6. Teaching methods and techniques that promote the active learning

The different student-teacher learning styles mentioned above can be catered for, if the tutor uses active learning whereby student-teachers are really engaged in the learning process.

What is Active learning?

Active learning is a pedagogical approach that engages student-teachers in doing things and thinking about the things they are doing. In active learning, learners are encouraged to bring their own experience and knowledge into the learning process.

The role of the tutor in active learning

- The tutor engages students through active learning methods such as inquiry methods, group discussions, research, investigative activities and group and individual work activities.
- He/she encourages individual, peer and group evaluation of the work done in the classroom and uses appropriate competence-based assessment approaches and methods.
- He provides supervised opportunities for student-teachers to develop different competences by giving tasks which enhance critical thinking, problem solving, research, creativity and innovation, communication and cooperation.
- Tutor supports and facilitates the learning process by valuing student teachers' contributions in the class activities.

The role of learners in active learning

Learners are key in the active learning process. They are not empty vessels to fill but people with ideas, capacity and skills to build on for effective learning. A learner engaged in active learning:

- Communicates and shares relevant information with other learners through presentations, discussions, group work and other learner-centered activities (role play, case studies, project work, research and investigation)
- Actively participates and takes responsibility for their own learning
- Develops knowledge and skills in active ways
- Carries out research/investigation by consulting print/online documents and resourceful people, and presents their findings
- Ensures the effective contribution of each group member in assigned tasks through clear explanation and arguments, critical thinking, responsibility and confidence in public speaking
- Draws conclusions based on the findings from the learning activities.

Some active techniques that can be used in Medical Pathology

The teaching methods strongly emphasized in the competence Based Curriculum (CBC) are active methods. Below are some active techniques that apply in sciences:

a) Practical work/ Skills lab demonstration/clinical placement:

Many of the activities suggested in Medical pathology syllabus as well as in the student teacher's book are practical works or skills lab demonstration. Clinical placement is core in learning medical pathology; this method gives the student-teacher the opportunity to implement a series of activities and leads to the development of both cognitive and hands-on skills. The skills lab demonstration, clinical practicum given should target the development of the following skills in student-teachers: observation, recording and report writing, manipulation of equipment, ethical attitude, therapeutic relationships, clinical skills demonstration and clinical decision making.

A practical lesson/Demonstration skill includes three main stages:

Preparation of materials, equipment and environment:

Checking materials to ensure they are available and at good state; try to prepare materials and learning environment before the lesson; think of safety rules and give instructions to lab technician if you have any.

Preparation of Learners: Teacher gives instructions, rules and guideline of skills lab room in order to facilitate them to adopt the ethical values during skills demonstration. Avail the learning objectives and checklist of planned technique

Performance of Techniques and procedures: Teacher puts the learners into small groups of five learners in order every learner should be able to observe what the teacher is demonstrating. Teacher follows four steps for skills demonstration:

- Teacher reads out the procedure written on check list and the learners follow,
- Teacher tells the voluntary to read steps while teacher is demonstrating the step by step,
- Teacher repeats the demonstration without reading while the learners are observing;
- Teacher invites the voluntary to demonstrate while the learners are observing and noting some errors.

In addition, teacher or school administrator prepare before clinical practicum before at least one month inform the clinical setting authorities, and avail all requirements concerning clinical practicum such as clinical learning objectives, clinical log book, and clinical rotation plan, etc.

The learners should be guided and mentored before going in respective clinical placement.

Research works

Each student or group of students is given a research topic.

They have to gather information from internet, available books in the library or ask experienced people and then they present the results in verbal or written form and discussed in class.

a) Project work

Medical pathology teachers are encouraged to provide a sample, and prepare the project works and engage their learners in, as many as possible. Learner-teachers in groups or individually, are engaged in medical-nursing round for getting medical terminology and medical pathology concepts, diseases, medication, material and acquiring the different approaches used in health assessment of patients with different pathologies. The learner is requested to compile the report daily, which will be included in final clinical report.

b) Field trip

One of the main aims of teaching Medical pathology in Rwanda is to apply its knowledge and skills for development. To achieve this aim we need to show to students the relationship between classroom teaching and clinical skills. This helps them see the link between medical pathology theory and patients 'diseases management in clinical practicum.

To be successful, the field visit should be well prepared and well exploited after the visit.

Before the visit, the clinical instructor and student-teachers:

- agree on aims and objectives
- gather relevant information prior to visit
- brainstorm on key questions and share responsibilities
- discuss materials needed and area of clinical setting to be visited.
- discuss and agree on accepted behaviors during the visit
- Visit the area before the trip if possible to familiarize yourself with the place

After the visit

When students and teachers come back from trip, the clinical instructor should plan for follow up. The follow-up should allow student and teachers to share experiences and relate them to the prior science knowledge. This can be done in several ways; either: Students write a report individually or in groups and give to the tutor for marking. The tutor then arranges for discussion to explain possible misconceptions and fill gaps. On the other hand, students write reports in groups and display them on the class notice board for everyone to read.

Main steps for a lesson in active learning approach

All the principles and characteristics of the active learning process highlighted above are reflected in steps of a lesson as displayed below. Generally, the lesson is divided into three main parts whereby each one is divided into smaller steps to make sure that student and teachers are involved in the learning process.

Below are those main parts and their small steps:

1) Introduction

Introduction is a part where the tutor makes connection between the current and previous lesson through appropriate technique. The tutor opens short discussions to encourage students to think about the previous learning experience and connect it with the current instructional objective. The tutor reviews the prior knowledge, skills and attitudes, which have a link with the new concepts to create good foundation and logical sequencings.

2) Development of the new lesson

The development of a lesson that introduces a new concept will go through the following small steps: discovery activities, presentation of student-teachers' findings, exploitation, synthesis/summary and exercises/application activities, explained below:

Discovery activity

Step 1

- The tutor discusses convincingly with student-teachers to take responsibility of their learning
- He/she distributes the task/activity and gives instructions related to the tasks (working in groups, pairs, or individual to instigate collaborative learning, to discover knowledge to be learned)

Step 2

- The tutor let the student-teachers work collaboratively on the task.
- During this period the tutor refrains to intervene directly on the knowledge
- He/she then monitors how the student-teachers are progressing towards the knowledge to be learned and boost those who are still behind (but without communicating to them the knowledge).

Presentation of students' productions

- In this episode, the tutor invites representatives of groups to present the student-teachers' productions/findings.
- After three/four or an acceptable number of presentations, the tutor decides to engage the class into exploitation of the student-teachers' productions.

Exploitation of students' productions

- The teacher asks the students to evaluate the productions: which ones are correct, incomplete or false
- Then the tutor judges the logic of the student-teachers' products, corrects those which are false, completes those which are incomplete, and confirms those which are correct.

Institutionalization (summary/conclusion/ and examples)

- The teacher summarizes the learned knowledge and gives examples which illustrate the learned content.

Exercises/Application activities

- Exercises of applying processes and products/objects related to learned unit/sub-unit
- Exercises in real life contexts
- Tutor guides students to make the connection of what they learnt to real life situations. At this level, the role of tutor is to monitor the fixation of process and product/object being learned.

3) Assessment

In this step the teacher asks some questions to assess achievement of instructional objective. During assessment activity, students work individually on the task/activity. The tutor avoids intervening directly. In fact, results from this assessment inform the tutor on next steps for the whole class and individuals. In some cases, the tutor can end with a homework assignment.

PART II. SAMPLE LESSON PLAN

Subject: MEDICAL PATHOLOGIES OF CARDIOVASCULAR SYSTEM

School Name:

Teacher's name:

Term	Date	Subject	Class	Unit N°	Lesson N°	Duration	Class size
I	17th September 2021	HYPOTENSION	S5BCN	2	1 of 3	40 minutes	30
Type of Special Educational Needs to be catered for in this lesson and number of learners in each category				Involve all students in all activities without any discrimination. E.g: Allow a student with physical disability (using wheel chair) to take notes or lead the team during the group discussion.			
Unit title		Medical pathologies of cardiovascular system					
Key Unit Competence		Take appropriate decision on different common medical pathologies of cardiovascular system					
Title of the lesson		Hypotension: Introduction to cardiovascular pathologies, Description of Hypotension, and its Investigations					
Instructional Objectives		The student will be able to identify correctly the main causes, risks factors, signs and symptoms and the investigations requested for hypotension during the assessment.					
Plan for this Class (location: in / outside)		Inside the classroom					
Learning Materials (For all learners)		The teacher could avail the Blood pressure machine and medical stethoscope to measure the blood pressure of a patient. In addition, the teacher should present to the students the library textbooks on medical-surgical nursing, especially cardiovascular diseases and indicates the pages.					

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Timing for each step	Description of teaching and learning activity		Generic competences and Cross cutting issues to be addressed + a short explanation
	Teacher activities	Learner activities	
Introduction 5 min	The teacher will introduce the cardiovascular pathologies by inviting students to observe the picture on introductory activity 2.0 and ask them to answer the questions related: 1. system you learnt, what do you think may happen to the human being if the required cardiac output for better function of entire parts of the body is not met? 2. What might be your interventions towards a patient with abnormal (low and high) cardiac output?	Give answers to the questions from Introductory activity Listening how teacher orient their answers to the appropriate answers.	Competences: Critical thinking in solving the medical condition Decision making in management of cardiovascular diseases Communication Problem solving Manipulation
Development of the lesson 25 minutes a) Discovering Activity (5 minutes)	• Give time to students for reading individually the case study from learning activity 2.1 and prepare them to be able to answer the questions.	Students carefully read the case study from learning activity 2.1 in student book. Students participate through brainstorming in answering the questions:	Competences: Critical thinking Decision making Lifelong learning

	• Monitor progress and be ready for clarifications when needed	1. Which are the abnormal symptoms and signs that the patient was presenting? 2. From the case scenario, identify different investigations that have been requested and their results? 3. Basing on those signs and symptoms, what could be the medical problem of this patient?	
b) Exploitation of students' answers (10 minutes)	• Judge the logic of the answers provided by students and corrects those, which are false. • Complete those, which are incomplete and confirm those, which are correct.	• Carefully listen the answers provided by other students. • Give comments on answers given by other students. • Follow the corrections of the teacher • Take notes of correct answers • Ask questions whenever there is need for clarification.	Critical thinking Lifelong learning

Synthesis (10 minutes)	- Summarize the main causes, risk factors and pathophysiology of hypotension. - Remind the important signs and symptoms of Hypotension, and the investigations required in the management of patient with hypotension. - Give more clarification on the learnt content.	- Participate actively in summarizing the content covered. - Produce summary/short notes	Writing skills Listening skills Decision making Critical thinking Lifelong learning
Conclusion and Assessment 10 min	- Conclude the lesson by asking some questions related to content covered - Engage students to work individually on questions of self-assessment 2.1 in student's book. - Select randomly two students to answer.	- Answer individually the questions as indicated in student's book, self-assessment 2.1. - Make conclusion through reviewing by flashback, or reviewing the content covered.	Decision making Critical thinking Long life learning
Teacher self-evaluation	Write down the challenges encountered during the lesson.		

PART III. UNIT DEVELOPMENT

1.1. Key unit competence

Demonstrate understanding of the appropriate management of different common Medical Pathologies of respiratory system

1.2. Prerequisite (Knowledge, skills, attitude and values)

To achieve the above competence, the associate nurse student needs to have learnt the following subjects:

- **Human body anatomy and physiology:** Respiratory tract structure
- **Fundamental of Nursing:** Vital signs and parameters measurements and interpretation, Drugs administration, History taking, Complete health assessment from head to toes through interview and Physical assessment regarding respiratory system.
- **Ethics and professional code of conduct:** Respect of principles of ethics during management of a patient with respiratory diseases. The Associate Nurse student should demonstrate good behaviors while interacting with the patient.
- **Pharmacology:** drugs acting on respiratory system (antibiotics, analgesics, anti-inflammatory) and their mode of administration.

1.3. Cross-cutting issues to be addressed

Standardization culture

All health care facilities must use same standard and accurate equipment and techniques in the management of the medical conditions. During the field trips, the teacher should ensure the availability of standard medical equipment and technics before selecting the health care facility to use. The learners have to learn the use of those standards equipment and technics in the management of patients with respiratory diseases.

Inclusive education

All students should participate in all activities without discrimination of a student with any disability. This may be challenging to students with special educational needs especially those with disabilities, slow learners, those with low self-esteem, etc. However, the teacher can make some arrangements like:

- **Grouping students:** Students with special educational needs are grouped with others and assigned roles basing on individual student's abilities.

Providing procedure/checklists or protocols earlier before the practical work so that students get familiar with them. They can be written on the chalkboard or printed depending on available resources. If you have students with low vision remember to print in appropriate fonts. Also you are supposed to pay attention to all categories of learners.

- Every important point is written and spoken. The written points help students with hearing impairment and speaking aloud helps students with visual impairment.
- Remember to repeat the main points of the lessons.

Gender education

Emphasize to learners that anybody irrespective of their gender can be a health care professional. The teacher must present some role models of people who have been successful in medical and nursing professions in the area where the learners come from. Make sure that during practical work both boys and girls share and participate equally in practices, arranging and proper hygiene after procedures.

1.4 Guidance on the introductory activity

During this introductory activity 1.1, remember that respiratory tract structure learnt in the unit of biology guides the learners on this activity, and they go back to read and review the anatomy and physiology of respiratory system, health assessment of respiratory system.

Teacher's activity

- Using brainstorming every learner is given opportunity to answer the questions
- Teacher writes on whiteboard the correct answers from the learners.

The expected answers to introductory activity 1.0

1. On the diagram, **the left lung is abnormal**, and **the right lung is normal**.
2. From the **abnormal lung**, the features that I observed are:
 - The muscle tightens
 - The swollen lining
 - The excess mucus
3. The possible diseases that can affect the lungs are the following:
 - Bronchitis
 - Lung abscess
 - COPDs (chronic obstructive pulmonary diseases)
 - Asthma
 - Pneumonia, and Tuberculosis

1.5 List of lessons/sub-heading (including assessment)

#	Lessons	Learning objectives	Number of periods
1	Enumeration of common medical pathologies of respiratory system Description of Asthma (definition, causes, pathophysiology, clinical manifestation and investigations of asthma)	- List the common medical pathologies of respiratory system. - Define the key concepts of asthma disease - List the common causes and pathophysiology of asthma - List the different signs and symptoms of asthma - Describe medical investigation of asthma	2
2	Description of asthma (diagnosis of asthma, treatment plan of patient with asthma, evolution and complications of asthma)	- Describe how to diagnose the asthma disease - Explain medical and nursing management of patient with asthma. - Predict the evolution and complications of asthma.	1
3	Self-assessment	- Identify the performance of learner. Identify the learners 'gaps during teaching - Give the relevant feedback to the learner. Elaborate the remedial teaching session	1
4	Description of Pneumonia (definition of pneumonia, causes, pathophysiology, clinical manifestations, medical investigation of pneumonia)	- Define the key concepts of pneumonia disease - List the common causes and pathophysiology of pneumonia - List the different signs and symptoms of pneumonia - Describe medical investigation of pneumonia	1

5	Description of Pneumonia (adequate medical diagnosis, treatment plan, evolution and complications of pneumonia)	• Describe how to diagnose the pneumonia disease • Explain medical and nursing management of patient with pneumonia • Predict the evolution and complications of pneumonia	1
6	Self-assessment	• Identify the performance of the learner. Identify the learners' gaps during teaching • Give the relevant feedback to the learner. Elaborate the remedial teaching session	1
7	Description of bronchiolitis (Definition of bronchiolitis, causes of bronchiolitis, Pathophysiology overview of bronchiolitis, Signs and symptoms of bronchiolitis, and Investigations of bronchiolitis)	• Define the key concepts bronchiolitis List the common causes and pathophysiology of bronchiolitis • List the different signs and symptoms of bronchiolitis • Describe medical investigation of bronchiolitis	1
8	Description of bronchiolitis (adequate medical diagnosis, treatment plan, evolution and complications of bronchiolitis)	• Describe how to diagnose the bronchiolitis • Explain medical and nursing management of patient with bronchiolitis • Predict the evolution and complications of bronchiolitis	1
9	Skills lab (check if the students know the sites of lungs auscultation and the results).	• Physical examination of respiratory system (mainly lung auscultation)	1

10	End unit assessment	• Demonstrate understanding of the appropriate management of different common Medical Pathologies of respiratory system • Identify the strengths and gaps of learners on appropriate decisions in the management of common pathologies of respiratory system. • Prepare the feedback to students • Organize different additional learning activities.	1
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Lesson 1: Description of asthma

This is the first lesson in unit 1 of medical pathologies of respiratory system. The teacher will introduce the common medical pathologies of respiratory system that are asthma, pneumonia and bronchiolitis. In addition, the lesson deals with definition of asthma, causes, pathophysiology, clinical manifestation, and medical investigation of asthma.

a) Learning objectives

On completion of this lesson, the learner will be able to:

- Define the key concepts of asthma disease
- List the common causes and pathophysiology of asthma
- List the different signs and symptoms of asthma
- Describe medical investigation of asthma

b) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), and didactic materials(stethoscope, mannequin),teaching methods (lecture, brainstorming, course work, small group discussion). In addition the teacher guide the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

c) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities that will be carried out such are taking notes, course work, and read textbook related to the lesson, group assignment, listen the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to brainstorm about the management and complications of asthma.
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study and answer the indicated
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Learning activity 1.1

Answer to activity 1.1

1. The abnormal signs and symptoms that patient presenting were:

- shortness of breathing
- wheezing,
- mucus secretions,
- cough,
- chest tightness and chest pain,

2. Basing on those signs and symptoms, the medical problem of this patient is:

- The patient is suffering from “asthma”

3. The investigations to be ordered to guide the confirmation of the medical problem are:

- Interview and physical examination: the history taking revealed that her mother died due to asthma,
- Spirometry was performed revealing a forced expiratory volume in the first second (FEV1) of 78% predicted,
- Chest X-ray: Within normal limits,
- Complete blood count (CBC): Within normal limits, white blood cells (WBC) 10.0 K/mcL, 3% eosinophils, etc
- Immunoglobulin (IgE): 25 IU/ML, Allergy-skin test: Positive for dust, trees.

Lesson 2: Description of asthma (diagnosis of asthma, treatment plan of patient with asthma, evolution and complications of asthma)

This is the second lesson in unit 1 of medical pathologies of respiratory system, lesson deals with adequate medical diagnosis, treatment plan for asthma, nursing management of patient with asthma, evolution and complications of asthma

a) Learning objectives

One completion this lesson, the learner will be able to

- Describe how to diagnose the asthma disease
- Explain medical and nursing management of patient with asthma.
- Predict the evolution and complications of asthma.

b) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives. These aids and teaching methods are teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook), didactic materials (stethoscope, mannequin), teaching methods (Lecture, Brainstorming, course work) in addition the teacher guide the learners where they can find the supporting resources such computer lab, nursing skills lab, and Library.

c) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in, practice, and gain feedback on specific progress towards those objectives. The various learning activities, which will be carried out such as taking notes, course work, and read

textbook related to the lesson, group assignment, listen and watch the video and summarize the content. In addition, the learners will be engaged in debate and other clinical learning activities, field trip (visit to a place outside the classroom, those are designed to achieve certain objectives that cannot be achieved by using class or school resource).

Teacher's activity

- Ask learners to brainstorm about the management and complications of asthma.
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study and answer the indicated
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Possible answers to questions from learning activity 1.1

4. The following interventions are included in the treatment plan of the case:

- Position (sit upright/leaning forward)
- Give salbutamol using a Spacer
- If he has productive cough, give ATB
- Give dose of prednisolone 2mg/kg
- Refer urgently to District hospital

These are the most common long-term control medications for asthma.

These **anti-inflammatory** drugs include:

- **fluticasone** (Flovent HFA),

- **budesonide** (Pulmicort Flexhaler),
- **beclomethasone** (Qvar RediHaler),
- **ciclesonide** (Alvesco, Omnaris) and **mometasone** (Asmanex HFA). etc

Nursing management of patient with asthma

- Monitor vital signs (To, RR, Pulse, BP, SpO2)
- Conduct basic health assessment
- Decision making (identify disturbed patient needs)
- Ensure the client safety and quality patient care
- Collaborate with health care team (Registered Nurse (RN), Physician)
- Implement medical prescription and nursing care plan
- Keep confidentiality of patient
- Demonstrate ethical and moral values principles while nursing care delivery
- Demonstrate effective communication skills with patient, family members.

5. The complications of asthma:

- Insomnia,
- Rapid heartbeat,
- throat Irritation,
- Depression,
- Pneumonia,
- Hospitalisation

Possible Answers of Self-assessment 1.1

- 1. The possible medical diagnosis is asthma.**
- 2. The triggering factors contributing to the asthma development are:**
 - Upper respiratory tract infections (especially)
 - Shortage of asthma
 - Exposure to triggers (cold, dust, smoke, etc)
 - Stress
- 3. The drugs that are administered for asthma are:**
 - These **anti-inflammatory** drugs like **Inhaled steroid medications include:** Beclomethasone dipropionate (Qvar), Budesonide (Pulmicort), Budesonide/Formoterol (Symbicort) - a combination drug that includes a steroid and a long-acting bronchodilator drug, Fluticasone (Flovent), Fluticasone inh powder (Arnuity Ellipta).

- **Bronchodilators:**

- **Short-acting beta 2-agonists (also called SABAs):** Albuterol (Proventil® HFA, Ventolin® HFA, ProAir®HFA, Accuneb®), Levalbuterol (Xoponex® HFA, Xoponex® nebulizer solution), Albuterol and ipratropium bromide combination (DuoNeb® solution, Combivent Respimat®), Ventolin.
- **Long-acting beta-2 agonists (also called LABAs):** Salmeterol (Serevent®), Formoterol (Foradil®), Combination medications: salmeterol and fluticasone (Advair®); formoterol and budesonide (Symbicort®); formoterol and mometasone (Dulera®); vilanterol and fluticasone (Breo®); salmeterol and fluticasone (Wixela Inhub ®); and salmeterol and fluticasone (Airduo ®), theophiline.
- **Anticholinergic drugs:** There are two anticholinergic bronchodilators currently available ipratropium bromide (Atrovent® HFA), which is available as a metered dose inhaler and nebulizer solution, and tiotropium bromide (Spiriva®).

4. Treatment plan of that patient:

- Position (sit upright/leaning forward)
- Give salbutamol using a Spicer
- If he has productive cough, given antibiotics (**doxycycline, amoxicillin, amoxicillin-clavulanic acid**)
- Give dose of prednisolone 2mg/kg
- Refer urgently to District hospital

5. Possible complications are:

- Severe asthma can disrupt daily life
- Sleeping disturbance
- Patient may be hospitalized
- Chronic airway inflammation
- Respiratory failure
- Death

Lesson 3: Description of Pneumonia

This is the second sub unit of medical pathologies of respiratory system, lesson deals with definition of pneumonia, causes, pathophysiology, clinical manifestation, and medical investigation of pneumonia.

a) Learning objectives

One completion this lesson, the learner will be able to

- Define the key concepts of pneumonia disease.
- List the common causes and pathophysiology of pneumonia
- List the different signs and symptoms of pneumonia
- Describe medical investigation of pneumonia

b) Teaching resources

This lesson will be taught with different aids, and methods in order to achieve learning objectives, these aids and teaching methods are teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook), and didactic materials (stethoscope, mannequin), teaching methods (Lecture, Brainstorming, course work.) In addition the teacher guide the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

c) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in, practice, and gain feedback on specific progress towards those objectives. The various learning activities that will be carried out such as taking notes, course work, and read textbook related to the lesson, group assignment, listen the video and summarize the content, engagement in debate and other clinical learning activities, case study.

Teacher's activity

- Ask learners to read individually the learning activity 1.2 and answer the questions 1, 2, and 3.
- Supervise the work and facilitates them to answer the questions by using the case study.
- Ask learners to present what they have done by brainstorming
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Student will read carefully in their appropriate places using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting

- Take notes from the correct answers
- Make conclusion from what they have learnt.

Possible answers to questions from learning activity 1.2

1. The **signs and symptoms that the patient** was presenting are:
 - General symptoms: transpiration, chills, coughing, productive cough like bloody muco-purulent discharge, difficulty in breathing associated with chest pain.
 - Vital signs: respiratory rate: 36 cycles/min, Temperature: 39 Celsius degrees, pulse rate: 98 beats/min.
 - CBC (complete blood account) with white blood cells of 14000/microliter (Normal 4000-11000/microliter).
 - Chest x-ray revealed infiltrations
 - Oxygen saturation (SPO2 of 86% on room air.
2. The **medical problem** of this patient is **Pneumonia**.
3. The **investigations** that have been ordered to guide the confirmation of that medical problem are the following:
 - CBC (complete blood account)
 - Chest x-ray
 - Blood smear

Lesson 4: Description of Pneumonia (Diagnosis, treatment plan of pneumonia, evolution and complications)

This is still second sub unit of medical pathologies of respiratory system, lesson deals with adequate medical diagnosis, treatment plan for asthma, nursing management of patient with pneumonia, evolution and complications of pneumonia.

a) Learning objectives

One completion this lesson, the learner will be able to

- Describe how to diagnose the pneumonia disease
- Explain medical and nursing management of patient with pneumonia.
- Predict the evolution and complications of pneumonia.

b) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook), didactic materials (stethoscope, mannequin), teaching methods (Lecture, Brainstorming, course

work) in addition the teacher guide the learners where they can find the supporting resources such computer lab, nursing skills lab, and Library.

c) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in, practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listen and watch the video and summarize the content, engagement in debate and other clinical learning activities, field trip (visit to a place outside the classroom which is designed to achieve certain objectives, which cannot be achieved by using class or school resource)

Teacher's activity

- Ask learners to read individually the learning activity 1.2 and answer the questions 4 and 5.
- Supervise the work and facilitates them to answer the questions by using the case study.
- Ask learners to present what they have done by brainstorming
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Student will read carefully in their appropriate places using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Possible answers to questions from learning activity 1.2

4. Treatment plan for pneumonia

Medical management

The treatment plan of pneumonia depends on the causative agents.

The following are different treatment options:

- Antibiotics in case of bacterial pneumonia such as a macrolide (Clarithromycin/ Erythromycin) or Doxycycline.
- In case of comorbidities or antibiotics in past 3 months: High dose Amoxicilline or Ceftriaxone plus Macrolide/ doxycycline
- In case of hospitalization: Cefotaxime or Ceftriaxone or Ampicillin plus a macrolide/ doxycycline
- Adequate hydration to thin secretions
- Supplemental oxygen to alleviate hypoxemia
- Good pulmonary hygiene (deep breathing, coughing)
- Supportive therapy in case of viral pneumonia
- Bronchodilators, analgesics, antipyretics, cough expectorants or suppressants, chest physiotherapy and postural drainage may be used depending on the nature of the client's cough.

Nursing management

The nursing management of pneumonia depends on the status of the patient upon admission.

The following are different nursing interventions:

- Auscultate lung sounds and monitor the client for signs of respiratory difficulty.
- Check oxygenation status with pulse oximeter, and give appropriate oxygen therapy if necessary.
- Monitor the client's vital signs
- Assessments of cough and sputum production.
- Put the client in the semi-Fowler's position to aid breathing and increase the amount of air taken with each breath.
- Ensure increased fluid intake because it helps to loosen secretions and replace fluids lost through fever and increased respiratory rate.
- Monitor fluid intake and output, skin turgor, vital signs, and serum electrolytes.
- Administer medications as indicated and ordered
- Help cough up secretions
- Suction mucus.
- Take samples for lab investigation
- Observation of the level of consciousness,

5. The consequences if the medical condition is not treated:
- Pleural effusion
 - Lung abscess
 - Respiratory failure

Possible Answers of Self-assessment 1.2

1. Different causes of pneumonia:

- Bacterial causes
- Virus causes
- Parasite causes

2. Overview pathophysiology of pneumonia:

These mechanisms include the release of multiple chemical mediators of inflammation, infiltration of white blood cells, and activation of the immune response. Tight adherence of some bacteria (e.g., *Pseudomonas*) to the tracheal lining and biofilm of an endotracheal tube makes clearance of these microbes from the airways difficult and accounts, in part, for their highly virulent nature. In non-hospitalized people, bacteria reach the lung by one of four routes.

3. The signs and symptoms of pneumonia:

- Fever
- Chills
- Productive (mucoid, purulent, or blood- stained sputum) or dry cough
- Malaise, headache, myalgia and arthralgia
- Pleural pain
- Dyspnea and hemoptysis (sometimes)
- 20% of patients may have gastrointestinal symptoms such as nausea, vomiting, and/or diarrhea.
- Physical examination: Dullness to percussion, crackles, egophony
- Individuals also may demonstrate signs and symptoms of underlying systemic disease or sepsis. Fever
- Chest pain
- Tachypnea
- Crackles
- Decreased level of consciousness

4. Some investigations that should be done to patient with pneumonia:

- Laboratory,
- Full blood account (FBC);
- Imageries:
- Chest x-ray

5. Treatment plan for pneumonia:

Medical management

- The treatment plan of pneumonia depends on the causative agents.
- The following are different treatment options:
- Antibiotics in case of bacterial pneumonia such as a macrolide (Clarithromycin/ Erythromycin) or Doxycycline.
- In case of comorbidities or antibiotics in past 3 months: High dose Amoxicilline or Ceftriaxone plus Macrolide/ doxycycline
- In case of hospitalization: Cefotaxime or Ceftriaxone or Ampicillin plus a macrolide/ doxycycline
- Adequate hydration to thin secretions
- Supplemental oxygen to alleviate hypoxemia
- Good pulmonary hygiene (deep breathing, coughing)
- Supportive therapy in case of viral pneumonia
- Bronchodilators, analgesics, antipyretics, cough expectorants or suppressants, chest physiotherapy and postural drainage may be used depending on the nature of the client's cough.

Nursing management

The nursing management of pneumonia depends on the status of the patient upon admission.

The following are different nursing interventions:

- Auscultate lung sounds and monitor the client for signs of respiratory difficulty.
- Check oxygenation status with pulse oximeter, and give appropriate oxygen therapy if necessary.
- Monitor the client's vital signs
- Assessments of cough and sputum production.
- Put the client in the semi-Fowler's position to aid breathing and increase the amount of air taken with each breath.

- Ensure increased fluid intake because it helps to loosen secretions and replace fluids lost through fever and increased respiratory rate.
- Monitor fluid intake and output, skin turgor, vital signs, and serum electrolytes.
- Administer medications as indicated and ordered
- Help cough up secretions
- Suction mucus.
- Take samples for lab investigation
- Observation of the level of consciousness

6. The complications of pneumonia:

- Pleural effusion
- Lung abscess
- Respiratory failure

Lesson 5: Description of bronchiolitis (Definition, causes, pathophysiology and investigations needed for bronchiolitis)

This is the third sub unit of medical pathologies of respiratory system, lesson deals with definition of bronchiolitis, causes, pathophysiology, clinical manifestation, and medical investigation of bronchiolitis.

a) Learning objectives

On completion of this lesson, the learner will be able to

- Define the key concepts of bronchiolitis disease
- List the common causes and pathophysiology of bronchiolitis.
- List the different signs and symptoms of bronchiolitis.
- Describe the medical investigations of bronchiolitis.

b) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook), didactic materials (stethoscope, mannequin), teaching methods (lecture, brainstorming, course work) in addition, the teacher guide the learners where they can find the supporting resources such as computer lab, Nursing skills lab, and Library.

c) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in, practice,

and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listen the video and summarize the content, engagement in debate and other clinical learning activities, case study.

Teacher's activity

- Ask learners to read individually the learning activity 1.3 and answer the questions 1, 2 and 3.
- Supervise the work and facilitates them to answer the questions by using the case study.
- Ask learners to present what they have done by brainstorming
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Student will read carefully in their appropriate places using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Possible answers to questions from learning activity 1.3

1. The abnormal clinical manifestations that you can identify from above scenario:
 - History of cough, rhinorrhea, nasal congestion, and fevers.
 - He was breathing faster and taking in less formula than normal.
 - His temperature is 102.5°f (39.0 c),
 - His heart rate is 140beats per minute,
 - His respiratory rate is 60 breaths per minute,
 - And blood pressure is 90/50mmhg.
 - His oxygen saturation is 95%.
 - He appears alert and smiling but is tachypneic and coughing.
 - He has subcostal and intercostal retractions.

- On auscultation of his lungs, wheezing is heard on both inspiration and expiration.
- 2. The medical condition that the boy is presenting is **Bronchiolitis**
- 3. The causes and risk factors contributing to the development of the identified medical condition:
 - A viral infection (different viruses: the flu, respiratory syncytial virus)
 - His 4-year-old sister has a cold

Lesson 6: Description of bronchiolitis (diagnosis, treatment plan, evolution and complications of bronchiolitis)

This is still third sub unit of medical pathologies of respiratory system, lesson deals with adequate medical diagnosis, treatment plan for bronchiolitis, nursing management of patient with bronchiolitis, evolution and complications of bronchiolitis.

a) Learning objectives

One completion this lesson, the learner will be able to

- Describe how to diagnose the pneumonia disease
- Explain medical and nursing management of patient with pneumonia.
- Predict the evolution and complications of pneumonia.

b) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook), didactic materials (stethoscope, mannequin), teaching methods (Lecture, Brainstorming, course work) in addition the teacher guide the learners where they can find the supporting resources such computer lab, nursing skills lab, and Library.

c) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in, practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listen and watch the video and summarize the content, engagement in debate. Other learning activities include clinical learning activities, field trip (visit to a place outside the classroom which is designed to achieve certain objectives, which cannot be achieved by using class or school resource).

Teacher's activity

- Ask learners to read individually the learning activity 1.3 and answer the questions.
- Supervise the work and facilitates them to answer the questions by using the case study.
- Ask learners to present what they have done by brainstorming
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Student will read carefully in their appropriate places using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Possible answers to questions from learning activity 1.3

4. The **treatment modalities** of the above medical condition are the following

At home: Keep the child upright. Keeping the child upright may make it easier for them to breathe, which may help when they're trying to feed, make sure the child drinks plenty of fluids, do not smoke at home, Relieving a fever, Saline nasal drops.

At hospital: Provide oxygen if saturations are low, assist with oral hydration, listen to the lungs, Monitor oxygenation, assess vitals and administer the antipyretics, Intake, and output, IV (intravenous) fluids if your child can't drink well, Extra oxygen and a breathing machine (ventilator) to help with breathing, Frequent suctioning of the child's nose and mouth if respiratory tract secretions, breathing treatments, as ordered by your child's healthcare provider.

5. Advise about hand hygiene, respect the prescribed treatment regimen, whenever there are danger signs to go to seek for medical help.

Possible Answers to Questions from self-assessment 1.3

1. **Signs and symptoms:** cough, running nose, fever, unable to feed, fever of 39, bilateral wheezing and crackles, nasal flaring.

2. The medical diagnosis is **Bronchiolitis**
3. Description of **the pathogenesis of Bronchiolitis** is the follow:

The pathogenesis of bronchiolitis involves a combination of airway oedema, increased mucus production, and necrosis of airway epithelial cells due to direct cytotoxic injury. Respiratory syncytial virus transmission occurs from person to person either by direct inoculation of nasal mucosa with contaminated secretions or by inhalation of large infectious droplets. Virus replicates in the nasal epithelium, and an exaggerated immune response occurs, with an influx of natural killer cells, lymphocytes, and granulocytes into the epithelium. After an incubation period of 4 to 6 days from transmission, upper respiratory tract symptoms appear, including nasal congestion and rhinorrhoea.

4. The most common causes of J.N medical condition are different viruses such as flu and respiratory syncytial virus
5. The investigations that may be ordered to J.N are: Laboratory (Full blood count (FBC) chain reactive protein (CRP), erythrocyte sedimentation rate), Chest Radiograph, Nasal Specimen/swabs.
6. The treatment plan for JN: Bronchodilators, Anticholinergic agents, Corticosteroids, Ribavirin, Antibiotics, Surfactant.
7. The **most** complications that may occur to J.N if it's poorly managed are the following: Cyanosis (a blue tinge to the skin caused by a lack of oxygen), Dehydration (when the normal water content of the body is reduced), Fatigue (extreme tiredness and a lack of energy), Severe respiratory failure (an inability to breathe unaided).

1.6 Summary of the Unit 1

Medical pathologies of respiratory system consist of a set of disorders that affect the anatomical structure of this system includes upper and lower respiratory system disorders, in this unit we have talked about asthma, pneumonia and bronchiolitis. Asthma is a medical condition characterized by airflow obstruction (narrowing), narrowing of the airways is usually reversible, but in some patients with chronic asthma there may be an element of irreversible airflow obstruction.

Pneumonia is an acute infection of the pulmonary parenchyma caused by different microbial agent species; it may be classified into Community- acquired pneumonia, immunocompromised individuals.

Bronchiolitis which is a common lower respiratory tract infection that affects babies and young children. The early symptoms are similar to those of a common cold, such as runny nose or cough.

1.7 Additional information

There are many pathologies of respiratory system including:

1. **Acute bronchiolitis** which is the infection and inflammation of the bronchi. It is a common disease that can occur at any time of the year, but most cases happen in the winter months. It is most common in infants and young children and the elderly.
2. **Chronic obstructive pulmonary disease (copd)** which is a condition characterized by the presence of airflow obstruction. Generally progressive it is caused by emphysema or chronic bronchitis. It may be accompanied by airway hyperactivity and may be partially reversible.
3. **Emphysema** which is an abnormal permanent enlargement of the air space distal to the terminal bronchioles, accompanied by destruction of bronchioles.
4. **Pulmonary embolism** which is an occlusion of a portion of the pulmonary vascular bed by an embolus, which can be a thrombus (blood clot), tissue fragment, lipids(fat), or an air bulble. The most common emboli are thrombi dislodged from deep veins in the thigh. They can also originate in the pelvis, particularly in pregnant women.
5. **Pleurisy** which is called also pleuritic, it is an inflammation of the pleura, which become redden and covered by an exudates of lymph, fibrin, and cellular elements.
6. **Pleural effusion**, it is the presence of fluid in the pleural space. It is an abnormal collection of fluid in the pleural space resulting from excess fluid production or decreased absorption.

1.8 Additional activities

A. Remedial activities

1. What do you understand by the term community acquired bronchiolitis?
2. Describe the role immunodepression in the development of pneumonia
3. Explain why heredity is an important risk factor in the asthma disease development.
4. Explain why unconsciousness is a risk factor of pneumonia disease occurrence

Answers for remedial activities

1. Community acquired pneumonia is a medical pathology of respiratory system that consists of a type of caused by pneumococcal pneumonia, mycoplasma pneumonia, haemophilus influenza etc

2. In immunocompromised people, pneumonia is caused by saprophyte micro-organisms that are not causing disease in immunocompetent people such as (*Pneumocystis carinii*, *Mycobacterium tuberculosis*, fungi etc)
3. Heredity is an important risk factor in the asthma disease because of it is a high risk factor of contracting asthma disease development
4. Unconsciousness status is a risk factor of pneumonia disease occurrence because of the increase rate of risk for aspiration.

B. Consolidations activities

Read the following case stud and circle the correct answer

T.K, a 20-year-old college student, lives in a small dormitory with 30 other students. Four weeks into the spring semester, she was diagnosed as having bacterial pneumonia and was admitted to the hospital.

1. The nurse is informed T.K has the strain of bacteria most frequently found in community-acquired pneumonia. The nurse suspects that the infecting agent is:
 - a. *Haemophilus influenza*.
 - b. *Klebsiella*.
 - c. *Pseudomonas aeruginosa*.
 - d. *Streptococcus pneumoniae*.
2. All of the following are manifestations of bacterial pneumonia except:
 - a. Fever
 - b. Bradycardia.
 - c. Pleuritic chest pain.
 - d. Tachypnea.
3. The nurse expects that T.K will be medicated with the usual antibiotic of choice, which is:
 - a. Cephalosporin.
 - b. Clindamycin.
 - c. Erythromycin.
 - d. Penicillin G.
4. Briefly explain the pathophysiology of asthma

Answers for consolidations activities

1.d

2. b

3. d

4. The inflammation of bronchi by allergens, results in airway hyperresponsiveness with releasing of inflammatory mediators such as histamine, interleukins, immunoglobulin IgE, leukotrienes, prostaglandins. The vasoactive effects of those mediators cause vasodilatation and increase capillary permeability, resulting in infiltration of neutrophils and eosinophils.

C. Extended activities

1. State differential diagnosis of asthma disease
2. What are differential diagnosis of bronchitis?

Read each statement carefully. Write your response in the space provided.

3. Describe the clinical picture of a patient who has developed an aspiration pneumonia.
4. The diagnosis of hospital-acquired pneumonia is usually associated with the presence of one of three conditions:
.....;
And.....
5. Name three common pathogens that cause aspiration pneumonia:
____;____, and
_____.
6. Pneumonia tends to occur in patients with one or more of these five underlying disorders:
_____, _____, _____
_____, _____, and _____.
7. Three severe complications of pneumonia are: _____,
_____,
and _____.
8. Explain the meaning of the term *superinfection*.

9. List four respiratory system mechanisms that can lead to acute respiratory failure (ARF):
_____, _____,

_____, and

_____.

Answers of extended activities

1. Differential diagnosis for asthma includes:

- Upper airway obstruction by a tumor or laryngeal edema can mimic severe asthma, but patients typically present with stridor.
- End bronchial obstruction with a foreign body: there is persistent wheezing.
- Left ventricular failure: there is wheezing that can mimic asthma, but crackles are present.
- Eosinophilic pneumonias and systemic vasculitis
- Chronic obstructive pulmonary disease (COPD): show less or no reversibility to bronchodilators

2. Differential diagnosis bronchitis are:

- Pneumonia
- Upper respiratory tract infections such as rhinitis
- Influenza or cold flu

3. The clinical picture of aspiration pneumonia is characterized by tachycardia, dyspnoea, central cyanosis, hypertension, hypotension, and ultimately death.

4. Impaired host defenses, an inoculum of organisms that reach the lower respiratory tract, and the presence of a highly virulent organism

5. *Streptococcus pneumoniae*, *Haemophilus Influenzae*, and *Staphylococcus aureus*

6. Alcoholism, COPD, AIDS, diabetes, and heart failure.

7. Hypotension, Shock, and respiratory failure

8. Superinfection is suspected when a subsequent infection occurs with another bacterium during antibiotic therapy.

9. Impaired CNS function, Neuromuscular, Musculoskeletal, and Pulmonary dysfunction.

1.9. Expected answers to the end unit 1 assessment

Section A: Multiple Choice Questions

1. D
2. B
3. B
4. B
5. A
6. D
7. C
8. D
9. B
10. A
11. A
12. B
13. D
14. A
15. B
16. A
17. D
18. TRUE
19. FALSE
20. TRUE
21. TRUE
22. FALSE
23. TRUE

Section B: Essay questions

1. Define asthma and its clinical features.

Definition:

Asthma is a chronic inflammatory disorder of the airway that causes recurrent spasmodic episodes due to increased hyperirritability or responsiveness of the bronchial tree to the various stimuli. It is a deterioration of the baseline asthma control leading to acute wheeze, shortness of breath and dyspnoea. Asthma is usually a reversible obstructive disease of the lower airway.

Clinical features:

The asthma symptoms are associated with shortness of breath, wheezing, mucous secretions, cough, chest tightness, quiet chest and decreased oxygen saturation chest tightness, quiet chest and decreased oxygen saturation.

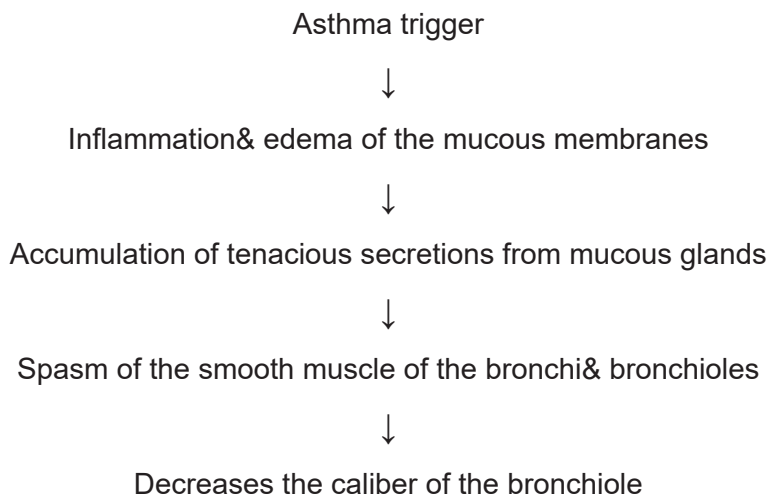
2. How to diagnose pneumonia

The auscultation of the chest reveals wheezing, crackles, and decreased breath sounds. Cyanosis of nail beds, lips, and oral mucosa may be observed during physical examination (inspection).

The most common investigations to be carried out during pneumonia suggests the chest x-ray, the biological laboratory tests needed to be performed such as full blood count (FBC) elevated (more than 10,000/mm³), although it may be below (6000/mm³) if the individual is debilitated, Sputum: Gram-stain and culture, blood culture, Chest X-ray show infiltrates that may involve a single lobe of the lung (**lobal pneumonia**) or may be more diffuse (**bronchopneumonia**)

3. Pathophysiology of asthma.

The primary pathophysiologic process in asthma is persistent but inflammation of the airways which results in bronchoconstriction, airway hyper responsiveness (hyper reactivity) and edema of the airways. The following is brief pathophysiological process of asthma development.



4. What is the treatment plan of patient with bronchiolitis?

Treatment at home:

- Keep the child upright. Keeping the child upright may make it easier for them to breathe, which may help when they're trying to feed.
- Make sure the child drinks plenty of fluids.
- Do not smoke at home.
- Relieving a fever.
- Saline nasal drops.

Symptomatic care:

There is no cure for bronchiolitis, so treatment is aimed at the symptoms (eg, difficulty breathing, fever). Treatment at home usually includes making sure the **child drinks enough and saline nose drops** (with bulb suctioning for infants).

The nurse carries out the following activities at hospital:

- Provide oxygen if saturations are low.
- Assist with oral hydration.
- Listen to the lungs.
- Monitor oxygenation.
- Assess vitals.
- Intake and output.
- IV (intravenous) fluids if your child can't drink well.
- Extra oxygen and a breathing machine (ventilator) to help with breathing.
- Frequent suctioning of the child's nose and mouth if respiratory tract secretions.
- Breathing treatments, as ordered by your child's healthcare provider

5. What is treatment plan of pneumonia?

Medical management

- The treatment plan of pneumonia depends on the causative agents.
- The following are different treatment options:
- Antibiotics in case of bacterial pneumonia such as a macrolide (Clarithromycin/ Erythromycin) or Doxycycline.
- In case of comorbidities or antibiotics in past 3 months: High dose Amoxicilline or Ceftriaxone plus Macrolide/ doxycycline
- In case of hospitalization: Cefotaxime or Ceftriaxone or Ampicillin plus a macrolide/ doxycycline
- Adequate hydration to thin secretions
- Supplemental oxygen to alleviate hypoxemia
- Good pulmonary hygiene (deep breathing, coughing)
- Supportive therapy in case of viral pneumonia
- Bronchodilators, analgesics, antipyretics, cough expectorants or suppressants, chest physiotherapy and postural drainage may be used depending on the nature of the client's cough.

Nursing management

The nursing management of pneumonia depends on the status of the patient upon admission.

The following are different nursing interventions:

- Auscultate lung sounds and monitor the client for signs of respiratory

difficulty.

- Check oxygenation status with pulse oximeter, and give appropriate oxygen therapy if necessary.
- Monitor the client's vital signs
- Assessments of cough and sputum production.
- Put the client in the semi-Fowler's position to aid breathing and increase the amount of air taken with each breath.
- Ensure increased fluid intake because it helps to loosen secretions and replace fluids lost through fever and increased respiratory rate.
- Monitor fluid intake and output, skin turgor, vital signs, and serum electrolytes.
- Administer medications as indicated and ordered
- Help cough up secretions
- Suction mucus.
- Take samples for lab investigation
- Observation of the level of consciousness,

6. Preventive measures for pneumonia

- Stop smoking and reduce alcohol intake
- Adequate nutrition
- Immunization
- Practice good hygiene and sanitation
- Physical exercise
- For hospitalized individuals:
 - Promote coughing and expectoration of secretions if client experiences increased mucus production.
 - Change position frequently if client is immobilized for any reason.
 - Encourage deep-breathing and coughing exercises at least every 2 hours.
 - Perform chest physiotherapy as indicated
 - Suction secretions in case of inability to expectorate.
 - Prevent aspiration in clients at risk.
 - Apply infection control measures
 - Cleanse respiratory equipment on a routine basis.
 - Promote frequent oral hygiene

2.1. Key unit competence

Take appropriate decision on different common medical pathologies of cardiovascular system.

2.2. Prerequisite (knowledge, skills, attitudes, and values)

To achieve the above competence, the associate nurse student needs to have learnt the following subjects:

- **Human body anatomy and physiology:** Anatomy of Heart and vessels, Physiology of blood circulation.
- **Fundamental of Nursing:** Vital signs and parameters measurements and interpretation, Drugs administration, History taking, Complete health assessment from head to toes through interview and Physical assessment regarding cardiovascular system.
- **Ethics and professional code of conduct:** Respect of principles of ethics during management of a patient with cardiovascular diseases. The Associate Nurse student should demonstrate good behaviors while interacting with the patient.
- **Pharmacology:** Drugs acting on cardiovascular system (drugs that increase the cardiac muscle functioning like Intravenous fluids, dopaminergic, etc; those that act on blood vessels. Students should have learnt different classes of antihypertensive drugs, antibiotics and different painkillers.

2.3. Cross-cutting issues to be addressed

Standardization culture

All health care facilities must use same standard and accurate equipment and techniques in the management of the medical conditions. During the field trips, the teacher should ensure the availability of standard medical equipment and technics before selecting the health care facility to use. The learners have to learn the use of those standards equipment and technics in the management of patients with cardiovascular diseases.

Inclusive education

All students should participate in all activities without discrimination of a student with any disability. This may be challenging to students with special educational needs especially those with disabilities, slow learners, those with low self-esteem, etc. However, the teacher can make some arrangements like:

- Grouping students: Students with special educational needs are grouped with others and assigned roles basing on individual student's abilities. Providing procedure/checklists or protocols earlier before the practical work so that students get familiar with them. They can be written on the chalkboard or printed depending on available resources. If you have students with low vision remember to print in appropriate fonts. Also you are supposed to pay attention to all categories of learners.
- Every important point is written and spoken. The written points help students with hearing impairment and speaking aloud helps students with visual impairment.
- Remember to repeat the main points of the lessons.

Gender education

Emphasize to learners that anybody irrespective of their gender can be a health care professional. The teacher must present some role models of people who have been successful in medical and nursing professions in the area where the learners come from. Make sure that during practical work both boys and girls shares and participate equally in practices, arranging and proper hygiene after procedures.

2.4. Guidance on the introductory activity

During this introductory activity 2.0, students should remember the anatomy and physiology of cardiovascular system and blood circulation learnt from Biology. They will be encouraged go back to read and review the health assessment of cardiovascular system.

Teacher's activity

- Using brainstorming every learner is given opportunity to answer the questions
- Teacher writes on whiteboard the correct answers from the learners.

The expected answers to introductory activity 2.0

- 1) The cardiac output may be low or high. Then the medical conditions such as Hypotension and Hypertension can occur.
- 2) To check the blood pressure of the patient, auscultate the heart or refer the patient for better management.
- 3) Different topics through brainstorming could be the diseases that affect the heart and vessels.

2.5. List of Lessons/sub-headings (Including Assessment)

#	Lesson Title	Learning Objectives	Number of Periods
1	Hypotension: Introduction to cardiovascular pathologies, Description of causes, risk factors, pathophysiology, signs and symptoms of Hypotension, and its Investigations.	- List the common medical pathologies of cardiovascular system: Hypotension, Hypertension, Stroke) - Describe causes, risk factors and pathophysiology of Hypotension. - Describe the signs and symptoms of Hypotension - Enumerate the investigations requested for Hypotension.	1
2	Hypotension: Medical diagnosis and Medical and Nursing Management plan of patient with Hypotension	- Identify the adequate medical diagnosis of Hypotension. - Develop a medical and nursing management plan for patient with Hypotension.	1
3	Hypotension: Evolution and complications of Hypotension. End of sub-unit self-assessment	- Explain the evolution and complications of the Hypotension. - Take appropriate decision regarding management of patient with Hypotension (using the Case study and end sub-topic self-assessment Questions)	1
4	Hypertension: Description of causes, risk factors, pathophysiology, signs and symptoms of Hypertension, and its Investigations.	- Define the concepts related to Hypertension - Describe causes, risk factors and pathophysiology of Hypertension. - Describe the signs and symptoms of Hypertension - Enumerate the investigations requested for Hypertension.	1
5	Hypertension: Medical diagnosis and Medical and Nursing Management plan of patient with Hypertension	- Identify the adequate medical diagnosis of Hypertension. - Develop a medical and nursing management plan for patient with Hypertension.	1

6	Hypertension: Evolution and complications of Hypertension. Description of Hypertensive crisis. End of sub-unit self-assessment	• Explain the evolution and complications of the Hypertension. • Discuss about the Hypertensive crisis (signs and symptoms, medical and nursing management) • Take appropriate decision regarding management of patient Hypertension (using the Case study and end sub-topic self-assessment Questions).	1
7	Stroke: Description of causes, risk factors, pathophysiology of stroke.	• Define the concepts related to Stroke • Describe causes, risk factors and pathophysiology of Stroke.	1
8	Stroke: Description of signs and symptoms of stroke, and its Investigations. Medical diagnosis of Stroke.	• Describe the signs and symptoms of Stroke. • Enumerate the investigations requested for patient with Stroke • Identify the adequate medical diagnosis of Stroke.	1
9	Stroke: Medical and Nursing Management of Stroke	• Develop a medical and nursing management plan for patient with Stroke.	1
10	Stroke: Evolution Sand complications of Stroke End of sub-unit self-assessment	• Explain the evolution and complications of the Hypertension. • Take appropriate decisions regarding management of patient Stroke (using the Case study and end sub-topic self-assessment Questions).	1

11	End Unit Assessment	• Take appropriate decisions regarding management of Cardiovascular pathologies (Hypotension, Hypertension, Stroke) • Identify the strengths and gaps of learners on appropriate decisions in the management of common pathologies of cardiovascular system. • Prepare the feedback to students • Organize different additional learning activities.	1
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Lesson 1: Introduction of common medical pathologies of cardiovascular system.

a) Prerequisites

This is the first lesson the second unit medical pathologies of cardiovascular system. In this lesson you will be dealing with the common medical pathologies which are hypotension, hypertension and stroke. The first thing to do before starting teaching is to remind learners that they have learnt about heart and blood circulation in anatomy and physiology of cardiovascular system, health assessment of cardiovascular system from fundamentals of nursing and let them discuss the questions as indicated in introductory activity 2.0 and from the case study from learning activity 2.1 so that they can prepare themselves for this lesson.

b) Learning objectives:

- List the common medical pathologies of cardiovascular system: Hypotension, Hypertension, Stroke)
- Define hypotension and Describe causes, risk factors and pathophysiology of Hypotension.

c) Teaching resources

The teacher could avail the Blood pressure machine and medical stethoscope to measure the blood pressure of a patient. Also, the teacher should present to the students the library textbooks on medical-surgical nursing especially cardiovascular diseases and indicates the pages. All students must have their student's books. There is need of black board and chalks or flipcharts and markers.

d) Learning activities

The teacher will be the facilitator during lesson.

Teacher 'activities and methodology

- Ask learners to do individually learning activity 2.1 in their student book and answer the questions number 1, 2 and 3.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite any five students to provide their answers
- Ask other students to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Student will read carefully in their appropriate places using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from Questions of learning activity 2.1

- 1. The abnormal symptoms and signs that the patient was presenting are:**
 - a. General body weakness,
 - b. Severe headache,
 - c. Tiredness,
 - d. Persistent blood pressure of 84/45mmhg,
 - e. Blurred vision.,
 - f. Inability to stand due to dizziness.

2. From the case scenario, the different investigations that have been requested and their results are:

- FBC (full blood count): normal with Hb: 12.5mg/dl, (normal value:11to 16mg/dl)
- Liver function tests:
 - ASAT (aspartate aminotransferase): 20U/l, (normal value:10 to 30U/l)
 - ALAT (alanine aminotransferase):28U/l, (normal value:10 to 40 U/l)
- Renal function test: Creatinine: 0.8mg/dl: (normal value:0.5 to 2mg/dl)

3. Basing on those signs and symptoms, the medical problem of this patient could be Unspecified Hypotension (It is more a symptom than a medical diagnosis).

Lesson 2: Hypotension: Medical diagnosis and Management plan of patient with Hypotension

a) Prerequisites

This is second lesson from the unit of medical pathologies of cardiovascular system. In this lesson you will be dealing with hypotension. The first thing to do before starting teaching is to remind learners what they have learnt about from lesson 1 that include: causes, risk factors, pathophysiology and signs and symptoms of hypotension. Students will again read the case study from learning activity 2.1 and answer the questions related to that case.

b) Learning objectives:

- Identify the adequate medical diagnosis of Hypotension.
- Develop a medical and nursing management plan for patient with Hypotension.

c) Teaching resources:

The teacher could avail the Blood pressure machine and medical stethoscope to measure the blood pressure of a patient. Also, the teacher should present to the students the library textbooks on medical-surgical nursing, especially cardiovascular diseases and indicates the pages. All students must have their student's books. The Algorithm or protocols about Hypotension management must be availed. There is need of black board and chalks or flipcharts and markers.

d) Learning activities

The students will be assigned to read the case study from learning activity 2.1 and answer the questions. The teacher will be facilitating and providing the correct answers in relation to students' answers.

Teacher 'activities and methodology:

- Ask learners to do individually activity 2.1 in their student book and answer the question number 4.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite any five students to provide they answers
- Ask other students to follow carefully the answers provided by students
- Note on the blackboard or flipchart the main students' ideas.
- Tick the correct responses and correct those ones which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Student will read carefully in their appropriate places using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from Questions of learning activity 2.1**4. The medical and nursing management (treatment plan) of this case is the following:**

- Comprehensive assessment to investigate the real cause
- Encourage oral fluids intake
- Intravenous fluids replacement and /or blood products when possible
- Monitor inputs and outputs
- Further investigations to rule out the cause
- Treat underlying condition

Lesson 3: Hypotension: Evolution and complications of Hypotension, End of sub-unit self- assessment

a) Prerequisites

This is third lesson from the unit of medical pathologies of cardiovascular system. In this lesson you will be dealing with hypotension. The first thing to do before starting teaching is to remind learners what they have learnt from lesson 1 and 2 that include: introduction to cardiovascular diseases and hypotension, causes, risk factors, pathophysiology and signs and symptoms of hypotension. Students will again read the case study from learning activity 2.1 and answer the questions related to that case.

b) Learning objectives:

- Explain the evolution and complications of the Hypotension.
- Take appropriate decision regarding management of patient with Hypotension (using the Case study and end sub-topic self-assessment Questions)

c) Teaching resources:

The teacher could avail the Blood pressure machine and medical stethoscope to measure the blood pressure of a patient. Also, the teacher should present to the students the library textbooks on medical-surgical nursing especially cardiovascular diseases and indicates the pages. All students must have their student's books. The Algorithm or protocols about Hypotension management must be availed. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher 'activities and methodology:

- Ask learners to do individually activity 2.1 in their student book and answer the question number 5.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite any five students to provide their answers
- Ask other students to follow carefully the answers provided by students
- Note on the blackboard or flipchart the main students' ideas.
- Tick the correct responses and correct those ones which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Student will read carefully in their appropriate places using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from Questions of learning activity 2.1**5. If not treated, the consequences are:**

- Injury from fall due to dizziness leading to fractures, wounds, lacerations, etc.
- Sever hypoxia due to poor perfusion and oxygenation leading to multiple organs failure (renal/kidney, brain, liver, etc.)
- Signs of severe dehydration: collapsed vessels, irritability, etc.
- Any type of shock may develop depending on the cause

Possible Answers for Self-assessment 2.1**1. The signs and symptoms of hypotension are:**

- Patient with hypotension is most commonly asymptomatic.
- In extreme low blood pressures, syncope may occur.
- Other symptoms are possible which typically begin from the underlying etiology rather than hypotension itself. They may include chest pain, shortness of breath, irregular heartbeat, headache, fatigue and weakness, pale skin color, rapid breathing, blurred vision, fainting when having syncope, nausea, rapid pulse rate

2. Possible causes of hypotension are:

- Hypotension is a result of troubles of the factors determining the blood pressure: cardiac output or peripheral resistance
- Certain conditions such as:
 - Pregnancy due to an increase in demand for blood from both mother and the growing fetus.
 - Large amounts of blood loss through injury.
 - Impaired circulation caused by heart attacks or faulty heart valves,

- Weakness and a state of shock due to dehydration,
- Anaphylactic shock due to a severe form of allergic reaction,
- Infections of the bloodstream,
- Endocrine disorders such as diabetes, adrenal insufficiency and thyroid disease.
- Nutrient deficiency like lack of vitamin B12 and folate can cause low blood pressure due to reason that nutrient are essential to produce the red blood cells and their deficiency can lead to drop in blood pressure levels.

3. Investigations useful for the patient with hypotension are:

- Laboratory investigations: complete blood count (CBC), cardiac enzymes, renal function tests (urea and creatinine), liver function tests, blood smear for malaria, blood sugar levels, electrolytes (sodium, potassium, chloride, calcium, etc.)
- Imaging investigations: chest x-ray, ultrasound of the heart, chest computerized tomography scan with angiography, etc.)
- Other investigations to determine the causes: electrocardiogram, blood culture, urine culture.

4. Appropriate treatment for hypotension includes:

- Stabilize the patient airway
- Adequate intravenous access
- Administer intravenous fluids to restore adequate tissue perfusion
- Administer blood products to increase the blood pressure and stabilize the vital signs and hemodynamic status.
- Ensure the investigation needed are done to investigate the suspected cause of hypotension
- Monitoring the Inputs and outputs
- Treat underlying medical conditions (medications for heart disease, diabetes, or infection)
- Advise the patient to drink plenty of water to avoid hypotension due to dehydration due to vomiting or diarrhea.
- Treat orthostatic hypotension with slow, gradual movements.
- Exercise regularly aiming at raising the heart rate and resistance exercises two or three days a week.

**The following are the possible responses to the application activity 2.1/
Case study**

- 1. The medical condition** the patient is having is Shock status associated with hypotension with open wound on the left leg.
- 2. The clinical manifestations that he displayed are:**
 - Blood pressure of 80/56 mm Hg.
 - Apical pulse 138 but no palpable radial or pedal pulses; carotid pulse present but weak.
 - Respiratory rate 38 cycles/min.
 - Oxygen saturation of 86% on room air and asymmetric chest wall movement.
 - Open wound of the lower left leg
- 3. The comprehensive assessment of K.L to further explore his condition will include:**
 - History taking
 - Vital signs taking (temperature, blood pressure, pulse, respiration rate, oxygen saturation)
 - Complete physical assessment (mainly musculoskeletal, cardiovascular and respiratory assessment)
- 4. The investigations that you will advise to K.L to confirm the medical condition and their rationale:**
 - Laboratory investigations: complete blood count (CBC), cardiac enzymes, renal function tests (urea and creatinine), liver function tests, blood smear for malaria, blood sugar levels, electrolytes (sodium, potassium, chloride, calcium, etc.)
 - Imaging investigations: chest x-ray, ultrasound of the heart, chest computerized tomography scan with angiography, etc.)
 - Other investigations: electrocardiogram, blood culture, urine culture.
- 5. The priority nursing interventions towards for K.L. medical condition are:**
 - Trendelenburg Position
 - Administer oxygen and monitor oxygen saturation
 - Administer painkillers
 - Take intravenous line and administer intravenous fluids
 - Ensure wound cleaning
 - Call the physician

6. After stabilization of K.L, the comprehensive medical and nursing management will include:

- Stabilize the patient airway
- Adequate intravenous access
- Administer intravenous fluids to restore adequate tissue perfusion
- Administer blood products to increase the blood pressure and stabilize the vital signs and hemodynamic status.
- Ensure the investigation needed are done to investigate the suspected cause of hypotension
- Monitoring the Inputs and outputs
- Treat underlying medical conditions (medications for heart disease, diabetes, or infection)
- Advise the patient to drink plenty of water to avoid hypotension due to dehydration due to vomiting or diarrhea.
- Treat orthostatic hypotension with slow, gradual movements.
- Exercise regularly aiming at raising the heart rate and resistance exercises two or three days a week.

7. The possible complications related to K.L medical condition are:

- Shock depending on etiology of hypotension
- Injury resulting from falls due to fainting (fractures, lacerations, wounds, limited movements, etc.)
- Severe hypotension with hypoxia leading to multiple organs failure (renal/ kidney, brain, liver, heart).

Lesson 4: Hypertension: Description of causes, risk factors, pathophysiology, signs and symptoms of Hypertension, and its Investigations.

a) Prerequisites

This is fourth lesson from the unit of medical pathologies of cardiovascular system. In this lesson you will be dealing with hypertension. The first thing to do before starting teaching is to remind learners what they have learnt from lessons 1, 2 and 3 that are related to hypotension as one of medical pathologies of cardiovascular system. You will let students discuss the questions as indicated in the case study from learning activity 2.2 so that they can prepare themselves for this lesson.

b) Learning objectives:

- Define the concepts related to Hypertension
- Describe causes, risk factors and pathophysiology of Hypertension.
- Describe the signs and symptoms of Hypertension
- Enumerate the investigations requested for Hypertension.

c) Teaching resources

The teacher could avail the Blood pressure machine and medical stethoscope to measure the blood pressure of a patient. Also, the teacher should present to the students the library textbooks on medical-surgical nursing especially cardiovascular diseases and indicates the pages. All students must have their student's books. The Algorithm or protocols about Hypertension management must be availed. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher 'activities and methodology

- Ask learners to do individually the learning activity 2.2 in their student book and answer the questions related.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite any five students to provide they answers
- Ask other students to follow carefully the answers provided by students
- Note on the blackboard the main student`s ideas.
- Tick the correct responses and correct those ones which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Student will read carefully in their appropriate places using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Expected answers for learning activity 2.2

1. Abnormal signs and symptoms that H.E was presenting are:

- Headache
- Dizziness
- Chest pain during activities

2. Other information to ask:

- Ever suffered other cardiovascular diseases
- Ever experienced falling down due to dizziness
- Marital status, any other person from the family being wife or children experiencing same symptoms or diseases?

3. The **Medical condition** is Hypertension to be investigated

4. The risk factors that H.E was having which predisposed him to develop that medical condition are:

- Obesity
- Family history of stroke: the father died from Stroke and the Mother has hypertension
- Smoking
- Alcohol intake

Investigations requested and results:

- Triglycerides: 350mg/dl
- Hb: 14mg/dl
- Sodium: 143 mEq/l

Lesson 5: Hypertension: Medical diagnosis and Medical and Nursing Management plan of patient with Hypertension

a) Prerequisites

This is fifth lesson from the unit of medical pathologies of cardiovascular system. In this lesson you will be dealing with hypertension. The first thing to do before starting teaching is to remind learners what they have learnt from lesson four that is related to hypertension as one of medical pathologies of cardiovascular system. You will let students discuss the questions as indicated in the case study from learning activity 2.2 so that they can prepare themselves for this lesson.

b) Learning objectives:

- Identify the adequate medical diagnosis of Hypertension.
- Develop a medical and nursing management plan for patient with Hypertension.

c) Teaching resources

The teacher could avail the Blood pressure machine and medical stethoscope to measure the blood pressure of a patient. Also, the teacher should orient the students to library for library textbooks on medical-surgical nursing especially cardiovascular diseases and indicates the pages. All students must have their student's books. The Algorithm or protocols about Hypertension management must be availed. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher 'activities and methodology

- Ask learners to do individually the learning activity 2.2 in their student book and answer the questions related.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite any five students to provide they answers
- Ask other students to follow carefully the answers provided by students
- Note on the blackboard the main student`s ideas.
- Tick the correct responses and correct those ones which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Student will read carefully in their appropriate places using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Expected answers for learning activity 2.2

5. Different medical and nursing management options that are effective in managing H.E medical condition are:

- Health education about lifestyle modifications: weight reduction, dietary sodium and potassium reduction, avoid alcohol consumption, regular physical activity, avoidance of tobacco use, respect of appointment given, and be able to manage psychosocial risk factors.
- Health education about adherence to the regimen: to continue the adherence to the prescribed medications for hypertension (antihypertensive drugs prescribed, like hydrochlorothiazide).

6. The most effective preventive strategies for lifestyles changes to lower his blood pressure are:

- Health education about lifestyle modifications: weight reduction, dietary sodium and potassium reduction, avoid alcohol consumption, regular physical activity, avoidance of tobacco use, respect of appointment given, and be able to manage psychosocial risk factors.

Lesson 6: Hypertension: Evolution and complications of Hypertension, and Description of Hypertensive crisis. End of sub-unit self- assessment

a) Prerequisites

This is sixth lesson from the unit of medical pathologies of cardiovascular system. In this lesson you will be dealing with evolution and complications of hypertension, and the description of hypertensive crisis. The first thing to do before starting teaching is to remind learners what they have learnt from lessons 4 and 5 that are related to hypertension as one of medical pathologies of cardiovascular system. You will let students discuss the questions as indicated in the case study from learning activity 2.2 so that they can prepare themselves for this lesson.

b) Learning objectives:

- Explain the evolution and complications of the Hypertension.
- Discuss about the Hypertensive crisis (signs and symptoms, medical and nursing management)
- Take appropriate decision regarding management of patient Hypertension (using the Case study and end sub-topic self-assessment Questions).

c) Teaching resources

The teacher could avail the Blood pressure machine and medical stethoscope to measure the blood pressure of a patient. Also, the teacher should orient the students to library for library textbooks on medical-surgical nursing especially cardiovascular diseases and indicates the pages. All students must have their student's books. The Algorithm or protocols about Hypertension management and hypertensive crisis management must be availed. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher 'activities and methodology

- Ask learners to do individually activity 2.2 in their student book and answer the questions related.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems

- Remember to assist those who are weak but without giving them the knowledge.
- Invite any five students to provide their answers
- Ask other students to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Student will read carefully in their appropriate places using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Expected answers for learning activity 2.2

- 7. If H.E presents poor adherence to prescribed treatment regimen, many complications can occur such as:** Hypertension emergency/crisis, Heart failure, Renal Failure, Stroke, Retinal vascular sclerosis, Gangrene of extremities, etc.
- 8. Poor adherence to the prescribed regimen may speed up complications of hypertension that include:**

Hypertension emergency

- Atherosclerotic coronary artery disease
- Myocardial ischemia/ infarction
- Heart failure
- Renal Failure
- Stroke/ Cerebral hemorrhage/ Cerebral ischemia
- Aortic aneurysm
- Retinal vascular sclerosis
- Gangrene of extremities

Answers for Self-assessment 2.2

1. **Answer: d.**
2. **Answers: a, c, e.**
3. **Answer: c.**
4. **Answers: a, b, c, d.**
5. **Difference between the essential and secondary hypertension:**
 - **Primary (essential or idiopathic) hypertension:** represent about 90-95% of all hypertension cases. It is sustained elevated blood pressure with no known cause. Although the exact cause of primary hypertension is unknown, there are several contributing factors which include increased sympathetic nervous system activity, overproduction of sodium-retaining hormones and vasoconstricting substances, increased sodium intake, overweight, diabetes mellitus, tobacco use, and excessive alcohol consumption. Essential hypertension also may develop from alterations in other body chemicals (renin-angiotensin-aldosterone mechanism).
 - **Secondary hypertension:** is elevated blood pressure with a specific cause that often can be identified and corrected. It results from some other disorder. This type of hypertension accounts for 5% to 10% of all hypertension cases. It should be suspected in people who suddenly develop high blood pressure, especially if it is severe. Clinical findings that suggest secondary hypertension relate to the underlying cause. Secondary hypertension may accompany any primary condition that affects fluid volume or renal function or causes arterial vasoconstriction. Predisposing conditions include kidney disease, pheochromocytoma (a tumor of the adrenal medulla), hyperaldosteronism (increased secretion of mineral corticoid by the adrenal cortex), atherosclerosis, use of cocaine or other cardiac stimulants (e.g., weight-control drugs, caffeine), and use of oral contraceptives. Treatment of secondary hypertension is aimed at removing or treating the underlying cause. Secondary hypertension is a contributing factor to hypertensive crisis.
6. **Two physiologic components that create blood pressure are:** Cardiac output and Peripheral resistance.
7. **Case study related questions:**
 - a) **Different lifestyle changes you would advise P.N. to practice in order to be able to control her hypertension.**
 - **Weight reduction:** overweight persons have an increased incidence of hypertension and increased risk for cardiovascular diseases. When a person decreases caloric intake, sodium and fat intake are usually also

reduced. Although reducing the fat content of the diet has not been shown to produce sustained benefits in blood pressure control, it may slow the progress of atherosclerosis and reduce overall cardiovascular diseases risk.

- Dietary sodium and potassium reduction: this involves avoiding foods known to be high in sodium and not adding salt in the preparation of foods or at meals.
 - Avoid/Moderation of alcohol consumption,
 - Regular physical activity: physically active lifestyle is essential to promote and maintain good health. Physical activity is more likely to be done if it is safe and enjoyable, fits easily into one's daily schedule, and is inexpensive. People with hypertension must increase their physical activity. Advise sedentary people to increase activity levels gradually.
 - Avoidance of tobacco use (smoking and chewing), and
 - Management of psychosocial risk factors.
 - Respect of appointments
 - Adherence to prescribed regimen (medications and lifestyle changes)
- b) P.N. must continue to take her medications (good adherence) for better outcome. To achieve this, we should assess the patient's diet, activity level, and lifestyle as additional indicators of adherence. Individually assess patients to determine the reasons why the patient is not adhering to the treatment and develop a plan with the patient to improve adherence. The plan should be compatible with the patient's personality, habits, and lifestyle. Active patient participation increases the likelihood of adherence to the treatment plan. Measures such as including the patient in the development of a medication schedule, selecting medications that are affordable, and involving caregivers help increase patient adherence.

8. All essential needed investigations and their rationale in the management of hypertension:

- Most hypertension is not classified as primary hypertension, testing for secondary causes should be routinely done.
- Basic laboratory studies are performed to:
 - Identify or rule out causes of secondary hypertension,
 - Evaluate target organ disease,
 - Determine overall cardiovascular risk, or
 - Establish baseline levels before initiating therapy.

- Basic diagnostic studies performed in a person with hypertension are the following: Full blood count (FBC); Routine urinalysis; Liver function tests (ASAT, ALAT) and serum creatinine levels: used to screen for renal and liver involvement and to provide baseline information about kidney and liver function; Measurement of serum electrolytes (sodium, potassium, chloride), especially potassium, is important to detect hyperaldosteronism, a cause of secondary hypertension; Blood glucose levels (serum glucose) assist in the diagnosis of diabetes mellitus; A lipid profile (total lipids, triglycerides, cholesterol) provides information about additional risk factors related to atherosclerosis; Uric acid levels establish a baseline, since the levels often rise with diuretic therapy; An electrocardiogram (ECG) provides baseline information about cardiac status and it can identify the presence of cardiac ischemia, or previous myocardial infarction, etc; Ophthalmic examination: may reveal vascular changes in the eyes, retinal hemorrhages, or edema of the optic nerves, known as papilledema.

9. The elements that constitute the nursing management of the client with hypertension:

- Health education about Lifestyle modifications that include:
 - Weight reduction: overweight persons have an increased incidence of hypertension and increased risk for cardiovascular diseases. When a person decreases caloric intake, sodium and fat intake are usually also reduced. Although reducing the fat content of the diet has not been shown to produce sustained benefits in blood pressure control, it may slow the progress of atherosclerosis and reduce overall cardiovascular diseases risk.
 - Dietary sodium and potassium reduction: this involves avoiding foods known to be high in sodium and not adding salt in the preparation of foods or at meals.
 - Avoid/Moderation of alcohol consumption,
 - Regular physical activity: physically active lifestyle is essential to promote and maintain good health. Physical activity is more likely to be done if it is safe and enjoyable, fits easily into one's daily schedule, and is inexpensive. People with hypertension must increase their physical activity. Advise sedentary people to increase activity levels gradually.
 - Avoidance of tobacco use (smoking and chewing), and
 - Management of psychosocial risk factors.
 - Adherence to medications
 - Respect of appointments for better follow up
- Administration of prescribed antihypertensive medications and monitor adherence and side effects.

10. Possible complications of uncontrolled hypertension: hypertension emergency/crisis, atherosclerotic coronary artery disease, myocardial ischemia/ infarction, heart failure, renal Failure, stroke/ cerebral hemorrhage/ cerebral ischemia, aortic aneurysm, retinal vascular sclerosis, gangrene of extremities.

11. Best answer is b.

12. Medical and nursing management of the client with Hypertensive crisis include:

- Patient assessment is extremely important: monitor for signs of neurologic deficits, retinal damage, heart failure, pulmonary edema, and renal failure. The neurologic changes are often similar to those related to a stroke.
- Hypertensive crisis require hospitalization, intravenous administration of antihypertensive drugs (mainly vasodilators, adrenergic inhibitor, the angiotensin converting enzyme inhibitor and the calcium channel blocker. Sodium nitroprusside is the most effective IV drug to treat hypertensive emergencies), and intensive care monitoring.
- Assess the patient blood pressure and pulse every 2 to 3 minutes during the initial administration of these drugs,
- Monitor the electrocardiogram for heart dysrhythmias and signs of ischemia.
- Measure urine output hourly to assess renal perfusion. Patients receiving IV antihypertensive drugs may be restricted to bed as getting up may cause severe cerebral ischemia and fainting.
- Ongoing assessment is essential to evaluate the effectiveness of these drugs and the patient's response to therapy.
- Frequent neurologic examinations including level of consciousness, pupillary size and reaction, and movement of extremities, help detect any changes in the patient's condition.
- Monitor cardiac, pulmonary, and renal systems for decompensation caused by the severe elevation in blood pressure (e.g., angina, pulmonary edema, renal failure).

The following are the possible responses to the application activity 2.2/ Case study

1. The **contributing factors to the development of hypertension** that K.J. was presenting are:
 - Weight gain (10kgs)
 - Family history of stroke: Father died from stroke
 - Sedentary lifestyle and inability to do physical activity

2. Other additional information you would need to collect about the medical condition of K.J:
 - Any heart diseases before
 - From when he started developing the signs and symptoms or medical condition
 - How often does he check his blood pressure?
3. Investigations to be requested that might be helpful in deciding further management of K.J medical condition are:
 - Most hypertension is not classified as primary hypertension, testing for secondary causes should be routinely done.
 - Basic laboratory studies are performed to:
 - Identify or rule out causes of secondary hypertension,
 - Evaluate target organ disease,
 - Determine overall cardiovascular risk, or
 - Establish baseline levels before initiating therapy.
 - Basic diagnostic studies performed in a person with hypertension are the following: Full blood count (FBC); Routine urinalysis; Liver function tests (ASAT, ALAT) and serum creatinine levels: used to screen for renal and liver involvement and to provide baseline information about kidney and liver function; Measurement of serum electrolytes (sodium, potassium, chloride), especially potassium, is important to detect hyperaldosteronism, a cause of secondary hypertension; Blood glucose levels (serum glucose) assist in the diagnosis of diabetes mellitus; A lipid profile (total lipids, triglycerides, cholesterol) provides information about additional risk factors related to atherosclerosis; Uric acid levels establish a baseline, since the levels often rise with diuretic therapy; An electrocardiogram (ECG) provides baseline information about cardiac status and it can identify the presence of cardiac ischemia, or previous myocardial infarction, etc; Ophthalmic examination: may reveal vascular changes in the eyes, retinal hemorrhages, or edema of the optic nerves, known as papilledema.
4. The aspects that might be included into the medical and nursing management of K.J. are:
 - Lifestyle modifications are indicated for all patients with prehypertension and hypertension, and include:
 - Weight reduction: overweight persons have an increased incidence of hypertension and increased risk for cardiovascular diseases. When a person decreases caloric intake, sodium and fat intake are usually also reduced. Although reducing the fat content of the diet has not been shown to produce sustained benefits in blood pressure control, it may

slow the progress of atherosclerosis and reduce overall cardiovascular diseases risk.

- Dietary sodium and potassium reduction: this involves avoiding foods known to be high in sodium and not adding salt in the preparation of foods or at meals.
- Avoid/Moderation of alcohol consumption,
- Regular physical activity: physically active lifestyle is essential to promote and maintain good health. Physical activity is more likely to be done if it is safe and enjoyable, fits easily into one's daily schedule, and is inexpensive. People with hypertension must increase their physical activity. Advise sedentary people to increase activity levels gradually.
- Avoidance of tobacco use (smoking and chewing), and
- Management of psychosocial risk factors.
- Medications: the drugs currently available for treating hypertension have two main actions: (1) they decrease the volume of circulating blood and (2) they reduce systemic vascular resistance. The drugs used in the treatment of hypertension include diuretics, the adrenergic inhibitors, direct vasodilators, angiotensin and renin inhibitors, and calcium channel blockers.

5. Examples of Different Classes of antihypertensive drugs that would be indicated to K.J. based on her clinical status are:

- Drugs acting on Sympathetic Nervous System
 - Beta blockers: eg: Atenolol, Propranolol, Carvedilol.
 - Alpha blockers
- Centrally Acting Antihypertensive Drugs
 - α_2 - adrenoceptor agonists: eg: Clonidine, Methyldopa.
- Drugs affecting Renin-Angiotensin System
 - ACE inhibitors; eg: captopril, Lisinopril Captopril, and Lisinopril
 - Angiotensin receptor blockers; eg: Losartan
 - Direct renin inhibitors
- Diuretics; eg: Spironolactone, Hydrochlorothiazide and Furosemide
- Vasodilators:
 - Calcium channel blockers; eg: Nifedipine, Amlodipine
 - Potassium channel openers

6. Different **lifestyles changes** that would be recommended to K.J.:

- Weight reduction: overweight persons have an increased incidence of hypertension and increased risk for cardiovascular diseases. When a person decreases caloric intake, sodium and fat intake are usually also reduced. Although reducing the fat content of the diet has not been shown to produce sustained benefits in blood pressure control, it may slow the progress of atherosclerosis and reduce overall cardiovascular diseases risk.
- Dietary sodium and potassium reduction: this involves avoiding foods known to be high in sodium and not adding salt in the preparation of foods or at meals.
- Avoid/Moderation of alcohol consumption,
- Regular physical activity: physically active lifestyle is essential to promote and maintain good health. Physical activity is more likely to be done if it is safe and enjoyable, fits easily into one's daily schedule, and is inexpensive. People with hypertension must increase their physical activity. Advise sedentary people to increase activity levels gradually.
- Avoidance of tobacco use (smoking and chewing), and
- Management of psychosocial risk factors.

7. **Complications of Hypertension:** hypertension emergency/crisis, atherosclerotic coronary artery disease, myocardial ischemia/ infarction, heart failure, renal Failure, stroke/ cerebral hemorrhage/ cerebral ischemia, aortic aneurysm, retinal vascular sclerosis, gangrene of extremities.

Lesson 7: Stroke: Description of causes, risk factors, pathophysiology of stroke.

a) Prerequisites

This is seventh lesson from the unit of medical pathologies of cardiovascular system. In this lesson you will be dealing with description of causes, risk factors and pathophysiology of different types of Stroke. The first thing to do before starting teaching is to remind learners what they have learnt from lessons 4, 5 and 6 that are related to hypertension as one of medical pathologies of cardiovascular system that is among the risk factors of Stroke. The students must also know the perfusion and oxygenation of the brain that they learnt from blood circulation and anatomy and physiology of nervous system. You will let students discuss the questions as indicated in the case study from learning activity 2.3 so that they can prepare themselves for this lesson.

b) Learning objectives:

- Define the concepts related to Stroke
- Describe causes, risk factors and pathophysiology of Stroke.

c) Teaching resources

The teacher should orient the students to library for library textbooks on medical-surgical nursing especially cardiovascular diseases/Stroke and indicates the pages. All students must have their student's books. The Algorithm or protocols about Stroke management must be availed. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

The students will be into six groups and during the group work, the teacher will move around assisting the groups during the discussion. The student will be tasked to read the case study from learning activity 2.3 and using the library textbooks, they will answer the questions related to that learning activity.

Teacher 'activities and methodology

- Form six groups of students and assign them the group work
- Ask learners to do learning activity 2.3 within their groups using their student book and answer the questions related.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite any five students to provide they answers
- Ask other students to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will read carefully the case study from learning activity 2.3 in their groups using their student books

- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Expected answers for learning activity 2.3

1. The **possible causes for her left side body functional impairment and general body weaknesses** are:
 - Hemorrhage (due to rupture of blood vessels) or
 - Poor perfusion and oxygenation to the brain tissues (due to obstruction of blood vessels)
2. Other **type of relevant information** you would request/ask to the husband and other family members regarding the development of N.J. condition:
 - Has there anyone from the family who experienced such symptoms?
 - Did the patient suffer from other diseases (being metabolic or heart)? Past medical and surgical history?
 - Among all symptoms, what came first?
 - Alcohol intake? Physical activity levels before developing the ongoing disease?
3. The **causes and risk factors** that N.J was having:
 - Advanced age
 - History of high blood pressure/hypertension

Lesson 8: Stroke: Description of signs and symptoms of stroke, and its Investigations; Medical diagnosis of Stroke.

a) Prerequisites

This is eighth lesson from the unit of medical pathologies of cardiovascular system. In this lesson you will be dealing with signs and symptoms of different types of Stroke, and its investigations; and confirmation of Stroke as medical diagnosis. The first thing to do before starting teaching is to remind learners what they have learnt from lessons 4, 5, 6 and 7 that are related to stroke and its risk factors. The students must also know the perfusion and oxygenation of the brain that they learnt from blood circulation and anatomy and physiology of nervous system. You will let students discuss the questions as indicated in the case study from learning activity 2.3 so that they can prepare themselves for this lesson.

b) Learning objectives:

- Describe the signs and symptoms of Stroke.
- Enumerate the investigations requested for patient with Stroke
- Identify the adequate medical diagnosis of Stroke.

c) Teaching resources

The teacher should orient the students to library for library textbooks on medical-surgical nursing especially cardiovascular diseases/Stroke and indicates the pages. All students must have their student's books. The Algorithm or protocols about Stroke management must be availed. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities**Teacher 'activities and methodology**

- Group the students into groups of 5 students, ask learners read the learning activity 2.3 in their student book and answer the questions related using/referring to the Library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide they answers
- Ask other students from groups to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will read carefully the case study from learning activity 2.3 in their groups using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions

- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Expected answers for learning activity 2.3:

- 4. Investigations** that might be ordered in order to decide about medical diagnosis and the management of N.J. are:
 - Imaging investigations like Brain/Head CT scan and MRI. These imaging are helpful in determining the extent of injury and location, therefore determining the causes and subtypes.
 - Other Laboratory investigations (FBC, Urea and creatinine, ASAT and ALAT, etc) are needed to look for other factors that might be associated with stroke.
- 5. The comprehensive physical assessment will include:**
 - Vital signs monitoring and interpretation
 - Detailed History taking (from patient or family members)
 - Comprehensive assessment and physical exam (head to toe or systems by systems review)
 - Focus about the neurological examination
- 6. The medical diagnosis** that N.J is presenting: Stroke that might be Hemorrhagic or Ischemic.

Lesson 9: Stroke: Medical and Nursing Management of Stroke

a) Prerequisites

This is ninth lesson from the unit of medical pathologies of cardiovascular system. In this lesson you will be dealing with medical and nursing management of different types of Stroke. The first thing to do before starting teaching is to remind learners what they have learnt from lessons 7 and 8 that are related to stroke and its risk factors and signs and symptoms. The students must also know the perfusion and oxygenation of the brain that they learnt from blood circulation and anatomy and physiology of nervous system. You will let students discuss the questions as indicated in the case study from learning activity 2.3 so that they can prepare themselves for this lesson.

b) Learning objectives:

- Develop a medical and nursing management plan for patient with Stroke.

c) Teaching resources

The teacher should orient the students to library for library textbooks on medical-surgical nursing especially cardiovascular diseases/Stroke and indicates the

pages. All students must have their student's books. The Algorithm or protocols about Stroke management must be available. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher 'activities and methodology

- Group the students into groups of 5 students, ask learners read the learning activity 2.3 in their student book and answer the questions related using/referring to the Library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide their answers
- Ask other students from groups to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will read carefully the case study from learning activity 2.3 in their groups using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Expected answers for learning activity 2.3

7. The **elements that must be included into the medical and nursing management** of N.J. medical diagnosis are aiming at:
- A. Primary assessment focuses on cardiac and respiratory status (ABC: Airway, Breathing, Circulation) and neurologic assessment (Glasgow coma scale). If the patient is stable, the history is obtained as follows: (1) description of the current illness with attention to initial symptoms, particularly symptom onset and duration, nature (intermittent or continuous), and changes; (2) history of similar symptoms previously experienced; (3) current medications; (4) history of risk factors and other illnesses such as hypertension; and (5) family history of stroke or cardiovascular diseases.
 - B. Secondary assessment includes a comprehensive neurologic examination of the patient. This includes (1) level of consciousness (using the Glasgow Coma Scale), (2) cognition; (3) motor abilities; (4) cranial nerve function; (5) sensation; (6) proprioception; (7) cerebellar function; and (8) deep tendon reflexes.
 - C. Management of Stroke should be holistic and focus at all systems aiming at:
 - Managing existing conditions to prevent secondary brain injury (intracranial hypertension, hematoma expansion, elevated intracranial pressure, seizures, herniation)
 - Maintaining and securing the airways (due to paralysis of the pharynx muscles),
 - Providing general body support (support her in movements, tongue protection, vital signs monitoring, fluid and electrolyte balance, hemodynamic patient monitoring: all Systems to be cared for) and
 - Anticipating the occurrence of complications and prevent them (atelectasis, aspiration pneumonia, airway obstruction that might require tracheal intubation and mechanical ventilation), and plan for Respiratory system management as Priority.
 - Comprehensive management of each system to avoid complications.

Lesson 10: Stroke: Evolution and complications of Stroke; and End of sub-unit self- assessment

a) Prerequisites

This is tenth lesson from the unit of medical pathologies of cardiovascular system. In this lesson you will be dealing with complications of Stroke. The first thing to do before starting teaching is to remind learners what they have learnt from lessons 7, 8 and 9 that are related to stroke, its risk factors, signs and symptoms,

investigations and medical and nursing management. The students must also know the perfusion and oxygenation of the brain that they learnt from blood circulation and anatomy and physiology of nervous system. You will let students discuss the questions as indicated in the case study from learning activity 2.3 so that they can prepare themselves for this lesson.

b) Learning objectives:

- Explain the evolution and complications of the Hypertension.
- Take appropriate decisions regarding management of patient Stroke (using the Case study and end sub-topic self-assessment Questions).

c) Teaching resources

The teacher should orient the students to library for library textbooks on medical-surgical nursing especially cardiovascular diseases/Stroke and indicates the pages. All students must have their student's books. The Algorithm or protocols about Stroke management must be available. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher 'activities and methodology

- Group the students into groups of 5 students, ask learners read the learning activity 2.3 in their student book and answer the questions related using/referring to the Library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide their answers
- Ask other students from groups to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities

- Student will read carefully the case study from learning activity 2.3 in their groups using their student books
- To read carefully the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Expected answers for learning activity 2.3

8. The **possible complications** that might result from the medical condition N.J. is experiencing are:
 - Stroke is a significant cause of disability. The ability to perform activities of daily living may be impaired.
 - Brain edema: swelling of brain post stroke
 - Pneumonia: causes breathing problems
 - Swallowing problems: that can potentially cause the aspiration pneumonia
 - Blood clot or deep vein thrombosis: related to limited range of motion/physical activity
 - Aphasia and speech disorders
 - Depression and other mood disorders, chronic headache, etc

Answers for Self-assessment 2.3

1. The **manifestations of a stroke that are** more likely to occur with right brain damage (R) or left brain damage (L).
 - a. Aphasia: **Answer:** Left side of brain damage
 - b. Impaired judgment: **Answer:** Right side of brain damage
 - c. Quick, impulsive behavior: **Answer:** Right side of brain damage
 - d. Inability to remember words: **Answer:** Left side of brain damage
 - e. Neglect of the left side of the body: **Answer:** Right side of brain damage
 - f. Hemiplegia of the right side of the body: **Answer:** Left side of brain damage
 - Answer: A. Check the patient's gag reflex.
 - Answer: D. Maintenance of respiratory function with a patent airway and oxygen administration
 - The difference between **ischemic and hemorrhagic stroke**:
 - Ischemic (represent 80% of all Strokes): mainly due to thrombus, emboli, systemic hypo perfusion, and atherosclerosis. When ischemic

strokes occur, glucose and oxygen to brain cells are reduced. The reduced glucose quickly depletes the stores of adenosine triphosphate (ATP), resulting in anaerobic cellular metabolism and the accumulation of toxic products such as lactic acid. Although some brain cells die from anoxia, the lack of oxygen destroys additional brain cells by a secondary mechanism

- Hemorrhagic (represent 20% of all Strokes): due to intracerebral hemorrhage (ICH) or subarachnoid hemorrhage (SAH).
- **Different criteria that are assessed to determine the level of consciousness using Glasgow coma scale are:**
 - Eye opening: /4 marks
 - Verbal response: /5 marks
 - Motor response: /6 marks
- The preventive strategies of stroke for (1) healthy people and overweight person, and for (2) patient with hypertension and diabetes are:

A. Preventive Strategies of Stroke for healthy and overweight people:

- Reduce salt and sodium intake.
- Maintain a normal body weight.
- Maintain a normal blood pressure.
- Increase level of physical exercise.
- Avoid cigarette smoking or tobacco products.
- Limit consumption of alcohol to moderate levels.
- Follow a diet that is low in saturated fat, total fat, and dietary cholesterol and high in fruits and vegetables.

B. Prevention strategies of Stroke for patient with hypertension and diabetes are:

- Lifestyles modifications: reduce salt and sodium intake, maintain a normal body weight, maintain a normal blood pressure, increase level of physical exercise, avoid cigarette smoking or tobacco products, avoid consumption of alcohol, follow a diet that is low in saturated fat, total fat, and dietary cholesterol and high in fruits and vegetables.
- Management of existing conditions
- What **therapeutic options are available for the patient with a hemorrhagic and ischemic stroke?**
 - a. Lifestyles modifications
 - b. Antiplatelet drugs are usually the chosen treatment: Aspirin is the most frequently used as antiplatelet agent. Recombinant Tissue plasminogen

activator: to reestablish blood flow from blocked blood vessel. To be given 3 to 4.5 hours after signs and symptoms of ischemic stroke. Determining eligibility to IV thrombolytic therapy for patients with acute ischemic stroke: IV Alteplase is first-line therapy, to be initiated within 4.5 hours of symptom onset or the time last known to be well. Oral anticoagulation using warfarin is the treatment of choice for individuals with atrial fibrillation.

- c. Surgical interventions might be needed depending on medical diagnosis and goal of treatment (eg: hematoma evacuation, removing the plaque, opening the blocked artery, anastomosis, etc).

**The following are the possible responses to the application activity 2.3/
Case study**

1. **Additional information you will ask the family members** to guide in deciding about the diagnosis and the management:
 - Has there anyone from the family who experienced such symptoms?
 - Did the patient suffer from other diseases (being metabolic or heart)? Past medical and surgical history?
 - Among all symptoms, what came first?
 - Alcohol intake? Physical activity levels before developing the ongoing disease?
2. **Investigations** that must be requested to determine the cause of R.C. unconsciousness and the rationale:
 - Investigations are done to:
 - Confirm that it is a stroke and not another brain lesion and
 - Identify the likely cause of the stroke, and possible other comorbidities associated with Stroke
 - Important diagnostic tools for patients who have experienced a stroke are:
 - A no and contrasted computed tomography scan (CT Scan) or magnetic resonance imaging (MRI): these tests can rapidly distinguish between ischemic and hemorrhagic stroke and help determine the size and location of the stroke.
 - The Blood tests are also done to help identify conditions contributing to stroke and to guide in deciding the management include Complete blood count (including platelets, coagulation studies: prothrombin time, troponin, international normalization rate: INR), Electrolytes (sodium, potassium, calcium, chloride, etc), Blood glucose levels, Renal function tests (urea and creatinine), and Liver function tests (ASAT, ALAT), Lipid profile, Cerebrospinal fluid analysis. The Electrocardiogram can also be performed.

3. List **all nursing interventions** that have the highest priority for R.C. at this stage of his illness?

a. Assessment and management should focus on ABC:

- Oxygen therapy
- IV catheter insertion
- Blood sample collection
- Elevate the head of bed at 30 degrees
- Urinary catheterization
- Tongue protector application
- Call medical doctor for guidance

4. **What the family must expect in terms of R.C. medical condition:**

- Stroke is a significant cause of death and disability.
- The ability to perform activities of daily living may require many adaptive changes because of physical, emotional, perceptual, and cognitive deficits. There is need to assist the patient and caregiver in the transition through acute phase of care, rehabilitation, long-term care, and home care. The needs of the patient, the caregiver, and the family involvement require ongoing health education.
- The most common complications of stroke are:
 - Brain edema: swelling of brain post stroke
 - Pneumonia: causes breathing problems
 - Swallowing problems: that can potentially cause the aspiration pneumonia
 - Blood clot or deep vein thrombosis: related to limited range of motion/ physical activity
 - Aphasia and speech disorders
 - Depression and other mood disorders, chronic headache, etc

2.6. Summary of the Unit 2

A good blood circulation requires the good cardiac output related to the capacity of the heart to pump and the normal functionality of blood vessels that determine the peripheral resistance. Blood pressure is primarily a function of cardiac output and systemic vascular resistance. Any condition that can have an impact on these two aspects might have an impact on the blood pressure.

Hypotension is a decrease in systemic blood pressure below accepted values. Even though there is no accepted standard hypotensive value, the blood pressure less than systolic of 90-120mmHg/diastolic of 60-90mmHg. Some conditions that can cause hypotension are pregnancy, large amount of blood loss from injury, impaired circulation due to heart diseases, severe dehydration, anaphylactic and allergic reactions, infections of blood stream, deficiency of vitamin B12, endocrine disorders like diabetes, etc. Patient with hypotension is most commonly asymptomatic, but might have chest pain, shortness of breath, headache, fatigue and weakness, pale skin color, blurred vision, fainting when having syncope, rapid pulse, etc. Investigations of hypotension depend on the causes, but basic laboratory investigations (full blood count, urea, creatinine and electrolytes) must be ordered. Its management should focus on treating underlying causes, drink plenty of water, IV fluids, exercises, etc. The complications related to hypotension are shock, injury and if persistent deprivation of oxygen there can be damage to the heart, brain, kidney, and mainly eyes.

Hypertension is a repeatedly elevated blood pressure exceeding the 90-120mmHg as systolic and 60-90mmHg of diastolic pressure. The causes of primary hypertension are not known but some risk factors are like overweight, diabetes mellitus, alcohol consumption. Secondary hypertension results from other disorders like kidney diseases, atherosclerosis, use of contraceptives. There are modifiable and non-modifiable risk factors of hypertension. Hypertension is silent killer and is frequently asymptomatic until it becomes severe. Patient with hypertension presents with fatigue, dizziness, palpitations, chest pain, dyspnea, severe headache, anxiety and sometimes nasal bleeding (epistaxis). Investigations to be requested are full blood count, renal functions test, liver function tests, blood glucose levels, electrolytes, ECG, eyes examination, etc. Treatment plan of hypertension is based on lifestyles modifications and antihypertensive drugs. Treatment of other existing pathologies is also key. The complications related to hypertension are hypertensive emergency/crisis, myocardial infarction, heart failure, renal failure, stroke, blindness, peripheral artery diseases causing gangrene of extremities, etc.

Stroke also called cerebrovascular accident occurs when the blood supply to parts of the brain is interrupted or reduced, preventing brain tissue from getting oxygen and nutrients. Ischemic stroke represents major cases of stroke and are mainly due thrombus, emboli, hypo-perfusion and atherosclerosis resulting to reduced glucose

and oxygen to brain cells. Hemorrhagic stroke is caused by rupture of blood vessels resulting in bleeding into the brain. Signs and symptoms of stroke include headache, blurred vision, weakness of body parts, slurred speech, sudden loss of balance and coordination, and other neurological signs and symptoms. Investigations of stroke involve brain CT scan or MRI, full blood count, renal function tests, blood glucose levels, lipid profile, etc. Treatment of stroke focus primarily on airway, breathing and circulation (ABC) and aims at preventing secondary brain injury, maintain adequate airway, provide general body support, anticipate the occurrence of complications. A stroke is a medical emergency, and prompt treatment is crucial. Early recognition and action can reduce brain damage and further complications.

The complications of stroke are brain edema, pneumonia, swallowing problems that can cause aspiration pneumonia, deep vein thrombosis, aphasia and depression or other mood disorders.

2.7. Additional information

- **Myocarditis** is an inflammation of cardiac muscle, and is most commonly the result of an infectious process, frequently complicated by autoimmunity.
- **Pericarditis** is the inflammation of the pericardium.
- **Coronary artery disease / atherosclerosis:** is defined as any vascular disorder that narrows or occludes the coronary arteries; the most common cause of coronary obstruction is atherosclerosis. Risk factors of atherosclerosis are: hypertension, cigarette smoking, hyperlipidemia, diabetes mellitus, family history of heart diseases, age (men > 45 years; women > 55 years), lifestyle risk factors like obesity (BMI > 30 kg/m²), physical inactivity (Sedentary life style), atherogenic diet (fat).
- **Myocardial ischemia:** is temporarily deprivation of blood supply in myocardium. Causes include coronary atherosclerosis as the main cause, dynamic obstruction: the spasm and the constriction of coronary arteries may also cause myocardial ischemia. The coronary arteries normally supply blood flow sufficient to meet the demands of the myocardium. Oxygen is extracted from these vessels with maximal efficiency. Narrowing of a major coronary artery by more than 50% impairs blood flow enough to stop cellular metabolism when myocardial demands increase. Ischemia occurs if demand exceeds supply and develops within 10 seconds of coronary occlusion. Cardiac cells remain viable for approximately 20 minutes under ischemic conditions. If blood flow is restored, aerobic metabolism resumes, contractility is restored, and cellular repair begins. If perfusion is not restored, then myocardial infarction occurs.
- **Myocardial infarction:** is the necrosis of the myocardium related to lack of oxygen in cardiac muscle due to interruption of coronary blood flow for an extended period of time.

- **Heart failure:** is a clinical syndrome that occurs in patients who, because of an inherited or acquired abnormality of cardiac structure and/or function, develop a constellation of clinical symptoms (e.g. dyspnea and fatigue) and signs (e.g. edema) that lead to frequent hospitalizations, a poor quality of life, and a shortened life expectancy. Causes are Depressed Ejection Fraction (<40%) due to coronary artery disease, non-ischemic dilated cardiomyopathy, myocardial infarction, familial/genetic disorders, hypertension, metabolic disorder, obstructive valvular disease, regurgitant valvular disease, viral, disorders of rate and rhythm, chronic bradyarrhythmias, chronic tachyarrhythmias, etc); Preserved Ejection Fraction (>40–50%) due to primary hypertrophic cardiomyopathies, secondary hypertrophic cardiomyopathies (hypertension), aging, etc; Pulmonary Heart Disease (cor pulmonale, pulmonary vascular disorders); High-Output States (Chronic anemia, metabolic disorders, nutritional pathologies (beriberi), thyrotoxicosis, excessive blood-flow requirements, systemic arteriovenous shunting). The heart failure may be categorized as Systolic HF (previously called left-sided failure), diastolic HF (previously called right-sided failure) or mixed failure. The factors that affect pre-load, after-load, myocardial contractility, heart rate and metabolic state can lead to ventricular dysfunction and heart failure
- **Systolic failure:** Impaired left ventricle causes an inability to pump blood resulting in reduced cardiac output (diminished ejection fraction). This may be caused by impaired contractile function, valvular diseases....
- **Diastolic failure:** this is impaired ability of the ventricles to fill during diastole. The diminution of ventricles filling lead to diminution of stroke volume. High filling pressure leads to venous engorgement in both the pulmonary and systemic vascular systems. The systemic function may be normal. This may be caused by hypertension, aortic stenosis, and hypertrophic cardiomyopathy.
- **Mixed systolic and diastolic heart failure:** Although pure forms exist, in most patients with heart failure both systolic and diastolic dysfunction can be present.
- **The patient with the ventricular failure may have any of the following in various degrees:** decreased cardiac output, poor renal perfusion, decreased activity tolerance. The reduced cardiac output leads to several compensatory mechanisms such as dilation of chambers and hypertrophy (cardiomyopathy), neurohormonal response, sympathetic stimulation, ventricular remodeling.
- **Signs and symptoms of Left heart failure (systolic failure) are:** pulmonary congestion (edema): backward failure, dyspnea on exertion (decreased exercise tolerance), orthopnea, hypotension, cough (may be dry or moist with pink sputum), diminished oxygen saturation/cyanosis, capillary refill > 3sec, diminished left ventricle ejection: forward failure causes diminished tissue perfusion, oliguria and cerebral and gastro intestinal manifestations.

- **Signs and symptoms of Right failure (diastolic failure) are:** Congestion of the viscera and peripheral tissues, distension of jugular veins, narrowing pulse pressure, pitting edema, hepatomegaly, ascites, weakness, anorexia and nausea, weight gain.
- **Investigations of heart failure include:** Chest X-ray, Left ventricular ejection fraction: % of blood ejected from LV during systole (normal: 50-70%), Echocardiogram, Cardiac catheterization, Left ventriculogram: the function of LV, Pulse oximetry to rule out low oxygen saturation.
- **Management of Heart failure:** Life style modification (e.g. salt avoidance, reduction of body weight), Rest, Medication are selected according to the type of failure: ACE inhibitors, Vasodilators, Aspirin, Calcium channel blockers, Digitalis, B- blockers, Diuretics. Treat the cause: surgery (myomectomy, heart transplant, assist devices like intraaortic balloon pump)
- **Cardiac tamponade:** The accumulation of fluid in the pericardial space in a quantity sufficient to cause serious obstruction to the inflow of blood to the ventricles results in cardiac tamponade. This condition may be fatal if it is not recognized and treated promptly. Causes: The three most common causes of tamponade are neoplastic disease, idiopathic pericarditis, and pericardial effusion secondary to renal failure. Tamponade may also result from bleeding into the pericardial space either following cardiac operations and trauma (including cardiac perforation during cardiac catheterization, percutaneous coronary intervention) or from tuberculosis and hemopericardium (This may occur when a patient with any form of acute pericarditis is treated with anticoagulants.). Clinical features include Beck's triad: hypotension, soft or absent heart sounds, and jugular venous distention. Those are three principal features of tamponade, there are both limitation of ventricular filling and reduction of cardiac output, the quantity of fluid necessary to produce this critical state may be as small as 200 mL when the fluid develops rapidly or >2000 mL in slowly developing effusions when the pericardium has had the opportunity to stretch and adapt to an increasing volume. Tamponade may also develop more slowly, and under these circumstances the clinical manifestations may resemble those of heart failure, including dyspnea, orthopnea, and hepatic enlargement. Investigations include Echocardiography, Transesophageal echocardiography may be necessary to diagnose hemorrhagic effusion responsible for cardiac tamponade. Treatment is Pericardiocentesis (needle aspiration of fluid from between the visceral and parietal pericardium). Needle aspiration is hazardous because the needle can puncture the myocardium, a branch of a coronary artery, or the pleura.

Problems of the vascular system include also disorders of the arteries, veins, and lymphatic vessels. Arterial disorders are classified as atherosclerotic, aneurysmal, and non-atherosclerotic vascular diseases. Atherosclerotic vascular disease is

divided into coronary, cerebral, peripheral, mesenteric, and renal artery disease, and venous diseases, specifically venous thromboembolism and chronic venous insufficiency.

2.8 Additional activities

A. Remedial activities:

1. Information provided by the patient that would help differentiate a hemorrhagic stroke from a thrombotic stroke includes:
 - a. Sensory disturbance.
 - b. A history of hypertension.
 - c. Presence of motor weakness.
 - d. Sudden onset of severe headache.

Answer: d

2. A patient with right-sided hemiplegia and aphasia resulting from a stroke most likely has involvement of the:
 - a. Brainstem.
 - b. Vertebral artery.
 - c. Left middle cerebral artery.
 - d. Right middle cerebral artery.

Answer: c

3. While getting blood pressure checked, a client asks the nurse why it is important to control hypertension. Which nursing response is most accurate?
 - a. Sustained hypertension predisposes to narrowing of the cardiac valves.
 - b. Sustained hypertension decreases the life span of many blood cells.
 - c. Sustained hypertension leads to the formation of venous blood clots.
 - d. Sustained hypertension compromises blood flow to many vital organs

Answer: d

4. When obtaining a health history from a client, which finding is most suggestive that the client is hypertensive? (Select all that apply)
 - a. The client experiences occasional heart palpitations.
 - b. The client has observed blood in his urine.
 - c. The client has had unexplained nosebleeds.
 - d. The client has difficulty sleeping all night.
 - e. All the above

Answer: e

5. A client diagnosed with hypertension begins drug therapy using an antihypertensive agent. The nurse instructs the client's spouse to remove any objects in the home that can lead to falls. The nurse knows that the teaching has been successful when the client restates which of the following?
 - a. "Antihypertensive drugs can lead to hypotension, resulting in falls."
 - b. "Blurred vision is a common side effect of antihypertensive therapy."
 - c. "Fatigue and weakness are manifestations of antihypertensive medications."
 - d. "Antihypertensives can contribute to muscle weakness and joint instability."

Answer: a

B. CONSOLIDATION ACTIVITIES

1. For a patient who is suspected of having a stroke, one of the most important pieces of information that the nurse can obtain is:
 - a. Time of the patient's last meal.
 - b. Time at which stroke symptoms first appeared.
 - c. Patient's hypertension history and management.
 - d. Family history of stroke and other cardiovascular diseases.

Answer: b

2. When a person's blood pressure rises, the homeostatic mechanism to compensate for an elevation involves stimulation of:
 - a. Baroreceptors that inhibit the sympathetic nervous system, causing vasodilation.
 - b. Chemoreceptors that inhibit the sympathetic nervous system, causing vasodilation.
 - c. Baroreceptors that inhibit the parasympathetic nervous system, causing vasodilation.
 - d. Chemoreceptors that stimulate the sympathetic nervous system, causing an increased heart rate.

Answer: a

3. When collecting subjective data related to the cardiovascular system, which information should be obtained from the patient (select all that apply)?
 - a. Annual income
 - b. Smoking history
 - c. Religious preference

- d. Number of pillows used to sleep
- e. Blood for basic laboratory studies

Answer: b, c, and d

- 4. A thrombus that develops in a cerebral artery does not always cause a loss of neurologic function because:
 - a. The body can dissolve atherosclerotic plaques as they form.
 - b. Some tissues of the brain do not require constant blood supply to prevent damage.
 - c. Circulation via the circle of Willis may provide blood supply to the affected area of the brain.
 - d. Neurologic deficits occur only when major arteries are occluded by thrombus formation around atherosclerotic plaque.

Answer: c. The communication between the anterior and posterior cerebral circulation in the circle of Willis provides a collateral circulation, which may maintain circulation to an area of the brain if its original blood supply is obstructed. All areas of the brain require constant blood supply and atherosclerotic plaques are not readily reversed. Neurologic deficits can result from ischemia caused by many factors.

- 5. Baroreceptors are a primary mechanism of blood pressure regulation which results from the initial stimulation of what type of receptors?
 - a. Chemical
 - b. Hormonal
 - c. Neural
 - d. Pressure

Answer: c

- 6. Patients receiving fluid replacement should frequently be monitored for:
 - a. Adequate urinary output.
 - b. Changes in mental status.
 - c. Vital sign stability.
 - d. All of the above.

Answer: d

- 7. To maintain an adequate blood pressure, three components of the circulatory system must respond effectively: the _____, _____, and _____.

Answers: blood volume, cardiac pump, and vasculature

8. List three major cardiovascular risk factors: _____,
_____, and _____.
_____.

Answers: hyperlipidemia, hypertension, and diabetes mellitus

9. List six consequences of prolonged, uncontrolled hypertension on the body and its systems.

Answers: myocardial infarction, heart failure, renal failure, stroke, impaired vision, and left ventricular hypertrophy

10. Structural and functional changes in the heart and blood vessels that occur with aging and because hypertension are: _____,
_____,
_____, and _____.

Answers: accumulation of atherosclerotic plaques, fragmentation of arterial elastins, increased collagen deposits, and impaired vasodilation

11. The first priority of treatment for a patient with altered level of consciousness is:
- a. Assessment of pupillary light reflexes.
 - b. Determination of the cause.
 - c. Positioning to prevent complications.
 - d. Maintenance of a patent airway.

Answer: d

12. A nurse assesses the patient's level of consciousness using the Glasgow Coma Scale. What score indicates severe impairment of neurologic function?
- a. 3
 - b. 6
 - c. 9
 - d. 12

Answer: a

13. The most common cause of cerebrovascular disease is:
- a. Arteriosclerosis.
 - b. Embolism.

- c. Hypertensive changes.
- d. Vasospasm.

Answer: a

14. The etiology of an ischemic stroke would include a(an):
- a. Cardiogenic emboli.
 - b. Cerebral aneurysm.
 - c. Arteriovenous malformation.
 - d. Intracerebral hemorrhage.

Answer: a

15. Three possible collaborative problems for a patient recovering from an ischemic stroke are: _____, _____, and _____.

Answers: decreased cerebral blood flow, inadequate oxygen delivery to the brain, and pneumonia

16. Hemorrhagic strokes are caused by bleeding into: _____, _____, or _____.

Answers: brain tissue, the ventricles or the subarachnoid space

17. Potential complications of a hemorrhagic stroke include: _____, _____, _____, and _____.

Answers: rebleeding or hematoma expansion, cerebral vasospasm, acute hydrocephalus, and seizures

18. The most common cause of intracerebral hemorrhage is: _____.

Answer: hypertension

C. EXTENDED ACTIVITIES:

1. A patient is given an alpha 1-adrenergic agonist and experiences a reflex bradycardia. What normal mechanism of BP control is stimulated in this situation?

Answer: The vasoconstriction caused by the α_1 -adrenergic agent raises the BP, stimulating the baroreceptors. The baroreceptors send impulses to the sympathetic vasomotor center in the brainstem, which inhibits the sympathetic nervous system, resulting in a decreased heart rate (HR), decreased force of contraction, and vasodilation.

2. A 78-year-old patient is admitted with a BP of 180/98 mm Hg. Which age-related physical changes may contribute to this patient's hypertension (select all that apply)?
- a. Decreased renal function
 - b. Increased baroreceptor reflexes
 - c. Increased peripheral vascular resistance
 - d. Increased adrenergic receptor sensitivity
 - e. Increased collagen and stiffness of the myocardium
 - f. Loss of elasticity in large arteries from arteriosclerosis

Answers: a, c, e, f. The age-related changes that contribute to hypertension include decreased renal function, increased peripheral vascular resistance, increased collagen and stiffness of the myocardium, and decreased elasticity in large arteries from arteriosclerosis. The baroreceptor reflexes are blunted. The adrenergic receptor sensitivity and renin response are both decreased with aging.

3. During treatment of a patient with a BP of 222/148 mm Hg and confusion, nausea, and vomiting, the nurse initially titrates the medications to achieve which goal?
- a. Decrease the mean arterial pressure (map) to 129 mm hg
 - b. Lower the bp to the patient's normal within the second to third hour
 - c. Reduce the systolic bp (sbp) to 158 mm hg and the diastolic bp (dbp) to 111 mm hg within the first 2 hours
 - d. Decrease the sbp to 160 mm hg and the dbp to between 100 and 110 mm hg as quickly as possible

Answer: a. Initially the treatment goal in hypertensive emergencies is to reduce the mean arterial pressure (MAP) by no more than 20% to 25% in the first hour, with further gradual reduction over the next 24 hours. In this case the MAP is 172, so decreasing it by 25% equals 129. Lowering the BP too far or too fast may cause a stroke, myocardial infarction (MI), visual changes, or renal failure. Only when the patient has an aortic dissection, angina, or signs of MI or an ischemic stroke does the SBP need to be lowered to 100 to 120 mmHg or less as quickly as possible.

4. Appropriate treatment modalities for the management of cardiogenic shock include (select all that apply)
- a. Dobutamine to increase myocardial contractility.
 - b. Vasopressors to increase systemic vascular resistance.
 - c. Circulatory assist devices such as an intraaortic balloon pump.
 - d. Corticosteroids to stabilize the cell wall in the infarcted myocardium.
 - e. Trendelenburg positioning to facilitate venous return and increase preload.

Answers: a and c

5. What physical problems could precipitate hypovolemic shock (select all that apply)?
- a. Burns
 - b. Ascites
 - c. Vaccines
 - d. Insect bites
 - e. Hemorrhage
 - f. Ruptured spleen

Answers: a, b, e, f. Hypovolemic shock occurs when there is a loss of intravascular fluid volume from fluid loss (as in hemorrhage or severe vomiting and diarrhea), fluid shift (as in burns or ascites), or internal bleeding (as with a ruptured spleen). Vaccines and insect bites would precipitate the anaphylactic type of distributive shock.

6. A 70-year-old patient is malnourished, has a history of type 2 diabetes mellitus, and is admitted from the nursing home with pneumonia. For which kind of shock should the nurse closely monitor this patient?
- a. Septic shock
 - b. Neurogenic shock
 - c. Cardiogenic shock
 - d. Anaphylactic shock

Answer: a. Older adults with chronic diseases and malnourished or debilitated patients are at risk of developing septic shock, especially when they have an infection (e.g., pneumonia, urinary tract infection) or indwelling lines or catheters.

7. As the body continues to try to compensate for hypovolemic shock, there is increased angiotensin II from the activation of the renin-angiotensin-aldosterone system. What physiologic change occurs related to the increased angiotensin II?
- a. Vasodilation
 - b. Decreased blood pressure (BP) and cardiac output (CO)
 - c. Aldosterone release results in sodium and water excretion
 - d. Antidiuretic hormone (ADH) release increases water reabsorption

Answer: d. Angiotensin II vasoconstricts both arteries and veins, which increases blood pressure (BP). It stimulates aldosterone release from the adrenal cortex, which results in sodium and water reabsorption and potassium excretion by the kidneys. The increased sodium raises serum osmolality and stimulates the pituitary

gland to release antidiuretic hormone (ADH), which increases water reabsorption, which further increases blood volume, leading to an increase in BP and CO.

8. Progressive tissue hypoxia leading to anaerobic metabolism and metabolic acidosis is characteristic of the progressive stage of shock. What changes in the heart contribute to this increasing tissue hypoxia?
 - a. Arterial constriction causes decreased perfusion.
 - b. Vasoconstriction decreases blood flow to pulmonary capillaries.
 - c. Increased capillary permeability and profound vasoconstriction cause increased hydrostatic pressure.
 - d. Decreased perfusion occurs, leading to dysrhythmias, decreased CO, and decreased oxygen delivery to cells.

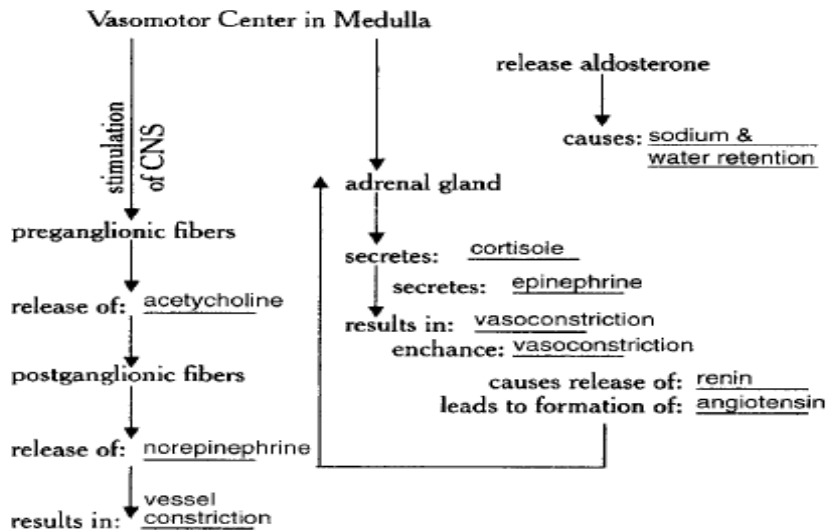
Answer: d. Decreased myocardial perfusion leads to dysrhythmias and myocardial ischemia, further decreasing CO and oxygen delivery to cells. The kidney's renin-angiotensin-aldosterone system activation causes arteriolar constriction that decreases perfusion. In the lung, vasoconstriction of arterioles decreases blood flow and a ventilation-perfusion mismatch occurs. Areas of the lung that are oxygenated are not perfused because of the decreased blood flow, resulting in hypoxemia and decreased oxygen for cells. Increased capillary permeability and vasoconstriction cause increased hydrostatic pressure that contributes to the fluid shifting to interstitial spaces.

2.9. Expected answers to end unit 2 assessment

SECTION A: Short Answer Questions

1. HEART RATE and STROKE VOLUME
2. HEART, KIDNEYS, BRAIN, AND EYES

3.



4.

- a. **Weight reduction:** overweight persons have an increased incidence of hypertension and increased risk for cardiovascular diseases. When a person decreases caloric intake, sodium and fat intake are usually also reduced. Although reducing the fat content of the diet has not been shown to produce sustained benefits in blood pressure control, it may slow the progress of atherosclerosis and reduce overall cardiovascular diseases risk.
- b. **Dietary sodium and potassium reduction:** this involves avoiding foods known to be high in sodium and not adding salt in the preparation of foods or at meals.
- c. **Avoid/Moderation of alcohol consumption,**
- d. **Regular physical activity:** physically active lifestyle is essential to promote and maintain good health. Physical activity is more likely to be done if it is safe and enjoyable, fits easily into one's daily schedule, and is inexpensive. People with hypertension must increase their physical activity. Advise sedentary people to increase activity levels gradually.
- e. Avoidance of tobacco use (smoking and chewing), and
- f. **Management of psychosocial risk factors.**
- g. **Medications:** the drugs currently available for treating hypertension have two main actions: (1) they decrease the volume of circulating blood and (2) they reduce systemic vascular resistance. The drugs used in the treatment of hypertension include diuretics, the adrenergic inhibitors, direct vasodilators, angiotensin and renin inhibitors, and calcium channel blockers.

5. Drugs that are used in management of hypertension:

- Drugs acting on Sympathetic Nervous System
 - Beta blockers: eg: Atenolol, Propranolol, Carvedilol.
 - Alpha blockers
- Centrally Acting Antihypertensive Drugs
 - α_2 -adrenoceptor agonists: eg: Clonidine, Methyldopa.
- Drugs affecting Renin-Angiotensin System
 - ACE inhibitors; eg: captopril, Lisinopril Captopril, and Lisinopril
 - Angiotensin receptor blockers; eg: Losartan
 - Direct renin inhibitors
- Diuretics; eg: Spironolactone, Hydrochlorothiazide and Furosemide
- Vasodilators:
 - Calcium channel blockers; e.g . Nifedipine, Amlodipine
 - Potassium channel openers

6. Hypertensive crisis is a term used to indicate either a hypertensive urgency or emergency. This is determined by the degree of target organ disease and how quickly the blood pressure must be lowered.

A hypertensive emergency develops over hours to days. It is a situation, in which a patient's blood pressure is severely elevated (often above 220/140 mm Hg) with clinical evidence of target organ disease. It can cause encephalopathy, intracranial or subarachnoid hemorrhage, acute left ventricular failure, myocardial infarction, renal failure, dissecting aortic aneurysm, and retinopathy.

Hypertensive urgency develops over days to weeks. This is a situation in which a patient's blood pressure is severely elevated (usually above 180/110 mm Hg), but there is no clinical evidence of target organ disease.

Prompt recognition and management of hypertensive crisis are essential to decrease the threat to organ function and life. Hypertensive crisis occurs more often in patients with a history of hypertension who have not adhered to their medication regimens or who have been under-medicated. In such cases, rising blood pressure is thought to trigger endothelial damage and the release of vasoconstrictor substances.

7. AGE, GENDER, HEREDITY/FAMILY HISTORY, RACE

8. Difference between Ischemic and hemorrhagic stroke:

Ischemic (represent 80% of all Strokes): mainly due to thrombus, emboli, systemic hypo perfusion, and atherosclerosis. When ischemic strokes occur, glucose and oxygen to brain cells are reduced. The reduced glucose quickly

depletes the stores of adenosine triphosphate (ATP), resulting in anaerobic cellular metabolism and the accumulation of toxic products such as lactic acid. Although some brain cells die from anoxia, the lack of oxygen destroys additional brain cells by a secondary mechanism.

Hemorrhagic (represent 20% of all Strokes): due to intracerebral hemorrhage (ICH) or subarachnoid hemorrhage (SAH). Hypertension is the most important cause. This type of stroke results from bleeding into the brain tissue itself or into the subarachnoid space or ventricles. Hemorrhage commonly occurs during periods of activity. It often has a sudden onset of symptoms, with progression over minutes to hours because of ongoing bleeding.

9. The Nurse would focus the care on following interventions: improving mobility and preventing joint deformities, preventing shoulder pain, enhancing self-care, managing sensory perceptual difficulties, managing dysphagia, attaining bladder and bowel control, improving communication, maintaining skin integrity, helping with family coping.
- 10.

Laboratory investigation	Rationale
Blood urea nitrogen (BUN): 48 mg/dL (17.1 mmol/L)	Elevated BUN and creatinine may indicate destruction of glomeruli and tubules of the kidney resulting from hypertension.
Creatinine: 4.3 mg/dL (380 mmol/L)	
Serum K+: 3.1 mEq/L (3.1 mmol/L)	Serum potassium levels are decreased when hypertension is associated with hyperaldosteronism.
Serum uric acid: 9.2 mg/dL (547 mmol/L)	An increased uric acid level may be caused by diuretics used to treat hypertension.
Fasting blood glucose: 183 mg/dL (10.2 mmol/L)	Fasting glucose levels are elevated when hypertension is associated with glucose intolerance and insulin resistance.
Low-density lipoproteins (LDL): 154 mg/dL (4.0 mmol/L)	An elevated LDL level indicates an increased risk for atherosclerotic changes in the patient with hypertension.

11.
 - a. Dietary modifications to restrict sodium, cholesterol, and saturated fat; maintain intake of potassium, calcium, and magnesium; and promote weight reduction if overweight

- b. Daily moderate-intensity physical activity for at least 30 minutes on most days of the week
- c. Cessation of smoking (if a smoker)
- d. Moderation or cessation of alcohol intake; usually medications and monitor BP at home.
- e. Also, psychosocial risk factors must be addressed.

12.

Type of Shock	Medical Therapies
Cardiogenic	Restore coronary artery blood flow with thrombolytic therapy, angioplasty, emergency revascularization; increase CO with inotropic agents; reduce workload by dilating coronary arteries, decreasing preload and afterload; use circulatory assist devices, such as an intra-aortic balloon pump
Hypovolemic	Fluid and blood replacement, control of bleeding with pressure, surgery
Septic	Fluid resuscitation, antimicrobial agents, inotropic agents with vasopressors
Anaphylactic	Epinephrine, inhaled bronchodilators, colloidal fluid replacement, diphenhydramine, corticosteroids

SECTION B: Multiple Choice Questions

- | | |
|-------|-------------|
| 1. B | 12. A |
| 2. D | 13. D |
| 3. D | 14. D |
| 4. D | 15. A, B, E |
| 5. B | 16. C, D |
| 6. D | 17. B |
| 7. D | 18. D |
| 8. C | 19. B |
| 9. C | 20. D |
| 10. B | 21. D |
| 11. C | |

UNIT 3

PATHOLOGIES OF GASTROINTESTINAL SYSTEM

3.1. Key unit competence

To take an appropriate decision on management of common pathologies of digestive system.

3.2. Prerequisite (knowledge, skills, attitudes, and values)

To achieve the above competence, the associate nurse student needs to have learnt the following subjects:

- **Human body anatomy and physiology:** Anatomy of Digestive tube, Physiology of digestion.
- **Fundamental of Nursing:** Vital signs and parameters measurements and interpretation, Drugs administration, History taking, Complete health assessment from head to toes through interview and Physical assessment regarding gastrointestinal system.
- **Ethics and professional code of conduct:** Respect of principles of ethics during management of a patient with gastrointestinal diseases. The Associate Nurse student should demonstrate good behaviors while interacting with the patient.
- **Pharmacology:** Drugs acting on gastrointestinal system (drugs that increase or decrease the bowel movements).

3.3. Cross-cutting issues to be addressed

Cross-cutting issues to be addressed

Standardization culture

All health care facilities must use same standard and accurate equipment and techniques in the management of the medical conditions. During the field trips, the teacher should ensure the availability of standard medical equipment and technics before selecting the health care facility to use. The learners have to learn the use of those standards' equipment and technics in the management of patients with gastrointestinal diseases.

Inclusive education

All students should participate in all activities without discrimination of a student with any disability. This may be challenging to students with special educational needs especially those with disabilities, slow learners, those with low self-esteem, etc. However, the teacher can make some arrangements like:

- Grouping students: Students with special educational needs are grouped with others and assigned roles basing on individual student's abilities. Providing procedure/checklists or protocols earlier before the practical work so that students get familiar with them. They can be written on the chalkboard or printed depending on available resources. If you have students with low vision, remember to print in appropriate fonts. Also, you are supposed to pay attention to all categories of learners.
- Every important point is written and spoken. The written points help students with hearing impairment and speaking aloud helps students with visual impairment.
- Remember to repeat the main points of the lessons.

Gender education

Emphasize to learners that anybody irrespective of their gender can be a health care professional. The teacher must present some role models of people who have been successful in medical and nursing professions in the area where the learners come from. Make sure that during practical work both boys and girls shares and participate equally in practices, arranging and proper hygiene after procedures.

3.4. Guidance on the introductory activity

During this introductory activity 3.0, students should remember the anatomy and physiology of gastrointestinal system and digestion learnt from Biology. They will be encouraged go back to read and review the health assessment of gastrointestinal system.

Teacher's activity

- Using brainstorming every learner is given opportunity to answer the questions
- Teacher writes on whiteboard the correct answers from the learners.

The expected answers to introductory activity 3.0

- The patient complains could be abdominal pain, nausea, and vomiting.
- The body system which is affected is Gastrointestinal system.
- The possible medical conditions of that patient could be Gastritis and Gastroenteritis.

3.5. List of Lessons/sub-headings (Including Assessment)

#	Lessons	Learning objectives	Number of periods
1	Gastritis: Introduction to gastrointestinal pathologies, Description of causes, risk factors, pathophysiology, signs and symptoms of Gastritis, and its Investigations.	1. List the common medical pathologies of Digestive system: Gastritis, Diarrhea, and Constipation) 2. Describe causes, risk factors and pathophysiology of Gastritis. 3. Describe the signs and symptoms of gastritis 4. Enumerate the investigations requested for Gastritis.	1
2	Gastritis: Medical diagnosis and Medical and Nursing Management plan of patient with Gastritis	5. Gastritis: 6. Identify the adequate medical diagnosis of gastritis. 7. Develop a medical and nursing management plan for patient with gastritis.	1
3	Gastritis: Evolution and complications of Gastritis. End of sub-unit self- assessment	8. Explain the evolution and complications of the gastritis. 9. Take appropriate decision regarding management of patient with gastritis (using the Case study and end sub-topic self-assessment Questions)	1
4	Diarrhea: Description of causes, risk factors, pathophysiology, signs and symptoms of Diarrhea, and its Investigations.	10. Describe causes, risk factors and pathophysiology of Diarrhea. 11. Describe the signs and symptoms of Diarrhea. 12. Enumerate the investigations requested for Diarrhea.	1

5	Diarrhea: Medical diagnosis and medical and Nursing Management plan of patient with Diarrhea.	13. Identify the adequate medical diagnosis of Diarrhea. 14. Develop a medical and nursing management plan for patient with Diarrhea.	1
6	Diarrhea: Evolution and complications of diarrhea. End of sub-unit self- assessment	15. Explain the evolution and complications of the Constipation. 16. Take appropriate decision regarding management of patient with Constipation (using the Case study and end sub-topic self-assessment Questions)	1
7	Constipation: Description of causes, risk factors, pathophysiology, signs and symptoms of Constipation, and its Investigations.	17. Describe causes, risk factors and pathophysiology of Constipation. 18. Describe the signs and symptoms of constipation. 19. Enumerate the investigations requested for Constipation.	1
8	Constipation: Medical diagnosis and medical and Nursing Management plan of patient with Constipation.	20. Identify the adequate medical diagnosis of Constipation. 21. Develop a medical and nursing management plan for patient with Constipation.	1
9	Constipation: Evolution and complications of constipation. End of sub-unit self- assessment	22. Explain the evolution and complications of the Constipation. 23. Take appropriate decision regarding management of patient with Constipation (using the Case study and end sub-topic self-assessment Questions)	1

10	End unit assessment	24. Take appropriate decisions regarding management of Gastrointestinal pathologies (Gastritis, Diarrhea, Constipation) 25. Identify the strengths and gaps of learners on appropriate decisions in the management of common pathologies of gastrointestinal system. 26. Prepare the feedback to students 27. Organize different additional learning activities.	1
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Lesson 1: Introduction to gastrointestinal pathologies, Description of causes, risk factors, pathophysiology, signs and symptoms of Gastritis, and its Investigations.

a) Prerequisites

This is the first lesson the third unit medical pathologies of gastrointestinal system. In this lesson, you will be dealing with the common medical pathologies, which are Gastritis, Diarrhea and Constipation. The first thing to do before starting teaching is to remind learners that they have learnt about digestive tract and foods digestion, health assessment of gastrointestinal system from fundamentals of nursing, and let them discuss the questions as indicated in introductory activity 3.0 , and from the case study from learning activity 3.1 so that they can prepare themselves for this lesson.

b) Learning objectives

- List the common medical pathologies of Digestive system: Gastritis, Diarrhea, and Constipation)
- Describe causes, risk factors and pathophysiology of Gastritis.
- Describe the signs and symptoms of gastritis
- Enumerate the investigations requested for Gastritis.

c) Teaching resources

The teacher could avail the figures of anatomy of digestive tract and images which illustrate the gastritis, diarrhea and constipation. Also, the teacher should present to the students the library textbooks on medical-surgical nursing especially gastrointestinal diseases and indicates the pages. All students must have their student's books. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities:

Teacher` activities, and methodology

- Group the students into groups of 5 students, ask learners to read the learning activity 3.1 in their student book and answer the questions related using/ referring to the library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide they answers
- Ask other students from groups to follow carefully the answers provided by students
- Note on the blackboard the main student`s ideas.
- Tick the correct responses and correct those ones which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will carefully read the case study from learning activity 3.1 in their groups using their student books
- To carefully read the case study and answer the indicated
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from questions of learning activity 3.1

- 1) The abnormal signs and symptoms that patient was presenting are epigastric pain (upper abdominal pain), anorexia, nausea. vomiting, general body weakness, pallor conjunctiva, complete blood count (CBC) was performed and revealed white blood cells (WBC) of 10500, Hemoglobin level of 9 mg/ dl, Helicobacter Pylori test was Positive.

- 2) The investigations that have been ordered to guide the confirmation of the medical diagnoses are complete blood count (CBC) and Helicobacter Pylori test.

Lesson 2: Medical diagnosis and medical and Nursing Management plan of patient with Gastritis

a) Prerequisites

This is the second lesson from the third unit of medical pathologies of gastrointestinal system. In this lesson, you will be dealing with medical diagnosis and nursing management plan of patient with gastritis. The first thing to do before starting teaching is to remind learners what they have learnt from lesson 1 that are related to gastritis, its causes, risk factors and pathophysiology, signs and symptoms, investigations. The students must also know the foods digestion and foods that can irritate the stomach lining. You will let students discuss the questions as indicated in the case study from learning activity 3.1 so that they can prepare themselves for this lesson.

b) Learning objectives:

- Identify the adequate medical diagnosis of gastritis.
- Develop a medical and nursing management plan for patient with gastritis.

c) Teaching resources

The teacher should orient the students to library for library textbooks on medical-surgical nursing, especially gastrointestinal diseases and indicates the pages. All students must have their student's books. The internal medicine clinical treatment guidelines (2012) must be availed. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher' activities and methodology:

- Group the students into groups of 5 students, ask learners to read the learning activity 3.1 in their student book and answer the questions related using/ referring to the library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide they answers
- Ask other students from groups to follow carefully the answers provided by students

- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones, which are incorrect and try again to complete those, which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will carefully read the case study from learning activity 3.1 in their groups using their student books
- To carefully read the case study and answer the indicated questions
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from questions of learning activity 3.1

- a. The medical diagnoses of this patient could be gastritis and peptic ulcer disease
- b. The management of this case includes clarithromycin, omeprazole and Flagyl, Vit B12, blood transfusion and to quit smoking and alcohol intake.

Lesson 3: Evolution and complications of Gastritis. End of sub-unit self- assessment

a) Prerequisites

This is the third lesson from the third unit of medical pathologies of gastrointestinal system. In this lesson, you will be dealing with evolution and complications of Gastritis. After, the students can proceed to the self-assessment on this subunit of Gastritis. The first thing to do before starting teaching is to remind learners what they have learnt from lesson 1 and 2 that are related to gastritis, its causes, risk factors and pathophysiology, signs and symptoms, investigations, and treatment plan. You will let students discuss the questions as indicated in the case study from learning activity 3.1 so that they can prepare themselves for this lesson.

b) Learning objectives

- Explain the evolution and complications of the gastritis.
- Take appropriate decision regarding management of patient with gastritis (using the Case study and end sub-topic self-assessment Questions)

c) Teaching resources

The teacher should orient the students to library for library textbooks on medical-surgical nursing, especially gastrointestinal diseases and indicates the pages. All students must have their student's books. The internal medicine clinical treatment guidelines (2012) must be availed. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher' activities and methodology

- Group the students into groups of five students, ask learners to read the learning activity 3.1 in their student book and answer the questions related using/referring to the library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide they answers
- Ask other students from groups to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones, which are incorrect and try again to complete those, which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will carefully read the case study from learning activity 3.1 in their groups using their student books
- To carefully read the case study and answer the indicated questions
- Student will participate in answering questions
- Other students will follow when someone will be presenting

- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from questions of learning activity 3.1

4. If not treated, the consequences will be:

Anemia: *H. pylori* can cause gastritis or stomach ulcers (sores in the stomach) that bleed,

Pernicious anemia due to the autoimmune gastritis can affect how the body absorbs vitamin B12, which put the client at risk of pernicious anemia when there is not enough B12 intake to make healthy red blood cells.

Peritonitis may occur when stomach ulcers are worse.

Sepsis and even **death** when adequate measures are not taken timely.

Stomach cancer: Gastritis caused by *H. pylori* and autoimmune disease can cause growths in the stomach lining. These growths increase the patient's risk of developing **stomach cancer**.

The expected answers from questions of self-assessment on subunit of Gastritis:

The term gastritis is defined as an inflammation of the stomach lining (gastric mucosa). It can be classified as acute gastritis (erosive) or chronic gastritis (non-erosive).

The causes and triggering factors contributing to the gastritis development are:

Dietary indiscretions; **Bile reflux** (reflux of duodenal contents): the liver makes bile to help you digest fatty foods. "Reflux" means flowing back. Bile reflux occurs when bile flows back into the stomach instead of moving through the small intestine.

Medications: Steady use of nonsteroidal anti-inflammatory drugs (NSAIDs) such as **Aspirin** or corticosteroids to manage chronic pain can irritate the stomach lining,

Alcohol or **caffeine:** Chronic alcohol use can irritate the stomach lining.

Autoimmune disease: In some people, the body's immune system attacks healthy cells in the stomach lining.

Cigarette smoking.

Ingestion of poisons or corrosive substances.

Food allergies.

Infection.

In addition, gastric ischemia secondary to vasoconstriction caused by a stress response.

The bacterial infection: *Helicobacter pylori* may contribute to chronic gastritis; the bacteria break down the stomach's protective lining and cause inflammation.

Physical stress: A sudden, severe illness or injury can bring on gastritis. Gastritis often develops even after a trauma that does not involve the stomach. Severe burns and brain injuries are the two common causes of gastritis.

The risk of developing gastritis goes up with age. **Older adults** have thinner stomach linings, decreased circulation and a slower metabolism of mucosal repair, they are also more likely to be on drugs that can cause gastritis such as nonsteroidal anti-inflammatory drugs, and other bacteria (staphylococci, streptococci, *Escherichia coli*), Herpes simplex virus, cytomegalovirus (in acquired immunodeficiency syndrome; AIDS).

In addition, the stress can induce acute gastritis especially for the critically ill patients. There are other risk factors such as alcohol, caffeine, food-containing acids (vinegar and pepper).

The different treatment options for a patient with acute gastritis are:

Emergency treatment in case of poisons.

In acute cases, eating is restricted and **IV fluids** such as Ringer lactate or normal saline are given to correct dehydration and electrolyte imbalances, particularly if vomiting is severe.

Antiemetics are prescribed to control nausea and vomiting.

Antibiotics such as amoxicillin (Amoxil) and clarithromycin (Biaxin), which exert bactericidal effects to eradicate *H. pylori*.

Amebicides: Metronidazole (Flagyl) assists in the eradication of *H. pylori* may be prescribed to inhibit or destroy infection.

The avoidance of irritating substances, such as alcohol and NSAIDs. Some clients may wish to avoid spicy foods, high-fat foods, and caffeine, depending on the degree to which these items aggravate their symptoms.

Various drugs, such as antacids, **H₂- receptor antagonists such as Cimetidine**, and **proton pump inhibitors** such as **Omeprazole** may be prescribed to reduce the amount of stomach acid production.

Proton pump inhibitors also treat stomach ulcers and gastroesophageal reflux disease (GERD).

Antacids: example includes Aluminium Hydroxide $\text{Al}(\text{OH})_3$.

The preventive measures to be taken to prevent gastritis:

The preventive measures of gastritis may be encouraged to the general population such as practicing good hygiene (hand- washing) to decrease the risk of *H. pylori* infection transmission. *H. pylori*, can be contagious via the fecal-to-oral route. Good hand washing before handling of foods and proper sanitation (sewer and water systems) are the first line of defense against spread. Many people can develop gastritis after being infected with *H. pylori* bacteria, *minimizing* indigestion and heartburn as these conditions are linked to gastritis, avoiding fatty, spicy or acidic foods, cutting back on caffeine, eating smaller meals throughout the day, managing stress, not taking NSAIDs, reducing alcohol consumption and not lying down for 2 to 3 hours after a meal would be taught to minimize the risk of contracting gastritis.

The possible investigations to be performed to confirm gastritis:

A **complete blood count** (CBC) may reveal anemia from chronic blood loss. **Stool testing** for occult blood often detects the presence of RBCs (Red blood cells) in the stool. In difficult cases, **gastroscopy** or **colonoscopy** may be performed to visualize the mucosa and obtain specimens, which are examined for pathogens or cellular abnormalities. ***H. pylori* test** may also be performed to rule out *H. pylori* bacterial infection.

If acute gastritis is not well treated, the complications will be:

Anemia: *H. pylori* can cause gastritis or stomach ulcers (sores in your stomach) that bleed, thereby lowering your red blood counts (called anemia).

Pernicious anemia due to the autoimmune gastritis can affect how the body absorbs vitamin B12 which put the client at risk of pernicious anemia when there is not enough B12 intake to make healthy red blood cells.

Peritonitis may occur when stomach ulcers are worse.

Sepsis and **even death** when adequate measures are not taken timely.

Stomach cancer: Gastritis caused by *H. pylori* and autoimmune disease can cause growths in the stomach lining. These growths increase the patient's risk of developing stomach cancer.

Lesson 4: Description of causes, risk factors, pathophysiology, signs and symptoms of Diarrhea, and its Investigations.

a) Prerequisites

This is the fourth lesson from the third unit of medical pathologies of gastrointestinal system. In this lesson, you will be dealing with Diarrhea as a disorder of elimination. The first thing to do before starting teaching is to remind learners that they have learnt about digestive tract and foods digestion, health assessment of gastrointestinal system from fundamentals of nursing, and let them discuss the questions as indicated in introductory activity 3.0 and from the case study from learning activity 3.2 so that they can prepare themselves for this lesson.

b) Learning objectives:

- Describe causes, risk factors and pathophysiology of Diarrhea.
- Describe the signs and symptoms of Diarrhea.
- Enumerate the investigations requested for Diarrhea.

c) Teaching resources

The teacher could avail the figures of anatomy of digestive tract and images which illustrate the diarrhea. In addition, the teacher should present to the students the library textbooks on medical-surgical nursing, especially gastrointestinal diseases and indicates the pages. All students must have their student's books. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher' activities and methodology

- Group the students into groups of 5 students, ask learners to read the learning activity 3.2
- in their student book and answer the questions related using/referring to the library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide they answers
- Ask other students from groups to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones, which are incorrect and try again to complete those, which are incomplete.

- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will carefully read the case study from learning activity 3.2 in their groups using their student books
- To carefully read the case study and answer the indicated questions
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from questions of learning activity 3.2

1. The abnormal signs and symptoms that patient was presenting are of headache, abdominal pain, discomfort, and cramps (mesogastric pain and epigastric pain), tiredness, anorexia, nausea, thirst, frequent watery stool elimination with fats containing 5times a day. Blood pressure (BP) 70/35mmHg, Pulse rate (PR) was 123bpm.

The investigations that have been ordered to guide the confirmation of the medical problem are stool examination and blood smear.

Lesson 5: Medical Diagnosis and Medical and Nursing Management Plan of Patient with Diarrhea.

a) Prerequisites

This is the firth lesson from the third unit of medical pathologies of gastrointestinal system. In this lesson, you will be dealing with Diarrhea as a disorder of elimination. The first thing to do before starting teaching is to remind learners that they have learnt about digestive tract and foods digestion, health assessment of gastrointestinal system from fundamentals of nursing, and let them discuss the questions as indicated in introductory activity 3.0 and from the case study of learning activity 3.2 so that they can prepare themselves for this lesson.

b) Learning objectives

- Identify the adequate medical diagnosis of Diarrhea.
- Develop a medical and nursing management plan for patient with Diarrhea.

c) Teaching resources

The teacher could avail the figures of anatomy of digestive tract and images which illustrate the diarrhea. In addition, the teacher should present to the students the library textbooks on medical-surgical nursing, especially gastrointestinal diseases and indicates the pages. All students must have their student's books. The internal medicine clinical treatment guidelines (2012) must be availed. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher' activities and methodology:

- Group the students into groups of 5 students, ask learners to read the learning activity 3.1 in their student book and answer the questions related using/ referring to the library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide they answers
- Ask other students from groups to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones, which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will carefully read the case study from learning activity 3.1 in their groups using their student books
- To carefully read the case study and answer the indicated questions
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from questions of learning activity 3.2

2. Basing on those signs and symptoms, the medical problem of this patient is Diarrhea caused by amoebic infection.

The management of this case includes Ringer lactate 2liters bolus intravenous, Loperamide and oral rehydration salts to be taken home after intravenous rehydration.

Lesson 6: Evolution and complications of diarrhea. End of sub-unit self- assessment

a) Prerequisites

This is the sixth lesson from the third unit of medical pathologies of gastrointestinal system. In this lesson, you will be dealing with Diarrhea as a disorder of elimination. The first thing to do before starting teaching is to remind learners that they have learnt about digestive tract and foods digestion, health assessment of gastrointestinal system from fundamentals of nursing, and let them discuss the questions as indicated in introductory activity 3.0 and from the case study of learning activity 3.2 so that they can prepare themselves for this lesson.

b) Learning objectives

- Explain the evolution and complications of the Constipation.
- Take appropriate decision regarding management of patient with Constipation (using the Case study and end sub-topic self-assessment Questions)

c) Teaching resources

The teacher could avail the figures of anatomy of digestive tract and images which illustrate the diarrhea. In addition, the teacher should present to the students the library textbooks on medical-surgical nursing, especially gastrointestinal diseases and indicates the pages. All students must have their student's books. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher' activities and methodology:

- Group the students into groups of five students, ask learners to read the learning activity 3.2 in their student book and answer the questions related using/referring to the library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems

- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide the answers
- Ask other students from groups to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones, which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will carefully read the case study from learning activity 3.2 in their groups using their student books
- To carefully read the case study and answer the indicated questions
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from questions of learning activity 3.2

- The following investigations have been ordered to guide the confirmation of the medical problem:
 - Stool examination
 - Blood smear
- The following was included in the management of this case:
 - Ringer lactate 2 liters bolus through intravenous
 - Loperamide and oral rehydration salts (to be taken at home)
- The appropriate topics of health education for this case should be Improving sanitation mainly **drinking water, Hand washing, Dietary adjustments, and Oral rehydration.**

The expected answers from questions of self-assessment on subunit of Diarrhea

1. Distinguish acute from chronic diarrhea

Items	Acute Diarrhea	Chronic Diarrhea
Symptoms	Diarrhea, cramps, and vomiting	Diarrhea that persists longer than 4 weeks
Causes	Viral infections: rotavirus, Norwalk virus, cytomegalovirus, herpes simplex virus, and viral hepatitis. Food intolerances: as lactose; the sugar found in milk, milk-protein allergies. Parasites: <i>Giardia lamblia</i>, <i>Entamoeba histolytica</i> Reaction to medicines: Antibiotics, cancer drugs, antacids containing magnesium, laxatives, digitalis, metformin, cholesterol lowering agents, Lithium, Theophylline, Thyroid hormone and colchicine. Intestinal diseases: Inflammatory bowel disease, colitis, Crohn's disease, Congenital a ganglionic megacolon Too much caffeine or alcohol Toxins such as insecticides A digestive problem: celiac disease or pancreatic problems.	Secretory causes: Bowel resection, disease, or fistula, Chronic ethanol ingestion, other drugs, and toxins. Inflammatory causes: Idiopathic inflammatory bowel disease. Osmotic causes: Osmotic laxatives (Mg²⁺, PO₄⁻³, SO₄⁻²) Lactase and other disaccharide deficiencies. Dysmotility causes Hyperthyroidism, Post vagotomy. Iatrogenic causes Cholecystectomy, Ileal resection. Steatorrhea causes liver disease, pancreatic exocrine insufficiency.

Five causes of diarrhea disease development:

- **Osmotic Diarrhea**
 - **Secretory Diarrhea**
 - **Inflammatory and Infectious Diarrhea**
 - **Diarrhea Associated with Deranged Motility**
 - **Idiopathic causes**
3. The treatment options for a patient with diarrhea disease are the following:
- **Administration of an antidiarrheal agent, Fluid and electrolyte replacement** by the oral or the intravenous (IV) route,
 - **Dietary adjustments**, which may involve eliminating foods that cause diarrhea, encourage potassium-rich foods as tolerated,
 - **Total parenteral nutrition (TPN)** if diarrhea is severe and prolonged and if the introduction of oral fluid and food results in another episode of diarrhea, **Reintroducing food** after a bout of diarrhea usually calls for a diet low in insoluble fiber to reduce the volume of stool. Give clear liquids as tolerated but limit high-sugar drinks. Advance oral intake as tolerated. Teach client to avoid foods high in insoluble fiber, such as whole grain bread and cereals, bran cereals, and raw vegetables. Advise client to avoid carbonated beverages or drinking with a straw.
4. Three preventive measures to take to prevent diarrhea disease: Improving sanitation mainly drinking water, Hand washing, and Immunization against the pathogens that cause diarrheal disease.
5. The possible investigations to perform to rule out diarrhea disease are routine stool cultures, routine ova, and parasite analysis, a proctosigmoidoscopy or colonoscopy, radiologic examination of the small bowel, and Upper GI endoscopy.

Lesson 7: Description of causes, risk factors, pathophysiology, signs and symptoms of Constipation, and its Investigations.

a) Prerequisites

This is the seventh lesson from the third unit of medical pathologies of gastrointestinal system. In this lesson, you will be dealing with Constipation as a disorder of elimination. The first thing to do before starting teaching is to remind learners that they have learnt about digestive tract and foods digestion, health assessment of gastrointestinal system from fundamentals of nursing, and let them discuss the questions as indicated in introductory activity 3.0 and from the case study of learning activity 3.3 so that they can prepare themselves for this lesson.

b) Learning objectives

- Describe causes, risk factors and pathophysiology of Constipation.
- Describe the signs and symptoms of constipation.
- Enumerate the investigations requested for Constipation.

c) Teaching resources

The teacher could avail the figures of anatomy of digestive tract and images which illustrate the diarrhea. In addition, the teacher should present to the students the library textbooks on medical-surgical nursing, especially gastrointestinal diseases and indicates the pages. All students must have their student's books. The internal medicine clinical treatment guidelines (2012) must be availed. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher' activities and methodology:

- Group the students into groups of 5 students, ask learners to read the learning activity 3.3 in their student book and answer the questions related using/ referring to the library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide they answers
- Ask other students from groups to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones, which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will carefully read the case study from learning activity 3.3 in their groups using their student books
- To carefully read the case study and answer the indicated questions

- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from questions of learning activity 3.3

The abnormal signs and symptoms that patient was presenting are having infrequent bowel movements and bloating, bowel movements of hard, pellet-like stools every two or three days, they have decreased in frequency to every three or four days and are preceded by bloating and discomfort in the left lower quadrant, the patient also usually strains excessively to pass stools.

Basing on those signs and symptoms, the medical problem of this patient could be Constipation.

Lesson 8: Medical diagnosis and medical and Nursing Management plan of patient with Constipation

a) Prerequisites

This is the eighth lesson from the third unit of medical pathologies of gastrointestinal system. In this lesson, you will be dealing with Constipation as a disorder of elimination. The first thing to do before starting teaching is to remind learners that they have learnt about digestive tract and foods digestion, health assessment of gastrointestinal system from fundamentals of nursing, and let them discuss the questions as indicated in introductory activity 3.0 and from the case study of learning activity 3.3 so that they can prepare themselves for this lesson.

b) Learning objectives

- Identify the adequate medical diagnosis of Constipation.
- Develop a medical and nursing management plan for patient with Constipation.

c) Teaching resources

The teacher could avail the figures of anatomy of digestive tract and images which illustrate the diarrhea. In addition, the teacher should present to the students the library textbooks on medical-surgical nursing, especially gastrointestinal diseases and indicates the pages. All students must have their student's books. The internal medicine clinical treatment guidelines (2012) must be availed. There is a need of black board and chalks or flipcharts and markers.

d) Learning activities

Teacher' activities and methodology:

- Group the students into groups of 5 students, ask learners to read the learning activity 3.3 in their student book and answer the questions related using/ referring to the library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide they answers
- Ask other students from groups to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones, which are incorrect and try again to complete those which are incomplete.
- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will carefully read the case study from learning activity 3.3 in their groups using their student books
- To carefully read the case study and answer the indicated questions
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from questions of learning activity 3.2

The management of this case includes treating the cause, for quick symptomatic relief, the physician prescribes an enema or a laxative in oral (polyethylene glycol is better tolerated) or suppository form, followed by prophylactic administration of a stool softener. Dietary management also is promoted. Encourage fiber food intake (green vegetables, fruits like papaya), fluid intake. Advise physical exercises

The appropriate topics of health education to prevent of the above medical condition are appropriate diet in prevention of constipation.

Lesson 9: Evolution and complications of constipation, End of sub-unit self- assessment.

a) Prerequisites

This is the ninth lesson from the third unit of medical pathologies of gastrointestinal system. In this lesson, you will be dealing with evolution and complications of constipation. After, the students can proceed to the self-assessment on this subunit of constipation. The first thing to do before starting teaching is to remind learners what they have learnt from lesson 7 and 8 that are related to constipation, its causes, risk factors and pathophysiology, signs and symptoms, investigations, and treatment plan. You will let students discuss the questions as indicated in the case study from learning activity 3.3 so that they can prepare themselves for this lesson.

b) Learning objectives

- Explain the evolution and complications of the Constipation.
- Take appropriate decision regarding management of patient with Constipation (using the Case study and end sub-topic self-assessment Questions)

c) Teaching resources

The teacher could avail the figures of anatomy of digestive tract and images which illustrate the diarrhea. In addition, the teacher should present to the students the library textbooks on medical-surgical nursing, especially gastrointestinal diseases and indicates the pages. All students must have their student's books. The internal medicine clinical treatment guidelines (2012) must be availed. There is a need of black board and chawks or flipcharts and markers.

d) Learning activities

Teacher' activities and methodology:

- Group the students into groups of five students, ask learners to read the learning activity 3.3 in their student book and answer the questions related using/referring to the library textbooks.
- Provide the necessary materials.
- Move around in silence to monitor if they are having some problems
- Remember to assist those who are weak but without giving them the knowledge.
- Invite each group to select one team member to provide they answers
- Ask other students from groups to follow carefully the answers provided by students
- Note on the blackboard the main student's ideas.
- Tick the correct responses and correct those ones, which are incorrect and try again to complete those which are incomplete.

- Harmonize and conclude on the learned knowledge and still engage student in making that conclusion.

Student activity:

- Students will be into different groups
- Each team will elect the team leader who will be responsible of coordinating group activities
- Student will carefully read the case study from learning activity 3.3 in their groups using their student books
- To carefully read the case study and answer the indicated questions
- Student will participate in answering questions
- Other students will follow when someone will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

The expected answers from questions of learning activity 3.3

1. The additional questions that you ask to learn more about her symptoms could be the following: What is the frequency of defecation? Ask the patient if the stools are preceded by bloating?
2. Constipation is condition in which stool becomes dry, compact, and difficult and painful to pass.
3. Five causes of constipation disease development are:
 - Irregular bowel habits, ignoring the need to defecate
 - Chronic illness e.g. Parkinson disease
 - Low fibre diet and high animal fat intake
 - Lack of fluid intake
 - Stress
 - Lack of physical exercises
 - colon cancer
 - People depending on heavy laxative drugs
 - Old age.
4. The possible investigations to be performed to rule out constipation disease are **A thorough history and physical examination, Abdominal radiography, A barium enema, Colonic transit or marker studies, Anorectal motility and/or colonic motility studies, Sigmoidoscopy and colonoscopy, Laboratory tests such as complete blood count, thyroid function test and blood glucose, serum electrolytes: sodium, potassium, calcium, and magnesium.**

5. The treatment options for a patient with constipation disease are Treating the cause provides the best relief. For quick symptomatic relief, the physician prescribes an enema or a laxative in oral (polyethylene glycol is better tolerated) or suppository form, followed by prophylactic administration of a stool softener. Dietary management also is promoted. Encourage fiber food intake (green vegetables, fruits like papaya), fluid intake. Advise physical exercise.
6. Three preventive measures to take to prevent constipation disease are fiber food intake (green vegetables, fruits like papaya), fluid intake, and physical exercises.
7. The complications of a chronic constipation are the following **Hemorrhoids, Anal Fissures, Rectal prolapse, and fecal impaction.**

3.6. Summary of the Unit 3

The gastrointestinal (GI) system may be divided into two parts: the upper GI tract and the lower GI tract. The upper GI tract begins at the mouth and ends at the jejunum. The lower GI tract begins at the ileum and ends at the anus. Accessory structures include the peritoneum, liver, gallbladder, and pancreas. The primary functions of the GI tract are digestion and distribution of food. Any part of gastrointestinal system may become diseased. The nurse is responsible for managing the care of clients with disorders affecting the upper gastrointestinal tract or the lower gastrointestinal tract.

Gastritis is one of diseases of upper gastrointestinal tract. It is an inflammation of the stomach lining (gastric mucosa). It can be classified as acute gastritis (erosive) or chronic gastritis (non-erosive). The causes of gastritis include dietary indiscretions; reflux of duodenal contents; use of aspirin, steroids, nonsteroidal anti-inflammatory drugs (NSAIDs), alcohol, or caffeine; cigarette smoking; ingestion of poisons or corrosive substances; food allergies; infection; and gastric ischemia secondary to vasoconstriction caused by a stress response. The bacterium *Helicobacter pylori* may contribute to chronic gastritis.

Usually, the client with gastritis complains of **epigastric pain**, feeling extra full during or after a meal (**fullness**), **pressure**, **anorexia (loss of appetite)**, **nausea**, and **vomiting**. When the cause of gastritis is bacterial or viral, the patient may experience **vomiting, diarrhoea, fever, and abdominal pain**. When the causes of gastritis are drugs, poisons, toxic substances and corrosives, the patient may experience **gastric bleeding**. Clients may describe seeing **blood in emesis** or note a **darkening of their stool colour (black stool)**.

Diseases or disorders of the lower GI system usually manifest themselves as changes in bowel elimination. The most common problems are diarrhea and

constipation. Irritable bowel syndrome is a motility problem in which constipation and diarrhea are alternately present.

Diarrhea is the frequent passage of larger-than-normal amounts of liquid or semiliquid stool (more than three bowel movements per day). It results from increased peristalsis, which moves fecal matter through the GI tract much more rapidly than normal. The swift velocity causes intestinal cramping and decreases the time available for water to be absorbed from stool in the large intestine. Consequently, the stool is either very soft or liquid.

Diarrhea is a common problem that can come suddenly or be a chronic complaint. Some possible causes of diarrhea include food poisoning, infections, food allergies or intolerances, and medication. In addition, other conditions that cause chronic diarrhea that run-in families or, rarely, have a genetic basis. Many different things can cause diarrhea in human gastro-intestinal tract in different forms.

The diagnostic of diarrhea is based on detailed family history, as well as physical and medical conditions, the travel history, and any sick contacts the client may have. In addition, a stool test on a collected stool sample to check for blood, bacterial infections, parasite and inflammatory markers.

Routine **stool cultures** are obtained to identify bacterial infections as the cause for infectious diarrhea. Stool specimens obtained to identify parasites and their ova are placed in special preservatives and analyzed separately by the microbiology department.

Treatment of diarrhea that is mild or of short duration, such as that caused by dietary changes or acute illness, involves resting the bowel by limiting intake to clear liquids for one or two meals and gradually advancing to a regular diet. When diarrhea persists and stools are frequent and large, or if the person is very young, elderly, or debilitated, medical treatment may include one or more of the following measures:

- Administration of an antidiarrheal agent, Fluid, and electrolyte replacement by either the oral or intravenous (IV) route,
- Dietary adjustments, which may involve eliminating foods that cause diarrhea,
- Encourage potassium-rich foods as tolerated,
- Total parenteral nutrition (TPN) if diarrhea is severe and prolonged and if the introduction of oral fluid and food results in another episode of diarrhea,
- Reintroducing food after a bout of diarrhea usually calls for a diet low in insoluble fiber to reduce the volume of stool.

Constipation is a condition in which stool becomes dry, compact, and difficult and painful to pass. Normally, fecal matter collects in the rectum and presses on the internal anal sphincter, creating an urge to defecate (eliminate stool). Peristalsis

and distention of the colon facilitate the signal to release stool. The gastrocolic reflex facilitates stool passage by accelerating peristalsis. This reflex is most active after eating, particularly after the first meal of the day.

Functional constipation is clinical diagnosis that can generally be made based on typical history and an essentially normal physical examination including one of the rectal examinations is a key part of the initial evaluation.

Treating the cause provides the best relief. For quick symptomatic relief, the physician prescribes an enema or a laxative in oral or suppository form, followed by prophylactic administration of a stool softener. Diet therapy: encourage fiber food intake (green vegetables, fruits like papaya), fluid intake, advice physical exercises, enema (cleansing) may be required, laxative: e.g., Oral polyethylene glycol is better tolerated.

3.7. Additional information

Peptic Ulcer Disease (PUD)

A peptic ulcer is a circumscribed loss of tissue in an area of the GI tract that is in contact with hydrochloric acid and pepsin. Most peptic ulcers occur in the duodenum; however, they may develop at the lower end of the esophagus, in the stomach, or in the jejunum after the client has had surgery at the spot where the stomach and the jejunum were sutured.

Causes and risk factors of Gastritis

PUD occurs when the normal balance between factors that promote mucosal injury (gastric acid, pepsin, bile acid, ingested substances) and factors that protect the mucosa (intact epithelium, mucus, and bicarbonate secretion) is disrupted. The single greatest risk factor for the development of PUD is infection with the gram-negative bacterium *H pylori*. Transmission of the bacterium is thought to be by fecal–oral or oral–oral pathways. Family history is thought to be an additional risk factor for the development of PUD. A genetic component may exist, as demonstrated by the high incidence among first degree relatives. Other risk factors include chronic use of NSAIDs, cigarette smoking, and physiologic stress.

Pathophysiology overview

Ulcers develop when there is prolonged hyperacidity or chronic reduction in mucus. Once gastric acid has penetrated the mucosal layer, the acid begins to digest the stomach wall. Histamine, released from the injured cells, aggravates the condition by triggering hypersecretion of more hydrochloric acid and pepsin. The body responds with the inflammatory process. Capillary permeability is increased, the mucosa swells and bleeds easily. Because food dilutes stomach acid, clients with PUD experience more discomfort when the stomach is empty than after eating

food. Unless the process is controlled, the erosion can lead to an obstruction from scar formation or penetrate the entire thickness of the stomach wall, spilling gastric contents into the peritoneal cavity, a process that may be accompanied by hemorrhage.

Signs and symptoms

Most clients with PUD have abdominal pain, which usually is confined to the epigastrium and does not radiate. Clients most often describe it as having a “burning” quality. They usually complain of pain that occurs 1 to several hours after meals and disturbs sleep. Eating food may relieve the pain. Back pain suggests that the ulcer is irritating the pancreas. Approximately 20% of clients may have bleeding as the first sign of the ulcer. Hemorrhage, hematemesis, or melena may occur. Protracted vomiting secondary to scarring and resultant obstruction also are seen among those who have ignored earlier symptoms. Some clients also have unexplained weight loss.

Investigations

The diagnosis is suggested by the history and confirmed by results of an upper GI series or EGD. To differentiate between benign and malignant ulcers, a gastric washing or biopsy for cytologic analysis may be performed. Typically, the hemoglobin level and RBC count are low from chronic blood loss. Vomiting alters electrolyte levels. In addition, tests for *H. pylori* are performed.

Treatment plan

Most clients with PUD have *H. pylori*. Thus, the goals of treatment are to (1) eradicate the bacteria and (2) reduce the acid levels in the digestive system to relieve pain and Ulcers that persist (referred to as refractory ulcers) despite medical interventions, repeatedly recur, cause severe hemorrhage, create unrelieved obstruction, cause perforation, or are predisposed to malignant changes justify surgical interventions such as vagotomy, pyloroplasty, antrectomy, gastroduodenostomy, gastrojejunostomy, and total Gastrectomy.

- Vagotomy: A branch of the vagus nerve is cut to reduce gastric acid secretion.
- Pyloroplasty: The pylorus is repaired or reconstructed to expand the stomach outlet narrowed by scarring or improve gastric motility and emptying.
- Antrectomy: The antrum (lower portion of the stomach, including the pylorus) is removed to eliminate a benign ulcer in the lesser curvature of the stomach if the ulcer has not healed after 12 weeks of medical treatment or is recurring.
- Gastroduodenostomy (Billroth I): Part of the stomach is removed, while the remaining portion is connected to the duodenum. Usually, a vagotomy also is performed. This procedure is done to remove an ulcerated area in the stomach that is prone to hemorrhage, perforation, and obstruction.

- **Gastrojejunostomy (Billroth II):** Same as Billroth I, except the remaining portion is connected to the jejunum in cases of extensive duodenal inflammation or perforation.
- **Total Gastrectomy:** The entire stomach is removed, and the esophagus is joined to the jejunum to remove an ulcer high in the stomach near the gastroesophageal junction. It is performed to treat a gastric malignancy.

If a total gastrectomy (removal of the stomach) is performed, the client receives vitamin B12 injections or intranasal vitamin B12 for life because, without the stomach, the intrinsic factor necessary for absorption of vitamin B12 no longer is produced. A dietary history must include relevant questions pertaining to foods that cause distress, the amount of food eaten at each meal, and whether eating food relieves pain.

Haemorrhoids

Hemorrhoids are dilated veins outside or inside the anal sphincter (Fig. 46-6). Thrombosed hemorrhoids are veins that contain clots.

Causes and risk factors

Chronic straining to have a bowel movement or frequent defecation with chronic diarrhea likely weakens the tissue supporting the veins. Clients whose work requires prolonged sitting are at increased risk for the development of hemorrhoids. Pregnancy, prolonged labor, portal hypertension, or other intra-abdominal conditions that interfere with venous blood return can cause or aggravate the condition.

Physiopathology Overview

The veins near the anal sphincter probably are displaced downward from their natural location as the result of a loss of supporting tissue. Without adequate connective tissue and smooth muscle support, the veins dilate and fill with blood. Dry stool passes by the engorged hemorrhoids, which stretches and irritates the mucosa, giving rise to the local symptoms of burning, itching, and pain. Passing dry, hard stool causes the hemorrhoids to bleed.

Signs and Symptoms

External hemorrhoids may cause few symptoms, or they can produce pain, itching, and soreness of the anal area. They appear as small, reddish-blue lumps at the edge of the anus. Thrombosed external hemorrhoids are painful but seldom cause bleeding. Internal hemorrhoids cause bleeding but are less likely to cause pain, unless they protrude through the anus. The amount of bleeding varies from an occasional drop or two of blood on toilet tissue or underwear to chronic loss of blood, leading to anemia. Internal hemorrhoids usually protrude each time the client defecates but retract after defecation. As the masses enlarge, they remain outside the sphincter.

Investigations

The physical examination involves putting on gloves, draping the client, and inspecting the anus. An anoscope, an instrument for examining the anal canal, or a proctosigmoidoscopy, allows visualization of internal hemorrhoids.

Treatment plan

Small external hemorrhoids may disappear without treatment, or the client may obtain relief through symptomatic treatment. The physician may recommend warm soaks, an ointment that contains a local anesthetic for the relief of pain and itching, topical astringent pads to relieve swelling, a diet that corrects or prevents constipation, and a stool softener.

Health teaching is focuses on self-management. The nurse reviews the physician's home care instructions, demonstrates wound care to the client or responsible caregiver and provides an opportunity for returning the demonstration, provides dietary recommendations and offers a list of high-fiber foods, instructs about stool softeners as indicated, emphasizes the importance of an active lifestyle and increased fluid intake, and cautions against the prolonged use of laxatives.

In some cases, the hemorrhoid is ligated (tied off) with a rubber band. Infrared photocoagulation, in which the protein and water in hemorrhoidal tissue are destroyed, is an alternative to traditional surgery.

A hemorrhoidectomy, the surgical removal of hemorrhoids, may be necessary in chronic and severe cases. The procedure is performed using conventional surgery or laser surgery; the client receives a local anesthetic or regional nerve block. Internal packing of lubricated gauze, external gauze dressing, or a perineal pad is applied to absorb blood. A T-binder holds the absorbent material in place.

3.8. Additional activities

A. Remedial activities

1. What is the most common symptom of patients with gastrointestinal dysfunction during nursing assessment?
 - a. diffuse pain.
 - b. dyspepsia.
 - c. constipation.

Answer: a. diffuse pain

2. A patient who has been vomiting for several days from an unknown cause is admitted to the hospital. What should the nurse anticipate will be included in collaborative care?

- a. Oral administration of soup and tea
- b. Administration of parenteral antiemetics
- c. IV replacement of fluid and electrolytes
- d. Insertion of a nasogastric (NG) tube for suction.

Answer: b IV replacement of fluid and electrolytes

3. Which type of gastritis is most likely to occur in a college student who has an isolated drinking alcoholic?
- a. Acute gastritis
 - b. Helicobacter pylori gastritis
 - c. Chronic gastritis
 - d. Autoimmune metaplastic atrophic gastritis

Answer: a. acute gastritis

4. A large number of children at a public school have developed profuse diarrhea and bloody stools. The school nurse suspects food poisoning related to food from the school cafeteria and requests analysis and culture of which food?
- a. Chicken
 - b. Ground beef
 - c. Commercially canned fish
 - d. Salads with mayonnaise dressing.

Answer: b. Ground beef

5. A 68-year-old patient is in the office for a physical. She notes that she no longer has regular bowel movements. Which suggestion by the nurse would be most helpful to the patient?
- a. Take an additional laxative to stimulate defecation.
 - b. Eat less acidic foods to enable the gastrointestinal system to increase peristalsis.
 - c. Eat less food at each meal to prevent feces from backing up related to slowed peristalsis.
 - d. Attempt defecation after breakfast because gastrocolic reflexes increase colon peristalsis at that time.

Answer: d. Attempt defecation after breakfast because gastrocolic reflexes increase colon peristalsis at that time.

B. Consolidation Activities

1. Consequences of diarrhea include all of the following except:
 - a. acidosis.
 - b. decreased bicarbonate.
 - c. electrolyte imbalance.
 - d. hyperkalemia.

Answer: d. hyperkalemia

2. The best time to administer an antacid is:
 - a. with the meal.
 - b. 30 minutes before the meal.
 - c. 1 to 3 hours after the meal.
 - d. immediately after the meal.

Answer: C. 1 to 3 hours after the meal.

3. Acute gastritis is often caused by:
 - a. ingestion of strong acids.
 - b. irritating foods.
 - c. overuse of aspirin.
 - d. all of the above

Answer: d. all of the above

4. To promote fluid balance when treating gastritis, the nurse knows that the minimal daily intake of fluids should be:
 - a. 1.0 L.
 - b. 1.5 L.
 - c. 2.0 L.
 - d. 2.5 L.

Answer: b. 1.5L

5. Abdominal pain associated with indigestion is usually:
 - a. described as crampy or burning.
 - b. in the left lower quadrant.
 - c. less severe after an intake of fatty foods.
 - d. relieved by the intake of coarse vegetables, which stimulate peristalsis.

C. Extended activities

1. The most common site for peptic ulcer formation is the:
 - a. duodenum.
 - b. esophagus.
 - c. pylorus.
 - d. stomach.

Answer: a. duodenum.

2. Intrinsic factor is a gastric secretion necessary for the intestinal absorption of the vitamin that prevents pernicious anemia, that is:
 - a. vitamin B1.
 - b. vitamin B12.
 - c. vitamin C.
 - d. vitamin K.

Answer: b vitamin B12

3. Which patient is at highest risk for having a gastric ulcer?
 - a. 55-year-old female, smoker, with nausea and vomiting
 - b. 45-year-old female admitted for illicit drug detoxification
 - c. 37-year-old male, smoker, who fell while looking for a job
 - d. 27-year-old male who is being divorced and has back pain

Answer: a. 55-year-old female, smoker, with nausea and vomiting

4. Corticosteroid medications are associated with the development of peptic ulcers, because of which probable pathophysiologic mechanism?
 - a. The enzyme urease is produced.
 - b. Secretion of hydrochloric acid is increased.
 - c. The rate of mucous cell renewal is decreased.
 - d. The synthesis of mucus and prostaglandins is inhibited.

Answer: c. the rate of mucous cell renewal is decreased.

5. Match the descriptions with the following surgical procedures used to treat peptic ulcer disease.

a. Often performed with a vagotomy to increase gastric emptying	1. Billroth I
b. Severing of a parasympathetic nerve to decrease gastric secretion	2. Billroth II
c. Removal of distal two thirds of stomach with anastomosis to jejunum	3. Pyloroplasty
d. Removal of distal two thirds of stomach with anastomosis to duodenum.	4. Vagotomy

Answer: a.3, b.4, c.2, d.1

6. Following a hemorrhoidectomy, what should the nurse advise the patient to do?
- Use daily laxatives to facilitate bowel emptying.
 - Use ice packs to the perineum to prevent swelling.
 - Avoid having a bowel movement for several days until healing occurs.
 - Take warm sitz baths several times a day to promote comfort and cleaning.

Answer: d. duodenum.

3.9. Expected answers of end unit 3 Assessment:

Learning objectives:

- Take appropriate decisions regarding management of Gastrointestinal pathologies (Gastritis, Diarrhea, Constipation)
- Identify the strengths and gaps of learners on appropriate decisions in the management of common pathologies of gastrointestinal system.
- Prepare the feedback to students
- Organize different additional learning activities.

Answers

- B. Maintain a non-irritating diet with six small meals a day.
- D. Suppressing the urge to defecate while at work.
- A. An enema.
- C. Assessment of the onset location, intensity, duration, and character of the pain.
- B. Drink at least 2 quarts of juice to replace the fluid lost in vomiting.
- A. Increase fluid intake.
- The preventive measures to be taken to prevent constipation disease are fiber food intake (green vegetables, fruits like papaya), fluid intake, and physical exercises
- The investigations to request for a patient with constipation are:
 - A thorough history and physical examination,
 - Abdominal radiography,

- A barium enema, Colonic transit or marker study,
 - Anorectal motility and/or colonic motility studies,
 - Sigmoidoscopy and colonoscopy,
 - Laboratory tests such as complete blood count, thyroid function test and blood glucose, serum electrolytes: sodium, potassium, calcium, and magnesium.
9. The investigations to request for diagnosing gastritis are:
- **blood test** which is designed to check for antibodies titers that fight against *H. pylori* bacteria,
 - Stool test may also be performed to rule out *H. pylori* in the patient's stool.
 - The physician may perform the **Upper endoscopy** using an endoscope (a long thin tube with an attached camera) to see in the patient's stomach by inserting the scope through the oesophagus to allow the physician to examine the stomach lining where the **biopsy** may be taken from the patient stomach lining to test for infection.
 - The **X-ray images** may be taken after barium swallowing during upper gastrointestinal exam.
10. Management plan of gastritis includes:
- Emergency treatment in case of poisons.
 - In acute cases, eating is restricted and **IV fluids** such as Ringer lactate or normal saline are given to correct dehydration and electrolyte imbalances, particularly if vomiting is severe.
 - **Antiemetics** are prescribed to control nausea and vomiting.
 - **Antibiotics** such as amoxicillin (Amoxil) and clarithromycin (Biaxin), which exert bactericidal effects to eradicate *H. pylori*.
 - **Amebicides:** Metronidazole (Flagyl) assists in the eradication of *H. pylori* may be prescribed to inhibit or destroy infection.
 - The avoidance of irritating substances, such as alcohol and NSAIDs. Some clients may wish to avoid spicy foods, high-fat foods, and caffeine, depending on the degree to which these items aggravate their symptoms.
 - Various drugs, such as **antacids**, **H2- receptor antagonists such as Cimetidine**, and **proton pump inhibitors** such as **Omeprazole** may be prescribed to reduce the amount of stomach acid production.
 - Proton pump inhibitors also treat stomach ulcers and gastroesophageal reflux disease (GERD).
 - **Antacids:** example includes Aluminium Hydroxide $\text{Al}(\text{OH})_3$.

11. The treatment plan of diarrhea must include:

- Administration of an antidiarrheal agent, such as diphenoxylate hydrochloride with atropine sulfate (Lomotil), loperamide hydrochloride (Imodium), or a combination product such as kaolin and pectin (Kaopectate)
- Fluid and electrolyte replacement by either the oral or intravenous (IV) route
- Dietary adjustments, which may involve eliminating foods that cause diarrhea.
- Encourage potassium-rich foods as tolerated. Examples include bananas, canned apricots and peaches, apricot nectar, orange juice, grapefruit juice, tomato juice, fish, potatoes, and meat.
- Total parenteral nutrition (TPN) if diarrhea is severe and prolonged and if the introduction of oral fluid and food results in another episode of diarrhea
- Give clear liquids as tolerated, but limit high-sugar drinks. Drinking clear liquids prevents dehydration.
- Encourage the intake of yogurt.
- Administer antidiarrheal medications
- Advise client to avoid carbonated beverages or drinking with a straw.

12. Different risk factors of gastritis are:

- Dietary indiscretions;
- **Bile reflux** (reflux of duodenal contents)
- **Medications:** Steady use of nonsteroidal anti-inflammatory drugs (NSAIDs) such as **Aspirin** or corticosteroids to manage chronic pain can irritate the stomach lining,
- **Alcohol** or **caffeine:** Chronic alcohol use can irritate the stomach lining;
- **autoimmune disease:** In some people, the body's immune system attacks healthy cells in the stomach lining;
- **Cigarette smoking;** ingestion of poisons or corrosive substances; food allergies; infection; and gastric ischemia secondary to vasoconstriction caused by a stress response.
- **The bacterial infection:** *Helicobacter pylori* may contribute to chronic gastritis.
- **Physical stress:** A sudden, severe illness or injury can bring on gastritis.
- Severe **burns** and **brain injuries** are the two common causes of gastritis.
- **Older adults.**

13. Difference between the osmotic, secretory and inflammatory diarrhea:

- **Osmotic diarrhea** typically results from one of two situations: Ingestion of a poorly absorbed substrate, Malabsorption: inability to absorb certain carbohydrates is the most common deficit in this category of diarrhea, but it can result virtually any type of malabsorption.
- **Secretory Diarrhea:** Diarrhea occurs when secretion of water into the intestinal lumen exceeds absorption. Example in case of cholera, Exposure to toxins from several other types of bacteria (e.g. E. coli heat-labile toxin).
- **Inflammatory and Infectious Diarrhea:** Disruption of the epithelium of the intestine due to microbial or viral pathogens is a very common cause of diarrhea in all species. The immune response to inflammatory conditions in the bowel contributes substantively to development of diarrhea.

UNIT 4

4.1. Key unit competence

To take an appropriate decision on management of different common medical pathologies of urogenital system.

4.2. Prerequisite (knowledge, skills, attitudes, and values)

To achieve the above competence, the associate nurse student needs to have learnt the following subjects:

- **Human body anatomy and physiology:** Anatomy of urinary system (bladder, kidney), Physiology of urinary system
- **Fundamental of Nursing:** Vital signs taking and parameters measurements, drugs administration, History taking, Complete health assessment from head to toes through interview and Physical assessment regarding cardiovascular system.
- **Pharmacology:** Diuretic drugs (taught in S6), and Antibiotics, and urinary antiseptic.

4.3. Cross-cutting issues to be addressed

a) Gender education

Emphasize to learners that anybody irrespective of their gender can present and report during group activities. During interactive lecturing, make sure that the response of both boys and girls are equally considered. Ensure that boys and girls participate equally in all activities such as group work presentations.

b) Environment and sustainability

They also get skills and attitudes that will enable them in their everyday life to address the environment and climate change issues and to have a sustainable livelihood. Help the learners to know maximum skills and attitudes on the environmental sustainability and to be responsible in caring for the skills laboratory where they perform their practice even at health facilities.

4.4. Guidance on the introductory activity

This introductory activity helps you to engage learners in introduction of medical pathologies of uro-genital tract and invite the learners to follow the next lessons.

Teacher's activity:

- Ask learners to observe the schematic representation of urogenital organs and answer the given questions.
- Engage learners in working individually on the activity.
- Ask any three learners to give their answers

The expected answers to introductory activity 4.0

1. What do you observe on the picture?

This is indicated the urinary system of human body such as Kidney, ureter, bladder and examples of bacteria that causes UTI.

2. What do you think will happen if the microorganisms enter in the urinary system?

A UTI occurs when a pathogen overwhelms the host's defense mechanisms and colonizes the urinary system with proliferation of bacteria, fungi, or parasite and the person raises a response to this invasion. The ability of the bacteria to adhere (attach) to the uro-epithelium influences its virulence. Adherence enhances bacterial persistence despite micturition that increase the risk for recurring UTI.

Causes of bacterial persistence include bacterial resistance to the antibiotic; emergence of resistant secondary bacterial strain after the primary microorganism is eradicated, renal insufficiency causing poor excretion of the antibiotic in the urine, a foreign body such as stone acting as a harbor for bacteria, and papillary necrosis.

3. How do you think the microorganisms can enter in the urinary system?

The microorganisms enter in urinary system by various ways such as sexual intercourse or ascending way, endogens due to loss immunity or other conditions.

4.5. List of Lessons/sub-headings (Including Assessment)

#	Lesson Title	Learning Objectives	Number of Periods
1	Introduction to urogenital infection	• Describe causes, risk factors and pathophysiology of urogenital track infection • Describe the signs and symptoms of UTIs • Enumerate the investigations requested for UTIs. • Identify the adequate medical diagnosis of UTIs. • Develop a medical and nursing management plan for patient with UTIs.	1
2	Description of urethritis	• Define the concepts related to urethritis • Describe causes, risk factors and pathophysiology of urethritis • Describe the signs and symptoms of urethritis • Enumerate the investigations requested for urethritis	1
3	Description of cystitis	• Define the concepts related to cystitis • Describe causes, risk factors and pathophysiology of cystitis • Describe the signs and symptoms of cystitis • Enumerate the investigations requested for cystitis • Develop a medical and nursing management plan for patient with cystitis	1

4	Description of acute and chronic pyelonephritis	• Define the concepts related to acute and chronic pyelonephritis • Describe causes, risk factors and pathophysiology of acute and chronic pyelonephritis • Describe the signs and symptoms of acute and chronic pyelonephritis • Enumerate the investigations requested for acute and chronic pyelonephritis • Develop a medical and nursing management plan for patient with acute and chronic pyelonephritis	1
6	Description of acute and chronic prostatitis	• Define the concepts related to acute and chronic prostatitis • Describe causes, risk factors and pathophysiology of acute and chronic prostatitis • Describe the signs and symptoms of acute and chronic prostatitis • Enumerate the investigations requested for acute and chronic prostatitis • Develop a medical and nursing management plan for patient with acute and chronic prostatitis	1
	Self-assessment	• Identify the performance of child • Identify the learners' gaps during teaching • Give the relevant feedback to the child • Elaborate the remedial teaching session	1

8	Introduction to Sexually transmissible diseases (STDs)	• Describe causes, risk factors and pathophysiology of sexually transmissible diseases(STDs) • Describe the signs and symptoms of STDs • Enumerate the investigations and treatment requested for STDs	1
	Self-assessment	• Identify the performance of child • Identify the learners' gaps during teaching • Give the relevant feedback to the child • Elaborate the remedial teaching session	1
9	Description of chlamydia	• Define the concepts related to chlamydia • Describe causes, risk factors and pathophysiology of chlamydia • Describe the signs and symptoms of chlamydia • Enumerate the investigations requested for chlamydia • Develop a medical and nursing management plan for patient with chlamydia	1
	Self-assessment	• Identify the performance of child • Identify the learners' gaps during teaching • Give the relevant feedback to the child • Elaborate the remedial teaching session	1

10	Description of syphilis	• Define the concepts related to syphilis • Describe causes, risk factors and pathophysiology of syphilis • Describe the signs and symptoms of syphilis • Enumerate the investigations requested for syphilis • Develop a medical and nursing management plan for patient with syphilis	1
	Self-assessment	• Identify the performance of child • Identify the learners' gaps during teaching • Give the relevant feedback to the child • Elaborate the remedial teaching session	1
11	Description of gonorrhea	• Define the concepts related to syphilis • Describe causes, risk factors and pathophysiology of gonorrhea • Describe the signs and symptoms of gonorrhea • Enumerate the investigations requested for gonorrhea • Develop a medical and nursing management plan for patient with gonorrhea	1
	Self-assessment	• Identify the performance of child • Identify the learners' gaps during teaching • Give the relevant feedback to the child • Elaborate the remedial teaching session	1

12	Description of HIV Infection	• Define the concepts related to HIV Infection • Describe causes, risk factors and pathophysiology of HIV Infection • Describe the signs and symptoms of HIV Infection • Enumerate the investigations requested for HIV Infection • Develop a medical and nursing management plan for patient with HIV Infection	1
	Self-assessment	• Identify the performance of child • Identify the learners' gaps during teaching • Give the relevant feedback to the child • Elaborate the remedial teaching session	1
13	Description of Human Papilloma Virus	• Define the concepts related to Human Papilloma Virus • Describe causes, risk factors and pathophysiology of Human Papilloma Virus • Describe the signs and symptoms of Human Papilloma Virus • Enumerate the investigations requested for Human Papilloma Virus • Develop a medical and nursing management plan for patient with Human Papilloma Virus	1
	Self-assessment	• Identify the performance of child • Identify the learners' gaps during teaching • Give the relevant feedback to the child • Elaborate the remedial teaching session	1

14	Description of hepatitis B	• Define the concepts related to Human Hepatitis B • Describe causes, risk factors and pathophysiology of hepatitis B • Describe the signs and symptoms of hepatitis B • Enumerate the investigations requested for hepatitis B • Develop a medical and nursing management plan for patient with hepatitis B	1
	Self-assessment	• Identify the performance of child • Identify the learners' gaps during teaching • Give the relevant feedback to the child • Elaborate the remedial teaching session	1
15	Description of genital herpes	• Define the concepts related to genital herpes • Describe causes, risk factors and pathophysiology of genital herpes - Describe the signs and symptoms of genital herpes • Enumerate the investigations requested for genital herpes • Develop a medical and nursing management plan for patient with genital herpes	1
	Self-assessment	• Identify the performance of child • Identify the learners' gaps during teaching • Give the relevant feedback to the child • Elaborate the remedial teaching session	1

16	Description of trichomoniasis	• Define the concepts related to trichomoniasis • Describe causes, risk factors and pathophysiology of genital herpes - Describe the signs and symptoms of trichomoniasis • Enumerate the investigations requested for trichomoniasis • Develop a medical and nursing management plan for patient with trichomoniasis	1
	Self-assessment	• Identify the performance of child • Identify the learners' gaps during teaching • Give the relevant feedback to the child • Elaborate the remedial teaching session	1
17	End Unit Assessment	• Take appropriate decision on different common medical pathologies of urogenital • Identify the strengths and gaps of learners on appropriatedecision of different common medical pathologies of urogenital • Prepare the feedback to individual and class • Organize different additional learning activities	1

Lesson 1: Introduction of common medical pathologies of urogenital tract Infection.

a) Prerequisites

This is the first lesson the fourth unit medical pathologies of urogenital tract. In this lesson, you will be dealing with the common medical pathologies which are pyelonephritis, urethritis, cystitis, and sexually transmissible diseases. The first thing to do before starting teaching is to remind learners that they have learnt about urogenital organs and physiology of urinary system, factors contributing to urogenital infection, be familiar to the medical terminology related to urogenital diseases.

b) Learning objectives:

- Describe causes, risk factors and pathophysiology of urogenital track infection
- Describe the signs and symptoms of UTIs
- Enumerate the investigations requested for UTIs.

c) Teaching resources

The teacher could ask the students to read and answer the clinical case, which simulate the patient who is having the signs and symptoms of urogenital tract infections. In addition, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube of patient with urogenital tract diseases. There is need of black board and chalks or flipcharts and markers.

d) Learning Activities**Teacher's activities and Methodology**

Teacher asks the students to observe the image of uro-genital tract and write what they have observed. Teacher call upon one of volunteer who can show where the microorganism can enter by using the didactic materials. Teacher will tell the students to use Google for searching how microorganism enters in human body and how it produces infection.

Learning activity 4.1**Answer to Learning activity 4.1****1. Basing on case described, what are the abnormal signs and symptoms the patient was presenting?**

He appears restless, and keeps moving from back to side in an effort to reduce his discomfort. At arrival, the vital signs were blood pressure 156/70 mmHg, Pulse 108 beats per minute, respiratory rate 24 cycles per minute, temperature 37.4° C, O₂ saturation 96% on room air. He was awake, alert, and oriented. Lungs were clear on auscultation. The abdomen not distended with positive bowel sounds in all 4 quadrants and no rebound tenderness. He had costovertebral tenderness and mild pain when palpating the hypogastric pain (lower parts of the abdomen). He was voiding small amounts (pollakuria) of chocolate urine with aromatic odor and had burning during urination (dysuria).

2. What are the investigations that have been requested to that patient? What were their rationales?

Urinalysis, culture of urine, full blood account, these are for searching germs (bacteria)

3. What was the medical problem that the patient was presenting?

He present cost vertebral tenderness and mild pain when palpating the hypogastric, pollakyuria, and dysuria

4. From the case study and what you know, what are all possible causes or risk factors to develop that medical condition?

Inflammation of the urinary tract may be caused by a variety of disorders, but bacterial infection is the most common.

The organisms that usually cause UTI are introduced via the ascending route from the urethra and originate in the perineum.

The commonest causes of UTI are:

- Bacteria which are the most common cause of UTI (*Escherichia coli*, *Neisseria gonorrhea*, *Chlamydia trachomatis*, *Klebsiella*, *Proteus*, *Staphylococcus*, *mycoplasma*, *Pseudomonas*)
- Fungi (*Candida albicans*)
- Viruses
- Parasites (e.g. *Trichomonas Vaginalis*)

5. What must be included into the management plan of that medical condition?

Antibiotic medications are necessary for the UTI. For treatment of uncomplicated UTI, oral (by mouth) antibiotics are usually adequate. However, for major complications such as sepsis or pyelonephritis, intravenous (IV) antibiotics may be typically necessary. The antibiotics usually used are Nitrofurantoin (Macrobid), Fosfomycin (Monurol), Trimethoprim-Sulfamethoxazole (Bactrim and others), Cefixime, Cefuroxime, Cefotaxime or Ceftriaxone, Gentamicin, Ciprofloxacin (Cipro) or Levofloxacin (Levaquin). Doxycycline or Erythromycin can also be provided. Metronidazole will be needed in case of *Trichomonas* infection or Nystatine in case of candida infection. The choice of regimen depends on Antimicrobial spectrum and susceptibility, where the ultimate choice of antimicrobial therapy is based upon the susceptibilities of the organism isolated. Cephalosporins are the first-line oral agent in the treatment of UTI among patients without genitourinary abnormalities. Amoxicillin and ampicillin are not routinely recommended for empiric therapy because of the high rate of resistance of *E. coli*.

Inpatient parenteral therapy: this will require hospitalisation and the parenteral therapy generally is indicated for the following cases: <2 months, clinical urosepsis (eg, toxic appearance, hypotension, poor capillary refill), immune compromise, vomiting or inability to tolerate oral medication, lack of adequate outpatient follow-up (eg, no telephone, live far from hospital, etc), failure to respond to outpatient therapy.

Adjunctive therapies might be used to reduce the renal parenchymal inflammation which if not treated leads to renal scarring. The therapies used are anti-inflammatory drugs like Dexamethasone, Prednisolone, etc.

6. If not treated, what might be the consequences?

If all prescribed regimen are respected, the outcome is very good. Without treatment, UTI can cause major health problems. Severe effects of a UTI that can develop include:

- Pyelonephritis (acute or chronic): An infection involving the kidneys
- Sepsis: A dangerous, systemic, whole-body infection
- Renal scarring: due to chronic inflammation of renal parenchyma
- Hypertension: related to ineffective Angiotensin-Renin-Aldosterone

Answer to Self-assessment 4.1

1. What are all possible causes or risk factors to develop the urinary tract infections?

Inflammation of the urinary tract may be caused by a variety of disorders, but bacterial infection is the most common.

The organisms that usually cause UTI are introduced via the ascending route from the urethra and originate in the perineum.

The commonest causes of UTI are:

- Bacteria which are the most common cause of UTI (*Escherichia coli*, *Neisseria gonorrhea*, *Chlamydia trachomatis*, *Klebsiella*, *Proteus*, *Staphylococcus*, *mycoplasma*, *Pseudomonas*)
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Another common factor contributing to ascending infection is urologic instrumentation (e.g., catheterization, cystoscopic examinations). This instrumentation allows bacteria that are normally present at the opening of the urethra to enter into the urethra or bladder.

Sexual intercourse promotes “milking” of bacteria from the vagina and perineum and may cause minor urethral trauma that predisposes women to UTI.

Rarely the UTI result from a hematogenous route, where blood-borne bacteria secondarily invade the kidneys, ureters, or bladder from elsewhere in the body. There must be prior injury to the urinary tract, such as obstruction of the ureter,

damage caused by stones, or renal scars, for a kidney infection to occur from hematogenous transmission.

Other risk factors of UTI are premature infants, sexually active women, women using a diaphragm and spermicide, individuals with diabetes mellitus, individuals with advanced HIV or immunosuppressive disorders, people with recent instrumentation of urinary system or indwelling catheterization, people with obstruction of the lower urinary tract.

2. What are the signs and symptoms of urinary tract infections?

Lower urinary tract symptoms are experienced in patients who have UTI of the upper urinary tract, as well as those confined to the lower tract. Symptoms are related to either bladder storage or bladder emptying. These symptoms include dysuria, frequent urination (more than every 2 hours), urgency, and suprapubic discomfort or pressure. The urine may contain grossly visible blood (hematuria) or sediment, giving it a cloudy appearance. Flank pain, chills, and fever indicate an infection involving the upper urinary tract (pyelonephritis). People with significant bacteriuria may have no symptoms or may have nonspecific symptoms such as fatigue or anorexia.

The UTI symptoms are often absent in older adults as they tend to experience non localized abdominal discomfort rather than dysuria and suprapubic pain. In addition, they may have cognitive impairment or generalized clinical deterioration. The older adults are less likely to experience a fever with a UTI, the value of body temperature, as an indicator of a UTI is unreliable.

3. What are the investigations that should be requested to make the diagnosis of urinary tract infections?

In a patient suspected of having a UTI:

- Initially obtain a **dipstick urinalysis** to identify the presence of nitrites (indicating bacteriuria), white blood cells (WBCs), and leukocyte esterase (an enzyme present in WBCs indicating pyuria). These findings can be confirmed by microscopic urinalysis.
- After confirmation of bacteriuria and pyuria, a **urine culture** may be obtained. A urine culture is indicated in complicated UTI, persistent bacteriuria, or frequently recurring UTI (more than two or three episodes per year). Urine may also be cultured when the infection is unresponsive to empiric therapy or the diagnosis is questionable. A urine culture is accompanied by sensitivity testing to determine the bacteria's susceptibility to a variety of antibiotic drugs.
- **Imaging studies** of the urinary tract like intravenous pyelogram (IVP), cystoscopy, ultrasound can be performed. A computed tomography (CT) urogram or ultrasound may be obtained when obstruction of the urinary system is suspected or UTI occurs.

4. What are their rationales?

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6. If not treated, what are the complications of UTIs?

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- Pyelonephritis (acute or chronic): An infection involving the kidneys
- Sepsis: A dangerous, systemic, whole-body infection
- Renal scarring: due to chronic inflammation of renal parenchyma
- Hypertension: related to ineffective Angiotensin-Renin-Aldosterone

Lesson 2: Description of urethritis

This is the second sub unit of medical pathologies of urinary system, lesson deals with definition of urethritis, causes, pathophysiology, clinical manifestation, and medical investigation of urethritis.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to urethritis
- Describe causes, risk factors and pathophysiology of urethritis
- Describe the signs and symptoms of urethritis
- Enumerate the investigations requested for urethritis

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections specially urethritis. Also, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with urogenital urethritis. There is need of black board and chalks or flipcharts and markers.

c) Learning Activities

Teacher's activities and Methodology

- The teacher asks the students to read carefully the case and take 30 minutes to answer the questions in group Of 6 students by consulting the library and Google, every student have to present the findings according the number of questions.
- The teacher motivates the audience to asks the questions related to the clinical case and at the end teacher summarize the answers from the presenters

Answer to Learning activity 4.1.1.

1. What are the possible medical conditions of this patient?

Sexually transmissible infection, urethritis, urinary tract infection

2. What are the signs and symptoms of this medical condition?

Infection of the urethra results in discomfort on urination varying from a slight tickling sensation to burning or severe discomfort and urinary frequency. Fever is not common, but fever in the male client may be due to further extension of the infection to areas such as the prostate, testes, and epididymis.

Urethritis can cause itching, pain, or discomfort when a person is not urinating, pain during sexual intercourse, discharge from the urethral opening or vagina, in men there can be blood in the semen or urine

3. What are the causes of this above medical condition?

Urethritis is an inflammatory condition that can be **infectious** or **posttraumatic** in nature. Infectious causes of urethritis are typically sexually transmitted and categorized as either gonorrhoea urethritis (ie, due to infections with *Neisseria gonorrhoeae*) or non-gonorrhoea urethritis (eg, due to infections with *Chlamydia trachomatis*, *Ureaplasma urealyticum*, *Mycoplasma hominis*, *Mycoplasma genitalium*, or *Trichomonas vaginalis*). Bacteria that normally are present cause no difficulty unless these tissues are traumatized, usually after instrumentation such as catheterization or cystoscopic examination. Other causes of nonspecific urethritis in men include irritation during vigorous intercourse, rectal intercourse, or intercourse with a woman who has a vaginal infection.

Urethritis is seen more commonly in men than in women. In women, urethritis may accompany cystitis but also may be secondary to vaginal infections. Soaps, bubble baths, sanitary napkins, or scented toilet paper also may cause urethritis. In men, a common cause of urethritis is infection with *Chlamydia trachomatis* or *Ureaplasma urealyticum*, which causes an STI. The distal portion of the normal male urethra is not totally sterile.

4. What are the investigations that should be used to diagnose that medical condition?

The diagnosis of urethritis relies on:

- Physical examination that includes the genitals, abdomen, and rectum.
- Urine tests and culture for gonorrhea, chlamydia, or other bacteria.
- Examination of any discharge under a microscope
- Blood tests may be done in certain situations.

5. Propose the treatment plan regarding this medical condition

Treatment includes appropriate antibiotic therapy (doxycycline, azithromycin, ceftriaxone, etc), liberal fluid intake, analgesics, warm sitz baths, and improvement of the client's resistance to infection by a good diet and plenty of rest. If urethritis is due to an STI, it is treated with appropriate antibiotic therapy. Oral Antibiotic treatment for 1-2 weeks (Men 2 weeks recommended). Urethritis due to trichomonas infection (called trichomoniasis) is usually treated with an antibiotic called metronidazole (Flagyl). Tinidazole (Tindamax) is another antibiotic that can treat trichomoniasis.

The nurse reinforces the need to complete antibiotic therapy, drink plenty of fluids, and take warm sitz baths and analgesics for pain. Urethritis may be seen in clients

with indwelling urethral catheters. To prevent or decrease urethritis, the nurse needs to be vigilant with sterile technique, as well as to exercise gentleness when changing catheters. It also is essential to provide frequent perineal care, especially if the client is incontinent of faeces. In addition to washing around the anus and buttocks, the nurse also cleans the meatus and labia of the female client. When cleaning the anal area, wiping away from the urethra ensures that there is no contamination. If cotton pledgets are used, the nurse wipes from the urethral meatus to the anus in a single stroke and discards the pledget. Client teaching information about prevention include: avoid having intercourse with multiple partners, use condoms every time you have unsafe sex, get tested regularly, protect others if you find out you have an STI, inform others who are also at risk of an infection.

6. If the patient is not well treated what are possible complications?

Failure to seek treatment for gonococcal urethritis may result in a urethral stricture in men. Medication can often treat urethritis quickly. If the infection goes untreated, however, the effects can be lasting and quite serious. For example, the infection may spread to other parts of the urinary tract, including the ureters, kidneys, and bladder. These infections can be painful on their own. While they can be treated with more intensive rounds of antibiotics, they can cause damage to the organs if left untreated for too long. These untreated infections can also spread to the blood and result in sepsis, which can be deadly.

In addition, the STIs that frequently cause urethritis can damage the reproductive system. Women may develop **pelvic inflammatory disease (PID)**, which is painful and can result in **infertility**, ongoing pelvic pain, or **pain during sex**. Women with untreated STIs are also at a higher risk for **ectopic pregnancies**, which can be life-threatening. Men may develop painful inflammation or **infection of the prostate gland**, or the narrowing of a section of the urethra due to scarring, leading to **painful urination**. Major complications of urethritis are: pyelonephritis, pre-term delivery, urinary retention, recurrent UTI, prostatitis, sepsis, renal abscess.

Answers to Self-assessment 4.1.1

1. What are all possible causes or risk factors to develop the urethritis?

Urethritis is an inflammatory condition that can be **infectious** or **posttraumatic** in nature. Infectious causes of urethritis are typically sexually transmitted and categorized as either gonorrhoea urethritis (ie, due to infections with *Neisseria gonorrhoeae*) or non-gonorrhoea urethritis (eg, due to infections with *Chlamydia trachomatis*, *Ureaplasma urealyticum*, *Mycoplasma hominis*, *Mycoplasma genitalium*, or *Trichomonas vaginalis*). Bacteria that normally are present cause no difficulty unless these tissues are traumatized, usually after instrumentation such as

catheterization or cystoscopic examination. Other causes of nonspecific urethritis in men include irritation during vigorous intercourse, rectal intercourse, or intercourse with a woman who has a vaginal infection.

Urethritis is seen more commonly in men than in women. In women, urethritis may accompany cystitis but also may be secondary to vaginal infections. Soaps, bubble baths, sanitary napkins, or scented toilet paper also may cause urethritis. In men, a common cause of urethritis is infection with *Chlamydia trachomatis* or *Ureaplasma urealyticum*, which causes an STI. The distal portion of the normal male urethra is not totally sterile.

2. What are the signs and symptoms of urethritis?

Infection of the urethra results in discomfort on urination varying from a slight tickling sensation to burning or severe discomfort and urinary frequency. Fever is not common, but fever in the male client may be due to further extension of the infection to areas such as the prostate, testes, and epididymis.

Urethritis can cause itching, pain, or discomfort when a person is not urinating, pain during sexual intercourse, discharge from the urethral opening or vagina, in men there can be blood in the semen or urine.

3. What are the investigations that should be requested to make the diagnosis of urethritis?

The diagnosis of urethritis relies on:

- Physical examination that includes the genitals, abdomen, and rectum.
- Urine tests and culture for gonorrhea, chlamydia, or other bacteria.
- Examination of any discharge under a microscope
- Blood tests may be done in certain situations.

4. What are their rationales?

Dipstick urinalysis to identify the presence of nitrites (indicating bacteriuria), white blood cells (WBCs), and leukocyte esterase (an enzyme present in WBCs indicating pyuria).

Urine culture: A urine culture is indicated in complicated UTI, persistent bacteriuria, or frequently recurring UTI (more than two or three episodes per year). Urine may also be cultured when the infection is unresponsive to empiric therapy or the diagnosis is questionable.

A computed tomography (CT) urogram or ultrasound may be obtained when obstruction of the urinary system is suspected or UTI occurs.

5. What must be included into the management plan of the urethritis?

The goals of treatment of UTI include:

- Elimination of infection and prevention of uro-sepsis
- Relief of acute symptoms (eg, fever, dysuria, frequency)
- Prevention of recurrence and long-term complications including hypertension, renal scarring, and impaired renal growth and function.
- Treatment to be effective should be oriented to both people if it is a couple

Interventions that must be carried out to meet those goals are:

- Ensuring adequate fluid intake if it is not contraindicated. Maintaining adequate fluid intake may be difficult because of the patient's perception, that fluid intake will worsen the discomfort and urinary frequency associated with a UTI. Tell patients that fluids will increase frequency of urination at first but will also dilute the urine, making the bladder less irritable. Fluids will help flush out bacteria before they have a chance to colonize in the bladder. Caffeine, alcohol, citrus juices, chocolate and highly spiced foods or beverages should be avoided because they are potential bladder irritants.
- Application of local heat to the suprapubic area or lower back may relieve the discomfort associated with a UTI. Advise the patient to apply a heating pad (turned to its lowest setting) against the back or suprapubic area. A warm shower or sitting in a tub of warm water filled above the waist can also provide temporary relief.
- Instruct the patient about the prescribed drug therapy, including side effects. Emphasize the importance of taking the full course of antibiotics. Often patients stop antibiotic therapy once symptoms disappear. This can lead to inadequate treatment and recurrence of infection or bacterial resistance to antibiotics.
- Instruct the patient to monitor for signs of improvement (e.g., cloudy urine becomes clear) and a decrease in or cessation of symptoms. Teach patients to promptly report any of the following to their health care provider: (1) persistence of bothersome UTI beyond the antibiotic treatment course, (2) onset of flank pain, or (3) fever.
- Antibiotic medications are necessary for the UTI. For treatment of uncomplicated UTI, oral (by mouth) antibiotics are usually adequate. However, for major complications such as sepsis or pyelonephritis, intravenous (IV) antibiotics may be typically necessary. The antibiotics usually used are Nitrofurantoin (Macrobid), Fosfomycin (Monurol), Trimethoprim-Sulfamethoxazole (Bactrim and others), Cefixime, Cefuroxime, Cefotaxime or Ceftriaxone, Gentamicin, Ciprofloxacin (Cipro) or Levofloxacin (Levaquin). Doxycycline or Erythromycin can also be provided. Metronidazole will be needed in case of Trichomonas

infection or Nystatine in case of candida infection. The choice of regimen depends on Antimicrobial spectrum and susceptibility, where the ultimate choice of antimicrobial therapy is based upon the susceptibilities of the organism isolated. Cephalosporins are the first-line oral agent in the treatment of UTI among patients without genitourinary abnormalities. Amoxicillin and ampicillin are not routinely recommended for empiric therapy because of the high rate of resistance of *E. coli*.

- Inpatient parenteral therapy: this will require hospitalisation and the parenteral therapy generally is indicated for the following cases: <2 months, clinical urosepsis (eg, toxic appearance, hypotension, poor capillary refill), immune compromise, vomiting or inability to tolerate oral medication, lack of adequate outpatient follow-up (eg, no telephone, live far from hospital, etc), failure to respond to outpatient therapy.
- Adjunctive therapies might be used to reduce the renal parenchymal inflammation which if not treated leads to renal scarring. The therapies used are anti-inflammatory drugs like Dexamethasone, Prednisolone, etc.

6. If not treated, what are the complications of urethritis?

If all prescribed regimen are respected, the outcome is very good. Without treatment, UTI can cause major health problems. Severe effects of a UTI that can develop include:

- Pyelonephritis (acute or chronic): An infection involving the kidneys
- Sepsis: A dangerous, systemic, whole-body infection
- Renal scarring: due to chronic inflammation of renal parenchyma
- Hypertension: related to ineffective Angiotensin-Renin-Aldosterone

Lesson3: Description of cystitis

This is the third sub unit of medical pathologies of urinary system, lesson deals with definition of cystitis, causes, pathophysiology, clinical manifestation, and medical investigation of cystitis.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to urethritis
- Describe causes, risk factors and pathophysiology of urethritis
- Describe the signs and symptoms of urethritis
- Enumerate the investigations requested for urethritis

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections specially cystitis. Also, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with urogenital urethritis. There is need of black board and chalks or flipcharts and markers.

c) Learning Activities

Teacher's activities and Methodology

- The teacher asks the students to read carefully the case and take 30 minutes to answer the questions in-group Of 6 students by consulting the library and Google, every student have to present the findings according the number of questions.
- The teacher motivates the audience to asks the questions related to the clinical case and at the end teacher summarize the answers from the presenters.

Answer to Learning activity 4.1.2.

1. What the abnormal signs and symptom the patient was presenting?

The symptoms of cystitis include urgency (feeling a pressing need to void although the bladder is not full), frequency, low back pain, dysuria, perineal and suprapubic pain, and hematuria, especially at the termination of the stream (terminal hematuria). If bacteremia is present, the client also may have chills, fever, dark urine, cloudy or strong smelling. When the disease/infection becomes severe, the patient will experience some systemic signs and symptoms: nausea, vomiting, loss appetite, weakness, etc. Chronic cystitis causes similar symptoms, but usually they are less severe.

2. What is the medical condition being the patient having?

The patient complains the fever, pain or burning sensation while urinating, cramps or pressure in lower middle abdomen and back, the results of laboratory test show red blood cells in urine and E. coli.

3. What are the possible causes and risk factors of that medical condition as stipulated in this case?

Although bacterial infections are the most common cause of cystitis, a number of noninfectious factors also may cause the bladder to become inflamed. The causes include urologic instrumentation (e.g., cystoscopy, catheterization), faecal contamination, prostatitis, or benign prostatic hyperplasia, indwelling catheters, pregnancy, and sexual intercourse.

Some examples include:

- **Interstitial cystitis:** The cause of this chronic bladder inflammation, also called painful bladder syndrome, is unclear. Most cases are diagnosed in women. The condition can be difficult to diagnose and treat.
- **Drug-induced cystitis:** Certain medications, particularly the chemotherapy drugs cyclophosphamide and ifosfamide, can cause inflammation of your bladder as the broken-down components of the drugs exit your body.
- **Radiation cystitis:** Radiation treatment of the pelvic area can cause inflammatory changes in bladder tissue.
- **Foreign-body cystitis:** Long-term use of a catheter can predispose you to bacterial infections and to tissue damage, both of which can cause inflammation.
- **Chemical cystitis:** Some people may be hypersensitive to chemicals contained in certain products, such as bubble bath, feminine hygiene sprays or spermicidal jellies, and may develop an allergic-type reaction within the bladder, causing inflammation.
- **Cystitis associated with other conditions:** Cystitis may sometimes occur as a complication of other disorders, such as diabetes, pregnancy, kidney stones, an enlarged prostate or spinal cord injuries.

4. What are the investigations for diagnosing that medical condition?

Microscopic examination of the urine reveals an increase in the number of red and white blood cells.

Culture and sensitivity studies are used to identify the causative microorganism and appropriate antimicrobial therapy.

If repeated episodes occur, **intravenous pyelogram (IVP)** or **cystoscopy** with or without retrograde pyelograms may be needed to identify the possible cause, such as chronic prostatitis or a bladder diverticulum (weakening and outpouching of the bladder wall), which encourages urinary stasis and infection.

5. Propose the treatment plan for this patient.

Medical management includes antimicrobial therapy and correction of contributing factors. Examples of drugs that may be used include trimethoprim-sulfamethoxazole (Bactrim) and nitrofurantoin macrocrystals (Macrocrystals). Antibiotics like sulfonamides are drugs commonly used to treat urinary tract infections (UTIs). Other drugs used are nitrofurantoin macrocrystals (Macrocrystals) and nitrofurantoin (Furadantin), and the acids methenamine mandelate (Mandelamine) and nalidixic acid (NegGram). An azo dye, phenazopyridine (Pyridium), may be ordered for its soothing effect on bladder mucosa and often is used in conjunction with urinary antimicrobial drugs.

Cranberry juice or vitamin C may be recommended to keep the bacteria from adhering to the wall of the bladder and thus promoting their excretion and enhancing the effectiveness of drug therapy.

When there is a partial urethral obstruction, no treatment of cystitis is fully effective until adequate drainage of urine is restored by the removal of the obstruction (see discussion of urethral strictures).

In some instances, treatment may be prolonged and may need to be repeated.

Advise clients to follow their physicians' instructions about the medication, such as drinking extra fluids.

6. What are possible complications if the patient is not well treated?

When treated promptly and properly, bladder infections rarely lead to complications. But left untreated, they can become something more serious.

Complications may include:

- **Kidney infection:** an untreated bladder infection can lead to kidney infection, also called pyelonephritis. Kidney infections may permanently damage your kidneys.

Young children and older adults are at the greatest risk of kidney damage from bladder infections because their symptoms are often overlooked or mistaken for other conditions.

- **Blood in the urine:** with cystitis, you may have blood cells in your urine that can be seen only with a microscope (microscopic hematuria) and that usually resolves with treatment. If blood cells remain after treatment, your doctor may recommend a specialist to determine the cause.

Blood in the urine that you can see (gross hematuria) is rare with typical, bacterial cystitis, but this sign is more common with chemotherapy- or radiation-induced cystitis

Answer to Self-assessment 4.1.2.

1. What are all possible causes or risk factors to develop the cystitis?

Cystitis can be either acute or interstitial:

Bacterial cystitis:

UTIs typically occur when bacteria outside the body enter the urinary tract through the urethra and begin to multiply. Most cases of cystitis are caused by a type of *Escherichia coli* (*E. coli*) bacteria. Bacterial bladder infections may occur in women as a result of sexual intercourse. But even sexually inactive girls and women are

susceptible to lower urinary tract infections because the female genital area often harbors bacteria that can cause cystitis.

Non-infectious cystitis:

Although bacterial infections are the most common cause of cystitis, a number of noninfectious factors also may cause the bladder to become inflamed. The causes include urologic instrumentation (e.g., cystoscopy, catheterization), faecal contamination, prostatitis, or benign prostatic hyperplasia, indwelling catheters, pregnancy, and sexual intercourse. Some examples include:

- **Interstitial cystitis:** The cause of this chronic bladder inflammation, also called painful bladder syndrome, is unclear. Most cases are diagnosed in women. The condition can be difficult to diagnose and treat.
- **Drug-induced cystitis:** Certain medications, particularly the chemotherapy drugs cyclophosphamide and ifosfamide, can cause inflammation of your bladder as the broken-down components of the drugs exit your body.
- **Radiation cystitis:** Radiation treatment of the pelvic area can cause inflammatory changes in bladder tissue.
- **Foreign-body cystitis:** Long-term use of a catheter can predispose you to bacterial infections and to tissue damage, both of which can cause inflammation.
- **Chemical cystitis:** Some people may be hypersensitive to chemicals contained in certain products, such as bubble bath, feminine hygiene sprays or spermicidal jellies, and may develop an allergic-type reaction within the bladder, causing inflammation.
- **Cystitis associated with other conditions:** Cystitis may sometimes occur as a complication of other disorders, such as diabetes, pregnancy, kidney stones, an enlarged prostate or spinal cord injuries.

2. What are the signs and symptoms of cystitis?

The symptoms of cystitis include urgency (feeling a pressing need to void although the bladder is not full), frequency, low back pain, dysuria, perineal and suprapubic pain, and hematuria, especially at the termination of the stream (terminal hematuria). If bacteremia is present, the client also may have chills, fever, dark urine, cloudy or strong smelling. When the disease/infection becomes severe, the patient will experience some systemic signs and symptoms: nausea, vomiting, loss appetite, weakness, etc. Chronic cystitis causes similar symptoms, but usually they are less severe.

3. What are the investigations that should be requested to make the diagnosis of cystitis?

Microscopic examination of the urine reveals an increase in the number of red and white blood cells.

Culture and sensitivity studies are used to identify the causative microorganism and appropriate antimicrobial therapy.

If repeated episodes occur, **intravenous pyelogram (IVP)** or **cystoscopy** with or without retrograde pyelograms may be needed to identify the possible cause, such as chronic prostatitis or a bladder diverticulum (weakening and outpouching of the bladder wall), which encourages urinary stasis and infection.

4. What are their rationales?

Dipstick urinalysis: to identify the presence of nitrites (indicating bacteriuria), white blood cells (WBCs), and leukocyte esterase (an enzyme present in WBCs indicating pyuria).

Urine culture: A urine culture is indicated in complicated UTI, persistent bacteriuria, or frequently recurring UTI (more than two or three episodes per year). Urine may also be cultured when the infection is unresponsive to empiric therapy or the diagnosis is questionable.

5. What must be included into the management plan of the cystitis?

Medical management includes antimicrobial therapy and correction of contributing factors. Examples of drugs that may be used include trimethoprim-sulfamethoxazole (Bactrim) and nitrofurantoin macrocrystals (Macrochantin). Antibiotics like sulfonamides are drugs commonly used to treat urinary tract infections (UTIs). Other drugs used are nitrofurantoin macrocrystals (Macrochantin) and nitrofurantoin (Furadantin), and the acids methenamine mandelate (Mandelamine) and nalidixic acid (NegGram). An azo dye, phenazopyridine (Pyridium), may be ordered for its soothing effect on bladder mucosa and often is used in conjunction with urinary antimicrobial drugs.

Cranberry juice or vitamin C may be recommended to keep the bacteria from adhering to the wall of the bladder and thus promoting their excretion and enhancing the effectiveness of drug therapy.

When there is a partial urethral obstruction, no treatment of cystitis is fully effective until adequate drainage of urine is restored by the removal of the obstruction (see discussion of urethral strictures).

In some instances, treatment may be prolonged and may need to be repeated.

Advise clients to follow their physicians' instructions about the medication, such as drinking extra fluids.

6. If not treated, what are the complications of cystitis?

When treated promptly and properly, bladder infections rarely lead to complications. But left untreated, they can become something more serious. Complications may include:

- **Kidney infection:** an untreated bladder infection can lead to kidney infection, also called pyelonephritis. Kidney infections may permanently damage your kidneys.

Young children and older adults are at the greatest risk of kidney damage from bladder infections because their symptoms are often overlooked or mistaken for other conditions.

- **Blood in the urine:** with cystitis, you may have blood cells in your urine that can be seen only with a microscope (microscopic hematuria) and that usually resolves with treatment. If blood cells remain after treatment, your doctor may recommend a specialist to determine the cause.

Blood in the urine that you can see (gross hematuria) is rare with typical, bacterial cystitis, but this sign is more common with chemotherapy- or radiation-induced cystitis

Lesson 4: Description of acute pyelonephritis

This is the fourth sub unit of medical pathologies of urinary system, lesson deals with definition of **acute pyelonephritis**, causes, pathophysiology, clinical manifestation, and medical investigation of **acute pyelonephritis**.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to chronic pyelonephritis
- Describe causes, risk factors and pathophysiology of chronic pyelonephritis
- Describe the signs and symptoms of chronic pyelonephritis
- Enumerate the investigations requested for chronic pyelonephritis
- Develop a medical and nursing management plan for patient with chronic pyelonephritis

b) Teaching resources

The teacher could ask the students to read and answer the clinical case, which simulate the patient who is having the signs and symptoms of urogenital tract infections especially **acute pyelonephritis**. In addition, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with urogenital urethritis. There is need of black board and chalks or flipcharts and markers.

c) Learning Activities

Teacher's activities and Methodology

- The teacher asks the students to read carefully the case and take 30 minutes to answer the questions in-group Of 6 students by consulting the library and Google, every student have to present the findings according the number of questions.
- The teacher motivates the audience to asks the questions related to the clinical case and at the end teacher summarize the answers from the presenters.

Answers to Learning activity 4.1.3

1. What are the abnormal signs and symptoms the patient was presenting?

The clinical manifestations of acute pyelonephritis are acute onset and vary from mild fatigue to the sudden onset of chills, fever, vomiting, malaise, flank or groin pain, and the lower UTIs characteristics that include dysuria, urgency, and frequency. The patient might also have the cloudy or purulent urine.

2. What are the risk factors that predispose S.U to develop her medical condition?

Pyelonephritis usually begins with colonization and infection of the lower urinary tract via the ascending urethral route. Acute pyelonephritis commonly starts in the renal medulla and spreads to the adjacent cortex. The common causes are:

- **Bacteria** normally found in the intestinal tract, such as *E. coli* or *Proteus*, *Klebsiella*, or *Enterobacter* species, frequently cause pyelonephritis.
- A preexisting condition like **vesicoureteral reflux** (retrograde, or backward, movement of urine from lower to upper urinary tract)
- **Dysfunction of the lower urinary tract** causing the urinary stasis or urinary obstruction (e.g., obstruction from benign prostatic hyperplasia, tumors, a stricture, a urinary calculi or stone).
- **Instrumentation of urethra and bladder** (Urinary tract catheterization, cystoscopy, urologic surgery) is also a common cause of pyelonephritis and urosepsis.
- Another important risk factor for acute pyelonephritis is **pregnancy**-induced physiologic changes in the urinary system.
- Women with increased **sexual activity**, who use the diaphragm or spermicide, who fails to void after intercourse, history of recent urinary infection.
- Men who perform anal intercourse, who has infection with HIV
- **Inability to empty the bladder**

- Other existing **conditions/comorbidities** like diabetes mellitus, other renal disease (polycystic kidney disease), neurogenic bladder (post stroke, multiple sclerosis, or spinal cord injury)

3. What is the medical condition that S.U is presenting?

Fever chills, generalized weakness, dysuria, pollakuria, nausea and vomiting, flank pain

4. List all investigations that have been ordered to the patient, and all other helpful investigations based on her medical condition.

For investigating the pyelonephritis, the complete history taking and comprehensive physical examination must be performed first. The most useful investigations are:

- **Urinalysis** that will indicate pyuria, bacteriuria, and varying degrees of hematuria. White blood cells casts may be found in the urine indicating involvement of the renal parenchyma.
- A **full blood count** (FBC) shows leucocytosis (increased levels of leukocytes in the blood)
- **Urine cultures** must be obtained when pyelonephritis is suspected to detect the causative agents.
- In patients with more **severe illness who are hospitalized**, blood cultures are usually obtained as well.
- **Ultrasonography** of the urinary system may be performed to identify anatomic abnormalities, hydronephrosis, renal abscesses, or an obstructing stone.
- **Other Imaging investigations** include **CT scan** alone or combined with **Intravenous pyelography**, VCUG (a **voiding cystourethrogram** is a study used to look at bladder and urethral abnormalities and to determine if you have ureteral reflux), **CT programs** are also used to assess for signs of infection in the kidney and complications of pyelonephritis such as impaired renal function, scarring, chronic pyelonephritis, or abscesses.

5. What was included into her treatment plan?

The treatment plan is made basing of severity of signs and symptoms that the patient is presenting.

Mild Symptoms (Uncomplicated Infection):

- Outpatient management or short hospitalization
- Antibiotics therapy should be for 2 – 3 weeks
- Empirically selected broad-spectrum antibiotics: ampicillin, vancomycin combined with an aminoglycoside (e.g., tobramycin, gentamicin)
- Switch to sensitivity-guided therapy: trimethoprim/sulfamethoxazole (Bactrim) when results of urine and blood culture are available

- Fluoroquinolones are helpful too like ciprofloxacin, ofloxacin, norfloxacin, gatifloxacin
- Adequate fluid intake (oral preferably)
- Nonsteroidal antiinflammatory drugs (NSAIDs) or antipyretic drugs
- Follow-up urine, blood cultures and imaging studies

Severe Symptoms:

- Require Hospitalization
- Antibiotics therapy should be for 2 – 3 weeks
- Parenteral (Intravenous) Antibiotics
- Oral antibiotics (broad spectrum antibiotics, fluoroquinolones, etc) when patient tolerates oral intake
- Adequate fluid intake (parenteral initially and switch to oral fluids as nausea, vomiting, and dehydration subside)
- NSAIDs as antipyretic or analgesic drugs to reverse fever and relieve discomfort
- Follow-up urine, blood culture and imaging studies

6. What do you think could be the complications if her medical condition is poorly managed?

After the acute phase, healing occurs with deposition of scar tissue and atrophy of affected tubules. Acute pyelonephritis rarely causes renal failure. The most common complications of acute pyelonephritis are:

1. Transformation to Chronic pyelonephritis
2. Papillary necrosis due to inflammatory thrombosis of the blood vessels supplying the renal papilla.
3. Pyonephrosis (filling of the dilated calyces and pelvis by pus due to obstruction at pelviureteric junction.
4. Perinephric abscess due to spread of the inflammation to the perinephric fat

Answers to Self-assessment 4.1.3.

1. **What is the most common cause of acute pyelonephritis resulting from an ascending infection from the lower urinary tract?**
 - a. The kidney is scarred and fibrotic.
 - b. The organism is resistant to antibiotics.**
 - c. There is a preexisting abnormality of the urinary tract.
 - d. The patient does not take all of the antibiotics for treatment of a UTI.

2. **Which characteristic is more likely with acute pyelonephritis than with a lower UTI?**
 - a. Fever
 - b. Dysuria
 - c. Urgency
 - d. Frequency
3. **Which test is required for a diagnosis of pyelonephritis?**
 - a. Renal biopsy
 - b. Blood culture
 - c. Intravenous pyelogram (IVP)
 - d. Urine for culture and sensitivity
4. **Referring to their causes, differentiate the acute and chronic pyelonephritis**

Acute pyelonephritis is a sudden and severe kidney infection. It causes the kidneys to swell and may permanently damage them. Pyelonephritis can be life-threatening. When repeated or persistent attacks occur, the condition is called chronic pyelonephritis

The infection usually starts in the lower urinary tract as a urinary tract infection (UTI). Bacteria enter the body through the urethra and begin to multiply and spread up to the bladder. From there, the bacteria travel through the ureters to the kidneys.

Bacteria such as *E. coli* often cause the infection. However, any serious infection in the bloodstream can also spread to the kidneys and cause acute pyelonephritis.

Acute pyelonephritis

Any problem that interrupts the normal flow of urine causes a greater risk of acute pyelonephritis. For example, a urinary tract that's an unusual size or shape is more likely to lead to acute pyelonephritis.

Also, women's urethras are much shorter than men's, so it's easier for bacteria to enter their bodies. That makes women more prone to kidney infections and puts them at a higher risk of acute pyelonephritis.

Other people who are at increased risk include:

- Anyone with chronic kidney stones or other kidney or bladder conditions
- Older adults
- People with suppressed immune systems, such as people with diabetes, HIV/AIDS, or cancer

- People with vesicoureteral reflux (a condition where small amounts of urine back up from the bladder into the ureters and kidneys)
- People with an enlarged prostate

Other factors that can make you vulnerable to infection include:

- Catheter use
- Cystoscopic examination
- Urinary tract surgery
- Certain medications
- Nerve or spinal cord damage

Chronic pyelonephritis

Chronic forms of the condition are more common in people with urinary obstructions. These can be caused by UTIs, vesicoureteral reflux, or anatomical anomalies. Chronic pyelonephritis is more common in children than in adults.

5. What are the investigations and their rationale requested for pyelonephritis?

Urine tests

A doctor will check for fever, tenderness in the abdomen, and other common symptoms. If they suspect a kidney infection, they will order a urine test. This helps them check for bacteria, concentration, blood, and pus in the urine.

Imaging tests

The doctor may also order an ultrasound to look for cysts, tumors, or other obstructions in the urinary tract.

For people who don't respond to treatment within 72 hours, a CT scan (with or without injectable dye) may be ordered. This test can also detect obstructions within the urinary tract

Radioactive imaging

A dimercaptosuccinic acid (DMSA) test may be ordered if your doctor suspects scarring as a result of pyelonephritis. This is an imaging technique that tracks an injection of radioactive material.

A healthcare professional injects the material through a vein in the arm. The material then travels to the kidneys. Images taken as the radioactive material passes through the kidneys show infected or scarred areas.

6. What are the treatment modalities being available for severe form of acute pyelonephritis?

Antibiotics are the first course of action against acute pyelonephritis. However, the type of antibiotic your doctor chooses depends on whether or not the bacteria can be identified. If not, a broad-spectrum antibiotic is used.

Although drugs can cure the infection within 2 to 3 days, the medication must be taken for the entire prescription period (usually 10 to 14 days). This is true even if you feel better.

The antibiotic options are:

- levofloxacin
- Ciprofloxacin
- Co-trimoxazole
- Ampicillin

Hospital admission

In some cases, drug therapy is ineffective. For a severe kidney infection, your doctor may admit you to the hospital. The length of your stay depends on the severity of your condition and how well you respond to treatment.

Treatment may include intravenous hydration and antibiotics for 24 to 48 hours. While you're in the hospital, doctors will monitor your blood and urine to track the infection. You'll likely receive 10 to 14 days' worth of oral antibiotics to take after you're released from the hospital.

Surgery

Recurrent kidney infections may result from an underlying medical problem. In those cases, surgery may be required to remove any obstructions or to correct any structural problems in the kidneys. Surgery may also be necessary to drain an abscess that doesn't respond to antibiotics.

In cases of severe infection, a nephrectomy may be necessary. In this procedure, a surgeon removes part of the kidney.

7. What are the most clinical signs and symptoms that determine the pyelonephritis?

Symptoms usually appear within two days of infection. Common symptoms include:

- A fever greater than 102°F (38.9°C)
- Pain in the abdomen, back, side, or groin
- Painful or burning urination
- Cloudy urine

- Pus or blood in the urine
- Urgent or frequent urination
- Fishy-smelling urine

Other symptoms can include:

- Shaking or chills
- Nausea
- Vomiting
- General aching or ill feeling
- Fatigue
- Moist skin
- Mental confusion

Symptoms may be different in children and older adults than they are in other people. For example, mental confusion is common in older adults and is often their only symptom.

People with chronic pyelonephritis may experience only mild symptoms or may even lack noticeable symptoms altogether.

8. What are the treatment options for chronic pyelonephritis?

The **penicillins (amoxicillin)** and **first-generation cephalosporins** are the drugs of choice for chronic pyelonephritis because of good activity against gram-negative rods and good oral bioavailability. In infants, the choice of antibiotics is either amoxicillin or a first-generation cephalosporin

9. Referring to RAA system, describe how the pyelonephritis can cause the hypertension

The kidney are noble organs which clean the human body about 150 quarts of blood daily they form about 1-2 quart of urinely pulling water and waste from the blood. Urine normally travels from the kidneys down to the bladder out through the urethra.

As filter, the kidney controls many things to keep us healthy.

Fluid balance, electrolyte levels (e.g. sodium,potassium,calcium,magnesium acid),waste removal in the form of urine.

The regulation of red blood cell count. When the kidneys are damaged, they may not function well. In most cases, some damage won't cause too many problems. But, major damage may require more treatment, like dialysis.

Hypertension complicates chronic pyelonephritis. Since arterial narrowing is common in the damaged kidney, **activation of the renin-angiotensin system due to renal ischaemia** has been suggested as a pathogenetic mechanism.

10. What are the complications of chronic pyelonephritis?

Acute pyelonephritis can have several complications such as **renal or perinephric abscess formation, sepsis, renal vein thrombosis, papillary necrosis, or acute renal failure**, with one of the more serious complications being emphysematous pyelonephritis

11. Describe how the pyelonephritis can lead to renal failure.

Untreated infection can damage the kidneys and lead to long term problems. In rare cases, **kidney infections can lead to kidney disease, high blood pressure, or kidney failure**. If kidney infection spreads to the bloodstream it can cause a serious problem called sepsis.

Lesson 5: Description of acute prostatitis

This is the third sub unit of medical pathologies of urinary system, lesson deals with definition of prostatitis, causes, pathophysiology, clinical manifestation, and medical investigation of prostatitis.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to acute prostatitis
- Describe causes, risk factors and pathophysiology of acute prostatitis
- Describe the signs and symptoms of acute prostatitis
- Enumerate the investigations requested for acute prostatitis
- Develop a medical and nursing management plan for patient with acute prostatitis

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections specially prostatitis. Also, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with urogenital prostatitis. There is need of black board and chalks or flipcharts and markers.

c) Learning Activities

Teacher's activities and Methodology

- The teacher asks the students to read carefully the case and take 30 minutes to answer the questions in group Of 6 students by consulting the library and Google, every student have to present the findings according the number of questions.
- The teacher motivates the audience to asks the questions related to the clinical case and at the end teacher summarize the answers from the presenters

Answer to Learning activity 4.1.4.

1. What are abnormal signs and symptoms was the patient having?

Patient with acute prostatitis present with low back pain, perineal pain, high fever up to 40° C, chills, dysuria, inability to empty the bladder, nocturia, urinary retention, systemic signs and symptoms of infection (myalgia, arthralgia, fatigue/malaise), prostatic pain especially when an individual is in upright position, symptoms can include pain (in the perineum, lower abdomen, testicles, penis, and with ejaculation), bladder irritation, bladder outlet obstruction, and sometimes blood in the semen, sexual dysfunction may accompany chronic bacterial prostatitis.

2. What is the medical diagnosis was the patient presenting?

The medical diagnosis the patient was presenting is: acute prostatitis.

3. What are different risk factors to the development of that medical condition?

Different types of prostatitis have different causes. Risk factors for chronic pelvic pain syndrome (CPPS), the most common type, aren't clear. Potential contributors to CPPS include:

- Autoimmune diseases.
- Pelvic floor muscle spasms.
- Stress.

Potential causes of bacterial forms of prostatitis include:

- Bladder infections or bladder stones.
- Surgery or biopsy requiring use of a urinary catheter.
- Prostate stones.
- Urinary retention (not emptying the bladder completely).
- UTIs.

4. What are all relevant investigations being helpful in confirming that diagnosis?

Diagnostic tests to assess for infection will likely include: Digital rectal exam. With this procedure, the health care provider inserts a lubricated, gloved finger into the rectum to detect inflammation of the prostate. Urine test

Digital rectal exam: The provider inserts a gloved, lubricated finger into the rectum to check the prostate gland for pain and swelling. ...

Urinalysis: A urinalysis and urine culture check for bacteria and UTIs.

Blood test: A blood test measures PSA, a protein made by the prostate gland

5. What is the treatment plan of that medical condition?

Prostatitis treatments vary depending on the cause and type. Asymptomatic inflammatory prostatitis doesn't require treatment.

For chronic pelvic pain syndrome (CPPS), the healthcare provider may use a system called UPOINT to classify symptoms into six categories. The provider uses multiple treatments at the same time to treat only the experienced symptoms.

Approximately 80% of men with CPPS improve with the UPOINT system. The system focuses on these symptoms and treatments:

- **Urinary:** Medications, such as tamsulosin (Flomax®) and alfuzosin (Uroxatral®), relax muscles around the prostate and bladder to improve urine flow.
- **Psychosocial:** Stress management can help. Some men benefit from counseling or medications for anxiety, depression and catastrophizing (over-reaction to minor stresses common in people with chronic pain).
- **Organ:** Quercetin and bee pollen supplements may relieve a swollen, inflamed prostate gland.
- **Infection:** Antibiotics kill infection-causing bacteria.
- **Neurologic:** Prescription pain medicines, such as amitriptyline (Elavil) and gabapentin (Gralise), relieve neurogenic pain. This pain can include fibromyalgia or pain that extends into the legs, arms or back.
- **Tenderness:** Pelvic floor physical therapy may include myofascial release (gentle massage to ease tension on tight pelvic floor muscles). This therapy can reduce or eliminate muscle spasms.
- Antibiotics can kill bacteria that cause bacterial types of prostatitis. Men with acute bacterial prostatitis may need 14 to 30 days of antibiotics, starting with IV antibiotics in the hospital. Rarely, men need surgery to drain an abscess on the prostate.

- Treating chronic bacterial prostatitis is challenging. You may need up to three months of antibiotics to sterilize the prostate. If the prostate can't be sterilized, low-dose antibiotics can be used long term to prevent recurrences. Some men need surgery to remove prostate stones or scar tissue in the urethra. Rarely, surgeons remove part or all of the prostate gland (prostatectomy)

6. What might be the complications if poorly treated?

Complications of acute or chronic prostatitis can include:

- Bacterial infection of the blood (bacteremia)
- Inflammation of the coiled tube attached to the back of the testicle (epididymitis)
- Pus-filled cavity in the prostate (prostatic abscess)
- Infection that spreads to the upper pelvic bone or lower spine

Complications of chronic prostatitis/chronic pelvic pain syndrome may include:

- Anxiety or depression
- Sexual dysfunction, such as the inability to get and maintain an erection (erectile dysfunction)
- Changes in sperm and semen that may cause infertility

There's no direct evidence that prostatitis can lead to prostate cancer.

Lesson 6: Introduction to sexually transmissible diseases (STDs)

This is the six sub unit of medical pathologies of urinary system, lesson deals with definition of sexually transmissible diseases, causes, pathophysiology, clinical manifestations, and medical investigation of sexually transmissible diseases.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to sexually transmissible diseases
- Describe causes, risk factors and pathophysiology of sexually transmissible diseases
- Describe the signs and symptoms of sexually transmissible diseases
- Enumerate the investigations requested for sexually transmissible diseases
- Develop a medical and nursing management plan for patient with sexually transmissible diseases

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections especially sexually transmissible diseases. Also, the teacher should

present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with sexually transmissible diseases. There is need of black board and chalks or flipcharts and markers.

c) Learning Activities

Teacher's activities and Methodology

- The teacher asks the students to read carefully the case and take 30 minutes to answer the questions in group of 6 students by consulting the library and Google, every student have to present the findings according the number of questions.
- The teacher motivates the audience to asks the questions related to the clinical case and at the end teacher summarize the answers from the presenters

Answer to introductory activity 4.2

1. What do you see on the picture?

The picture simulates the man and woman who is in intercourse, and I think is one of way to contract sexually transmissible infection if they perform unprotected sex intercourse.

Sexually transmitted infections (STIs), also known as Sexually Transmitted Diseases (STDs), are caused by bacteria, viruses or parasites that are transmitted through unprotected sex (vaginal, anal, or oral) and skin to skin genital contact

2. What do you think could be the consequences of their act?

The general population is largely unaware of the health consequences of STDs, and STDs are “hidden” from public attention for three reasons. First, many STDs are often asymptomatic and thus go undetected. Second, major health consequences, such as infertility, certain cancers, and other chronic diseases, occur years after the initial infection, so that there is a lack of awareness of any link to the original STD. Third, the stigma associated with having an STD has inhibited public discussion and education concerning the consequences of STDs and frequently prevents clinicians from educating their patients regarding STDs.

Lesson 7: Description of chlamydia

This is the seven sub unit of medical pathologies of urinary system, lesson deals with definition of Description of chlamydia, causes, pathophysiology, clinical manifestation, and medical investigation of sexually transmissible diseases.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to Description of chlamydia
- Describe causes, risk factors and pathophysiology of Description of chlamydia
- Describe the signs and symptoms of Description of chlamydia
- Enumerate the investigations requested for Description of chlamydia
- Develop a medical and nursing management plan for patient with Description of chlamydia

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections especially Description of chlamydia. Also, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with Description of chlamydia. There is need of black board and chalks or flipcharts and markers.

Answer to Learning activity 4.2.1.

1. What signs and symptoms was the patient presenting?

Symptoms of chlamydia can appear in both men and women, including:

- Pain or burning while peeing
- Pain during sex
- Lower belly pain
- Abnormal vaginal discharge (may be yellowish and have a strong smell)
- Bleeding between periods
- Pus or a watery/milky discharge from the penis
- Swollen or tender testicles
- Pain, discharge and/or bleeding around the anus

If chlamydia infects your eyes, you may have redness, skin discoloration around your eye, itching, or discharge. Sometimes chlamydia infections in the throat cause soreness, but it's rare.

2. Basing on those signs and symptoms, what do you think was the medical diagnosis?

Screening and diagnosis of chlamydia is relatively simple. Tests include:

- **A urine test.** A sample of the urine is analyzed in the laboratory for presence of this infection.
- **A swab.** For women, the doctor or nurse takes a swab of the discharge from the cervix for culture or antigen testing for chlamydia. This can be done during a routine Pap test. Some women prefer to swab their vaginas themselves, which has been shown to be as diagnostic as doctor-nurse obtained swabs.

For men, the doctor inserts a slim swab into the end of the penis to get a sample from the urethra. In some cases, the doctor or nurse will swab the anus.

3. What were the risk factors that predisposed her to develop that condition?

A risk factor is something that increases the chances of getting a disease or condition.

Chlamydia is far more common in women than in men. The risk is highest among adolescents and young adults (generally up to age 25), who are more likely to take risks with their sexual behavior.

Since most people are unaware they are infected, chlamydia can get transmitted from person to person without knowing.

Other factors that may increase the chances of chlamydia:

- Multiple or frequent changes in sex partners
- Inconsistent or incorrect condom use —latex condom use helps prevent the spread of sexually transmitted infections (STIs)
- A history of chlamydia or other STIs—reinfection is common and can lead to serious reproductive complications
- Excessive alcohol or illegal drug use—increases the risk of risky sexual behavior
- Men having sex with men

Another risk factor for women is cervical ectropion, a condition where cells from inside the cervix are on the outside.

Chlamydial diseases are sexually transmitted and caused by the bacterium *Chlamydia trachomatis*. However, this bacterium acts more like a virus. This can affect the way chlamydia infection is transmitted and the risk factors that are important in acquiring it. Chlamydia infections can affect the vagina, cervix, and rectum, among other areas.

Fortunately, chlamydia is a largely preventable infection. Learning how Chlamydia trachomatis behaves can give you a better understanding of what makes an infection more likely.

4. What were the investigations requested to guide in the confirmation of that diagnosis?

As most people infected with chlamydia do not experience symptoms, doctors rely on screening to detect most cases of chlamydia. Screening guidelines vary based on many factors, including a person's anatomy, health, and sexual practices. Regular screening for chlamydia is recommended for several groups:

- **Women and anyone with a vagina:** Those who are sexually active and under the age of 25 should be tested for chlamydia annually, while those aged 25 and older should be screened regularly only if they are at an increased risk of contracting chlamydia.
- **Pregnant people:** Chlamydia testing is recommended for all pregnant people under age 25 and for those 25 and over with an increased risk of this infection. In addition to initial testing, experts recommend retesting during the third trimester for people with an elevated risk of infection. For pregnant patients diagnosed with chlamydia, follow-up testing is advised four weeks after completing treatment and again within three months.
- **Men and anyone with a penis:** Those who are gay, bisexual, or have sex with other people with a penis should be tested at least annually. Testing may be recommended every three to six months if patients are at an increased risk of contracting chlamydia. Regular screening is not recommended for other people with a penis unless they are at an increased risk of infection.
- **People diagnosed with HIV:** Sexually active people diagnosed with HIV should be screened for chlamydia during their initial HIV evaluation, then at least annually depending on their risk and local infection rates.

Certain factors increase the risk of contracting chlamydia and may affect how often a person should be screened. Risk factors include having:

- Sex with a new partner
- More than one sexual partner or a partner who has sex with multiple people
- A sex partner diagnosed with an STD

Testing for chlamydia is more frequently conducted in asymptomatic people in settings where infection rates are high, which often includes correctional facilities, adolescent health clinics, the military, and sexual health clinics.

5. What were the treatment options being available towards that diagnosis?

For the treatment of chlamydia infection, the Centers for Disease Control and Prevention (CDC) recommends **oral administration of either 1 g of azithromycin in a single dose or 100 mg of doxycycline twice daily for 7 days**

6. If not well managed, what will be the complications?

Untreated infection can result in serious complications such as pelvic inflammatory disease, infertility, and ectopic pregnancy in women, and epididymitis and orchitis in men. Men and women can experience chlamydia-induced reactive arthritis.

Answers to Self-assessment 4.2.1

1. Name the bacteria that is responsible of chlamydia.

Chlamydia trachomatis

2. What are the signs and symptoms of chlamydia?

Chlamydia is often referred to as a “silent infection” because most people with a chlamydia infection don’t experience any symptoms.

However, it can cause several symptoms in others, including:

- Pain
- A burning sensation while urinating
- Abnormal discharge from the penis or vagina

Some symptoms of chlamydia may also differ slightly for men and women.

Chlamydia symptoms in men

Many men do not notice the symptoms of chlamydia. Most men have no symptoms at all.

Some of the most common symptoms of chlamydia in men include:

- Burning sensation during urination
- Yellow or green discharge from the penis
- Pain in the lower abdomen
- Pain in the testicles

It’s also possible to get a chlamydia infection in the anus. In this case, the main symptoms are often:

- Discharge
- Pain
- Bleeding from this area

Having oral sex with someone who has the infection raises the risk of getting chlamydia in the throat. Symptoms can include a sore throat, cough, or fever. It's also possible to carry bacteria in the throat and not know it.

Chlamydia symptoms in women

Chlamydia is often known as the “silent infection.” That's because people with chlamydia may not experience symptoms at all.

If a woman contracts the STI, it may take several weeks before any symptoms appear.

Some of the most common symptoms of chlamydia in women include:

- Painful sexual intercourse (dyspareunia)
- Vaginal discharge
- Burning sensation during urination
- Pain in the lower abdomen
- Inflammation of the cervix (cervicitis)
- Bleeding between periods

In some women, the infection can spread to the fallopian tubes, which may cause a condition called pelvic inflammatory disease (PID). PID is a medical emergency.

The symptoms of PID are:

- Fever
- Severe pelvic pain
- Nausea
- Abnormal vaginal bleeding between periods

Chlamydia can also infect the rectum. Women may not experience symptoms if they have a chlamydia infection in the rectum. If symptoms of a rectal infection do occur, however, they may include rectal pain, discharge, and bleeding.

Additionally, women can develop a throat infection if they have oral sex with someone with the infection. Though it's possible to contract it without knowing it, symptoms of a chlamydia infection in your throat include cough, fever, and sore throat.

The symptoms of STIs in men and women can be different, so it's important to talk with a healthcare professional if you experience any of the above symptoms.

3. What are the tests that are done to diagnose the infection of chlamydia?

There are a few different tests the doctor can use to diagnose chlamydia. They'll probably use a swab to take a sample, either from the urethra (the tube urine comes out of) in men or from the cervix in women. It goes to a laboratory for analysis. They may also check a urine sample for the bacteria.

4. Explain the treatment plan of chlamydia

Chlamydia is curable. Because it's a bacterial infection, doctors can treat it with antibiotics. If you have chlamydia, the doctor will prescribe oral antibiotics, usually azithromycin (Zithromax) or doxycycline. They'll also recommend your partner(s) get treated to prevent reinfection and further spread of the disease.

5. What are the preventive measures of chlamydia trachomatis?

The only way to avoid getting chlamydia is to abstain from having vaginal, anal or oral sex with someone who has a chlamydia infection. And be sure that sex toys that carry the bacteria don't come in contact with the genitals.

It's not always possible to know if a current or potential partner has chlamydia, though, especially since many people with chlamydia never notice symptoms. With prevention in mind, it's a good idea to make safer sex practices a regular part of your sex life:

- Use condoms during intercourse, anal sex and oral sex.
- Use dental dams during oral sex or vagina-to-vagina contact.
- Don't share sex toys, but if you do, wash them after each use and cover toys used for penetration with a condom.
- Have sex with only one partner, who only has sex with you

6. What are the complications of chlamydia in women and men?

In women, chlamydia can spread to the womb, ovaries or fallopian tubes. This can cause a condition called pelvic inflammatory disease (PID).

PID can cause a number of serious problems, such as:

- Difficulty getting pregnant or infertility
- Persistent (chronic) pelvic pain
- An increased risk of ectopic pregnancy (where a fertilised egg implants itself outside the womb)

The symptoms of PID are generally similar to the symptoms of chlamydia, including discomfort or pain during sex, pain during urination, and bleeding between periods and after sex.

PID is usually treated with a 2-week course of antibiotics. The risk of experiencing problems such as infertility is lower if it's treated early, so it's important to seek medical advice as soon as possible if you have symptoms of the condition.

Pregnancy complications

If you have chlamydia that's not treated while you're pregnant, there's a chance you could pass the infection on to your baby. If this happens, your baby may develop an eye infection (conjunctivitis) and lung infection (pneumonia).

If your baby has symptoms of these conditions, your midwife or GP can arrange for a test to check for chlamydia, and antibiotics can be used to treat the infection.

Untreated chlamydia in pregnancy may also increase the risk of problems such as premature labour and birth (before 37 weeks of pregnancy) or your baby being born with a low birthweight.

In men, chlamydia can spread to the testicles and epididymis (tubes that carry sperm from the testicles), causing them to become painful and swollen. This is known as epididymitis or epididymo-orchitis. This is very rare.

The inflammation is usually treated with antibiotics. If it's not treated, there's a possibility it could affect your fertility.

Reactive arthritis

Chlamydia is the most common cause of sexually acquired reactive arthritis (SARA). This is where your joints, eyes or urethra (the tube that passes urine out of the body) become inflamed, usually within the first few weeks after having chlamydia.

It can affect women who have had chlamydia but is more common in men.

There's currently no cure for SARA, but most people get better in a few months. In the meantime, treatment with non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen can help relieve the symptoms.

Lesson 8: Description of syphilis

This is the eight sub unit of medical pathologies of urinary system, lesson deals with definition of Description of syphilis, causes, pathophysiology, clinical manifestation, and medical investigation of Description of syphilis.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to Description of syphilis
- Describe causes, risk factors and pathophysiology of Description of chlamydia
- Describe the signs and symptoms of Description of syphilis

- Enumerate the investigations requested for Description of syphilis
- Develop a medical and nursing management plan for patient with description of syphilis

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections especially Description of syphilis. Also, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with Description of syphilis. There is need of black board and chalks or flipcharts and markers.

Answers to Learning activity 4.2.2

1. Basing on the scenario above, what are the signs and symptoms the patient was presenting.

The patient presents generalized weakness, headache, nausea, and arthralgia. The patient had unprotected sexual intercourse with a man whom the past 6 months' physical examination revealed a painful ulcerated plaque on the upper lip, a macular rash with painless lesions (considered to be healing chancres) on the glans, a non-pruritic hyperkeratotic palmar rash and bilateral submandibular lymphadenopathy

2. What is the medical diagnosis being the patient presenting?

Dark-field microscopy is the most specific technique for diagnosing syphilis when an active chancre or condyloma latum is present.

Syphilitic infection leads to the production of non-specific antibodies that react to cardiolipin. This reaction is the basis of traditional nontreponemal tests such as the VDRL (**Venereal disease research laboratory**) test and rapid plasma reagin test.

Treponemal-specific tests detect antibodies to antigenic components of *T. pallidum*. These tests are used primarily to confirm the diagnosis of syphilis in patients with a reactive nontreponemal test

3. What are different risk factors and causes of that medical condition?

Syphilis is a sexually transmitted infection (STI) caused by a spiral-shaped bacterium called **Treponema pallidum**. It is typically transmitted through contact with a sore during a sexual encounter with an infected person. A mother can also pass it to her child during pregnancy. There are certain risk factors that increase the chances of contracting syphilis. Unprotected sex, multiple partners, men having sex with men, mother-to-child transmission, HIV positive.

The risk and mode of transmission can vary by the stage:

- During **primary syphilis**, the disease is passed by coming into contact with sores that may be firm round or painless.
- During **secondary syphilis**, the disease can be passed by coming into contact with the secondary rash.
- During **latent syphilis**, there are no signs of symptoms and the infection generally cannot be spread.
- During **tertiary syphilis**, the disease has spread to other organs and is likely highly contagious at this point

4. What are different investigations used to diagnose that medical condition?

Common tests to check for syphilis antibodies include:

- Treponema pallidum particle agglutination assay (TP-PA)
- Fluorescent treponemal antibody absorption (FTA-ABS) test.
- Microhemagglutination assay for antibodies to T. pallidum (MHA-TP)
- T. pallidum hemagglutination assay (TPHA)
- Chemiluminescence immunoassays (CLIA)

5. What are different treatment modalities are used in treating that medical condition?

Primary and secondary syphilis are easy to treat with a penicillin injection. Penicillin is one of the most widely used antibiotics and is usually effective in treating syphilis. People who are allergic to penicillin will likely be treated with a different antibiotic, such as:

- Doxycycline
- Ceftriaxone

6. If not properly treated, what might be some complications?

Untreated syphilis can have devastating effects, including:

- Gummas, which contain masses of dead, swollen, fiber-like tissue. They're most often found in the liver. They can also occur in the brain, heart, skin, bones, eyes, and testis.
- Blindness
- Hearing loss
- Brain damage
- Paralysis

- Meningitis
- Heart valve damage
- Aneurysm
- Aortitis (inflammatory aortic disease)

Answers to Self-Assessment 4.2.2

1. What is the cause of syphilis?

The cause of syphilis is a bacterium called **Treponema pallidum**. The most common way syphilis is spread is through contact with an infected person's sore during sexual activity. The bacteria enter the body through minor cuts or abrasions in the skin or mucous membranes.

2. Can you list some risk factors to syphilis development?

Common risk factors for syphilis:

- Unprotected sexual activity involving contact with oral, genital mucosa or anal especially in gbMSM. ...
- Sexual contact with a known case of syphilis.
- Sex with someone from a country/region with a high prevalence of syphilis.
- Previous syphilis, HIV infection or other STBBI

3. Differentiate different phases/stages of syphilis.

Syphilis is described in terms of its four stages: primary, secondary, latent (hidden), and tertiary (late).

Primary stage

During the primary stage, a sore (chancre) that is usually painless develops at the site where the bacteria entered the body. This commonly occurs within 3 weeks of exposure but can range from 10 to 90 days. A person is highly contagious during the primary stage.

- In men, a chancre often appears in the genital area, usually (but not always) on the penis. These sores are often painless.
- In women, chancres can develop on the outer genitals or on the inner part of the vagina. A chancre may go unnoticed if it occurs inside the vagina or at the opening to the uterus (cervix), because the sores are usually painless and are not easily visible.
- Swelling of the lymph nodes may occur near the area of the chancre.
- A chancre may also occur in an area of the body other than the genitals.

- The chancre lasts for 3 to 6 weeks, heals without treatment, and may leave a thin scar. But even though the chancre has healed, syphilis is still present and a person can still pass the infection to others.

Secondary stage

Secondary syphilis is characterized by a rash that appears from 2 to 8 weeks after the chancre develops and sometimes before it heals. Other symptoms may also occur, which means that the infection has spread throughout the body. A person is highly contagious during the secondary stage.

A rash often develops over the body and commonly includes the palms of the hands and the soles of the feet.

- The rash usually consists of a reddish brown, small, solid, flat or raised skin sore or sores that are less than 2 cm (0.8 in.) across. The rash may look like other more common skin problems.
- Small, open sores may be present on mucous membranes. The sores may contain pus, or moist sores that look like warts may be present (condyloma lata).
- In dark-skinned people the sores may be a lighter colour than the surrounding skin.

The skin rash usually heals without scarring within 2 months. After healing, skin discoloration may develop. But even though the skin rash has healed, syphilis is still present and a person can still pass the infection to others.

When syphilis has spread throughout the body, the person may have:

- A fever of usually less than 38°C (100.4°F).
- A sore throat.
- A vague feeling of weakness or discomfort throughout the body.
- Weight loss.
- Patchy hair loss, especially in the eyebrows, eyelashes, and scalp hair.
- Swelling of the lymph nodes.
- Nervous system symptoms of secondary syphilis, which can include neck stiffness, headaches, irritability, paralysis, unequal reflexes, and irregular pupils.

Latent (hidden) stage

If untreated, an infected person will progress to the latent (hidden) stage of syphilis. After the secondary-stage rash goes away, the person will not have any symptoms for a time (latent period). The latent period may be as brief as 1 year or range from 5 to 20 years.

Often during this stage an accurate diagnosis can only be made through blood testing, the person's history, or the birth of a child with congenital syphilis.

A person is contagious during the early part of the latent stage and may be contagious during the latent period when no symptoms are present.

Relapses of secondary syphilis

About 20 to 30 out of 100 people with syphilis have a relapse of the secondary stage of syphilis during the latent stage. A relapse means the person had passed through the second stage, had no symptoms, then began to experience secondary-stage symptoms again. Relapses can occur several times.

When relapses no longer occur, a person is not contagious through contact. But a woman in the latent stage of syphilis may still pass the disease to her developing baby and may have a miscarriage, a stillbirth, or give birth to a baby infected with congenital syphilis.

Tertiary (late) stage

This is the most destructive stage of syphilis. If untreated, the tertiary stage may begin as early as 1 year after infection or at any time during a person's lifetime. A person may never experience this stage of the illness.

The symptoms of tertiary (late) syphilis depend on the complications that occur. Complications of this stage include:

- Gummata, which are large sores inside the body or on the skin.
- Cardiovascular syphilis, which affects the heart and blood vessels.
- Neurosyphilis, which affects the nervous system.

4. Describe briefly the pathogenesis of congenital syphilis.

Transmission to the fetus is primarily transplacental but it can also occur during delivery in the presence of maternal genital lesions.

The risk of transmission to the fetus is dependent on the stage of the maternal disease (dependent on the spirochete concentration in the blood stream) and the duration of exposure to the fetus in utero.

The risk of vertical transmission of syphilis from an infected untreated mother decreases as maternal disease duration progresses: transmission risk of 70–100% for primary syphilis and 40% for early latent syphilis to 10% for late latent disease. The variation in the percentages with the duration of infection is due to the concentration of spirochetes in the blood stream, which decrease with the duration of maternal syphilis infection.

Kassowitz's law describes the inverse relationship of interval between the disease and pregnancy. Longer the interval between infection and pregnancy more benign is the outcome.

Transmission of infection typically takes place between the 16th and 28th week of pregnancy, however the transmission can be as early as the first trimester of pregnancy

5. What are different investigations used to diagnose syphilis and their rationale?

The doctor or healthcare professional will take a blood sample to run tests, and conduct a thorough physical examination. If a sore is present, they may take a sample from the sore to determine if the syphilis bacteria are present.

If the doctor or healthcare professional suspects that, you are having nervous system problems because of tertiary syphilis (and you have positive screening blood tests), you may need a lumbar puncture, or spinal tap. During this procedure, spinal fluid is collected so that your doctor can test for syphilis bacteria.

6. What are the preventive strategies for syphilis?

Some of the tips to prevent transmission of syphilis include the safe sex measures.

- Having sex with a single faithful, tested and non-infected partner. Sexual penetration or ejaculation does not need to take place for syphilis to spread.
- Condoms can be used to reduce the risk of catching syphilis, but cannot prevent it altogether. Some risk remains via exposure to the mouth (those having oral sex) or via anus (those having anal intercourse). It is important to use a condom during vaginal, oral and anal sex.
- Other forms of barriers like use of a dental dam (square of plastic) when having oral sex or when the mouth of an uninfected individual makes contact with partner's vagina or anus. This also prevents transmission of sexually transmitted infection (STI).
- Sex toys that have been used by another individual (possibly infected) should not be shared. For people who wish to use them can wash them after each use and use a fresh condom over them.
- Transmission needs to be prevented by routine testing and, if positive, treatment of sexual partners of infected individuals.
- The infected individuals are counselled regarding prevention of spread to their sexual partners. Individuals sexually exposed to a person with primary, secondary, or early latent syphilis within 90 days preceding the diagnosis should be assumed to be infected.
- All sexual partners of the infected person in the recent past need to be identified, notified and rapidly referred for medical evaluation and treatment.

Long-term sex partners of patients with late syphilis should be evaluated clinically and serologically and treated appropriately. All patients with syphilis should be tested for HIV. Patient and partner education is important.

7. What are the treatment options available to syphilis?

Primary and secondary syphilis are easy to treat with a penicillin injection. Penicillin is one of the most widely used antibiotics and is usually effective in treating syphilis. People who are allergic to penicillin will likely be treated with a different antibiotic, such as:

- doxycycline
- ceftriaxone

8. What are the complications of syphilis?

Untreated syphilis can have devastating effects, including:

- Gammas, which contain masses of dead, swollen, fiber-like tissue. They're most often found in the liver. They can also occur in the brain, heart, skin, bones, eyes, and testis.
- Blindness
- Hearing loss
- Brain damage
- Paralysis
- Meningitis
- Heart valve damage
- Aneurysm
- Aortitis (inflammatory aortic disease)

Lesson 9: Description of gonorrhea

This is the nine sub unit of medical pathologies of urinary system, lesson deals with definition of Description of gonorrhea, causes, pathophysiology, clinical manifestation, and medical investigation of description of gonorrhea.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to description of gonorrhea.
- Describe causes, risk factors and pathophysiology of description of gonorrhea.
- Describe the signs and symptoms of description of gonorrhea.
- Enumerate the investigations requested for description of gonorrhea.
- Develop a medical and nursing management plan for patient with description of gonorrhea.

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections especially Description of syphilis. Also, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with Description of syphilis. There is need of black board and chalks or flipcharts and markers.

Answers to Learning activity 4.2.3

1. What are abnormal signs and symptoms that patient was presenting?

The signs and symptoms of gonorrhea appear within 2 to 30 days after exposure. That said, it may take several weeks for symptoms to appear, and you might not experience any symptoms at all

Burning or pain during urination may be the first symptom you notice.

Other possible symptoms include:

- Greater frequency or urgency of urination
- A pus-like discharge or drip from your penis (this discharge could be yellow, white, beige, or greenish)
- Discoloration and swelling at the penis opening
- Testicular swelling or pain
- Itching and soreness in your anus
- Rectal bleeding or discharge
- Pain when having bowel movements

If you have a vagina

Many people with a vagina don't develop any symptoms of gonorrhea. Symptoms you do experience can show up anywhere from a day or so to several weeks after you're exposed.

These symptoms are often fairly mild. What's more, they can seem very similar to symptoms of vaginal yeast or other bacterial infections, which can make them even more difficult to recognize.

Possible symptoms include:

- Watery, creamy, or greenish vaginal discharge
- Pain or burning while urinating
- An urge to urinate more frequently

- Heavier periods or spotting between periods
- Pain during penetrative vaginal sex
- Sharp pain in your lower abdomen
- Itching and soreness in your anus
- Rectal bleeding or discharge
- Painful bowel movements

Other gonorrhoea symptoms

Gonorrhea can also affect your mouth and throat.

Oral gonorrhea symptoms can include:

- A persistent sore throat
- Inflammation and redness in your throat
- Swelling in the lymph nodes in your neck

Gonorrhea can also cause a fever.

2. Basing on those signs and symptoms, what could be the medical problem of this patient?

It can be Sexually transmitted diseases (STDs) — or sexually transmitted infections (STIs) such chlamydia, syphilis, gonorrhea, etc.

3. What are the investigations that have been ordered to guide the confirmation of the medical problem?

A healthcare professional can diagnose gonorrhea in a few different ways:

- **Testing your urine.** Often, a urine test can detect gonorrhea.
- **Testing a sample of fluid.** A healthcare professional may also swab your penis, vagina, throat, or rectum to get a sample of fluid for testing. This type of test requires a laboratory culture, which can take several days.
- **Testing your blood.** In rare instances, a healthcare professional may use a blood test to detect gonorrhea. However, this test may not be conclusive.

4. What was included in the management of this case at different levels of health care settings he visited?

The recommended treatment. Trusted Source for gonorrhea is a one-time intramuscular injection of the antibiotic ceftriaxone. Typically, you'll get this shot in the buttocks. A healthcare professional will likely also prescribe an oral medication, such as:

- A twice-daily dose of doxycycline for 7 days

The CDC previously recommended ceftriaxone plus azithromycin, but the guidelines were changed because the bacteria causing gonorrhea are becoming increasingly resistant to azithromycin.

After taking these antibiotics, you should begin to feel relief from any symptoms within days — but you'll need to wait a full week after finishing your medications before participating in any sexual activity.

5. If not treated, what will be the consequences

Untreated gonorrhea can lead to major complications, such as:

- Infertility in women. ...
- Infertility in men. ...
- Infection that spreads to the joints and other areas of your body. ...
- Increased risk of HIV/AIDS. ...
- Complications in babies.

Answers to Self-assessment 4.2.3

1. What is gonorrhoea?

Gonorrhoea is a **sexually transmitted infection (STI) caused by bacteria called *Neisseria gonorrhoeae* or gonococcus.**

2. Describe the causes and triggering factors contributing to the gonorrhoea development.

Gonorrhea is a bacterial infection. You can get infected when the bacteria enter your body through the penis, anus, vagina or mouth, often during unprotected sex. You can also get or pass gonorrhea through sharing sex toys that haven't been washed or covered with a new condom. If a pregnant woman has gonorrhea, she can pass it to her baby during birth.

In women, the most common site of infection is the cervix. The cervix is the opening from the vagina to the uterus (womb).

In men, the infection tends to start in the urethra, the tube that helps urine exit the body.

Sexual exposure to an infected partner without barrier protection (eg, failure to use a condom or condom failure)

Multiple sex partners.

Male homosexuality.

Low socioeconomic status.

3. What are different treatment options for a patient with gonorrhea?

Uncomplicated gonococcal infections of the cervix, urethra, or rectum should be treated with a **single 125-mg dose of ceftriaxone (Rocephin) administered intramuscularly**. Oral regimens to treat pelvic inflammatory disease should continue for 14 days.

4. State the preventive measures to be taken to prevent gonorrhea

The only way to definitely avoid gonorrhea and other STDs is to not have sex (vaginal, oral or anal).

If you are sexually active, you can take steps to protect yourself from gonorrhea:

- Don't have sex with someone you know is infected.
- Always use a condom or dental dam during sex.
- In addition to a condom, use a spermicide containing nonoxynol-9.
- Limit sexual partners and get tested.

5. What are possible investigations to be performed to confirm gonorrhea?

The healthcare provider will ask the questions about the symptoms and sexual history. A urine test can often diagnose gonorrhea.

During the physical exam, the healthcare provider may:

- Perform a pelvic exam, taking a sample of fluid from the cervix to test.
- Take a sample of fluid from the penis.
- Do a throat or anal culture to see if the infection is in those areas.

6. If acute gonorrhea is not well treated effectively, what could be the complications?

If treated early, gonorrhoea is unlikely to lead to any complications or long-term problems. However, without treatment, it can spread to other parts of your body and cause serious problems.

The more times you have gonorrhoea, the more likely you are to have complications.

In women, gonorrhoea can spread to the reproductive organs and cause pelvic inflammatory disease (PID). This is estimated to occur in 10 to 20% of cases of untreated gonorrhoea. PID can lead to long-term pelvic pain, ectopic pregnancy and infertility.

During pregnancy, gonorrhoea can cause:

- Miscarriage
- Premature labour and birth
- The baby being born with conjunctivitis

If the baby is not promptly treated with antibiotics, there's a risk of progressive and permanent vision damage.

In men, gonorrhoea can cause a painful infection in the testicles and prostate gland, which may lead to reduced fertility in a small number of cases.

In rare cases, when gonorrhoea has been left untreated, it can spread through the bloodstream and cause life-threatening infections in other parts of the body (sepsis).

Lesson 10: Description of HIV Infection

This is the ten sub unit of medical pathologies of urinary system, lesson deals with definition of description of HIV Infection, causes, pathophysiology, clinical manifestation, and medical investigation of description of HIV Infection.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to description of HIV Infection.
- Describe causes, risk factors and pathophysiology of description of HIV Infection
- Describe the signs and symptoms of description of HIV Infection.
- Enumerate the investigations requested for description of HIV Infection.
- Develop a medical and nursing management plan for patient with description of HIV Infection.

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections especially description of HIV Infection. Also, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with Description of syphilis. There is need of black board and chalks or flipcharts and markers.

Answers to Learning activity 4.2.4

1. What was the medical diagnosis the patient was presenting?

When infected with HIV, **a person's body develops antibodies against the infection, and these antibodies become detectable in laboratory tests within three months.**

HIV infection in adults is diagnosed on the basis of laboratory detection of anti-HIV antibody. A person is defined as infected with HIV when his/her serum specimen is reactive in all three anti-HIV antibody tests, which rely on different antigens or of different operating characteristics (as regulated by the Ministry of Health).

There are three types of tests available: nucleic acid tests (NAT), antigen/antibody tests, and antibody tests. HIV tests are typically performed on blood or oral fluid. They may also be performed on urine.

- A **NAT** looks for the actual virus in the blood and involves drawing blood from a vein. The test can either tell if a person has HIV or tell how much virus is present in the blood (known as an HIV viral load test). While a NAT can detect HIV sooner than other types of tests, this test is very expensive and not routinely used for screening individuals unless they recently had a high-risk exposure or a possible exposure and have early symptoms of HIV infection.
- An **antigen/antibody test** looks for both HIV antibodies and antigens. Antibodies are produced by immune system when someone is exposed to viruses like HIV. Antigens are foreign substances that cause immune system to activate. If you have HIV, an antigen called p24 is produced even before antibodies develop. Antigen/antibody tests are recommended for testing done in labs and are now common in the United States. This lab test involves drawing blood from a vein. There is also a rapid antigen/antibody test available that is done with a finger prick.
- **HIV antibody tests** only look for antibodies to HIV in the blood or oral fluid. In general, antibody tests that use blood from a vein can detect HIV sooner after infection than tests done with blood from a finger prick or with oral fluid. Most rapid tests and the only currently approved HIV self-test are antibody tests

2. What were the risks factors that exposed her to develop that medical condition?

- Having unprotected anal or vaginal sex;
- Having another sexually transmitted infection (sti) such as syphilis, herpes, chlamydia, gonorrhoea and bacterial vaginosis;
- Sharing contaminated needles, syringes and other injecting equipment and drug solutions when injecting drugs;

3. What must be considered before initiating the treatment to that condition?

HIV treatment involves taking highly effective medicines called antiretroviral therapy (ART) that work to control the virus. ART is recommended for everyone with HIV, and people with HIV should start ART as soon as possible after diagnosis, even on that same day.

People on ART take a combination of HIV medicines called an HIV treatment regimen. A person's initial HIV treatment regimen generally includes three HIV medicines from at least two different HIV drug classes that must be taken exactly as prescribed. There are several options that have two or three different HIV medicines combined into a once-daily pill. Long-acting injections of HIV medicine, given every two months, are also available if your health care provider determines that you meet certain requirements.

4. What are different investigations being useful to decide on the management of that medical condition?

HIV can be diagnosed through blood or saliva testing. Available tests include:

- **Antigen/antibody tests.** These tests usually involve drawing blood from a vein. Antigens are substances on the HIV virus itself and are usually detectable — a positive test — in the blood within a few weeks after exposure to HIV. Antibodies are produced by your immune system when it's exposed to HIV. It can take weeks to months for antibodies to become detectable. The combination antigen/antibody tests can take 2 to 6 weeks after exposure to become positive.
- **Antibody tests.** These tests look for antibodies to HIV in blood or saliva. Most rapid HIV tests, including self-tests done at home, are antibody tests. Antibody tests can take 3 to 12 weeks after you're exposed to become positive.
- **Nucleic acid tests (NATs).** These tests look for the actual virus in your blood (viral load). They also involve blood drawn from a vein. If you might have been exposed to HIV within the past few weeks, your health care provider may recommend NAT. NAT will be the first test to become positive after exposure to HIV.

5. What are different drugs you know that are used to treat that medical condition?

These drugs block a protein that infected cells need to put together new HIV virus particles.

- Atazanavir or ATV (Reyataz)
- Darunavir or DRV (Prezista)
- Fosamprenavir or FPV (Lexiva)
- Indinavir or IDV (Crixivan)
- Lopinavir + ritonavir, or LPV/r (Kaletra)
- Nelfinavir or NFV (Viracept)
- Ritonavir or RTV (Norvir)

6. What are the possible complications related to that medical condition?

HIV is associated with a variety of long-term consequences, including **metabolic and cardiovascular complications, cancer, frailty, and bone demineralization**. An awareness of the potential for these complications and knowledge of prevention and treatment strategies is critical in the management of HIV disease.

- Pneumocystis pneumonia (PCP). This fungal infection can cause severe illness. ...
- Candidiasis (thrush). Candidiasis is a common HIV -related infection. ...
- Tuberculosis (TB). TB is a common opportunistic infection associated with HIV.
- Cytomegalovirus. ...
- Cryptococcal meningitis. ...
- Toxoplasmosis.

Answers to Self-assessment 4.2.4

1. Describe briefly the steps of HIV infection pathogenesis

- Attachment
- Fusion
- Uncoating
- Reverse transcription
- Nuclear import
- Integration
- Transcription
- Nuclear export
- Translation
- Assembly
- Budding
- Release

2. What are different classes of ART drugs and their site of actions?

Types of antiretroviral drug

Antiretroviral therapy involves taking a combination of drugs each day. An HIV treatment regimen usually involves at least three different drugs from at least two different drug classes.

The following are the different categories of antiretroviral drug:

Nucleoside reverse transcriptase inhibitors (NRTIs)

NRTIs block the action of an enzyme called viral reverse transcriptase, which is necessary for HIV to replicate.

Some examples of NRTIs include:

- Abacavir (Ziagen)
- Emtricitabine (Emtriva)
- Lamivudine (Epivir)
- Stavudine (Stavudine)
- Tenofovir disoproxil fumarate (Viread)
- Zidovudine (Retrovir)

Non-nucleoside reverse transcriptase inhibitors (NNRTIs)

NNRTIs work similarly to NRTIs. The only difference is that they act on different sites of the enzyme.

Some examples of these antiretroviral medications include:

- Doravirine (Pifeltro)
- Efavirenz (Sustiva)
- Etravirine (Intelence)
- Nevirapine (Viramune)
- Rilpivirine (Edurant)

Protease inhibitors (PIs)

PIs impede another viral enzyme, called HIV protease. HIV requires protease to replicate.

Some types of PI include:

- Atazanavir (Reyataz)
- Darunavir (Prezista)
- Fosamprenavir (Lexiva, Telzir)
- Indinavir (Crixivan)
- Lopinavir/ritonavir (Kaletra)
- Ritonavir (Norvir)
- Saquinavir (Invirase)
- Tipranavir (Aptivus)

Entry inhibitors

As the name suggests, these drugs prevent the virus from entering the targeted cells.

To penetrate immune cells, HIV must fuse to the cells' receptors, and these drugs work to stop this from happening.

People often take entry inhibitors when other treatments have not worked.

Some examples currently in use include enfuvirtide (Fuzeon) and maraviroc (Selzentry).

Integrase inhibitors

HIV uses a protein called integrase to send its genetic material into the cells that it targets. Integrase inhibitors block this action.

Research into these drugs is ongoing, but some types currently approved for use include dolutegravir (Tivicay) and raltegravir (Isentress).

Side effects

Antiretroviral drugs can have adverse effects. Most are manageable, but some can be serious. Newer drugs tend to cause fewer and less severe side effects.

The benefits of taking HIV medications typically outweigh the side effects. These treatments can help people live long, healthy lives with reduced risks of HIV-related complications and transmission.

The potential side effects vary depending on the types of medication a person uses. Also, the same medication can have different side effects in different people.

Some side effects from antiretroviral therapy, such as nausea or fatigue, may last only a few days or weeks. Other side effects, such as high cholesterol, may not appear for a few months or years.

Some other possible side effects of antiretroviral therapy include:

- Headache
- Nausea and vomiting
- Diarrhea
- Fatigue
- Difficulty sleeping
- A dry mouth
- A rash
- Dizziness
- Pain

If someone experiences severe side effects or side effects that do not go away, they can talk to their healthcare provider about changing dosages or drug combinations to find the one that works best for them.

3. Describe different coping skills needed towards HIV preventive strategies

Anyone can get HIV, but you can take steps to protect yourself from HIV.

- Get tested for HIV. ...
- Choose less risky sexual behaviors. ...
- Use condoms every time you have sex. ...
- Limit your number of sexual partners. ...
- Get tested and treated for STDs. ...
- Talk to your health care provider about pre-exposure prophylaxis (PrEP).

4. Differentiate signs and symptoms depending on the different phases of HIV

Early-Stage Symptoms of HIV Infection

Many people about two in three experience flu-like symptoms within two to four weeks of contracting HIV. (2) Known as acute retroviral syndrome (ARS) or primary HIV infection, these symptoms are the immune system's natural response to the virus.

Symptoms include:

- Fever
- Chills
- Rash
- Night sweats
- Muscle aches
- Sore throat
- Fatigue
- Swollen lymph nodes
- Mouth ulcers

During this very early period, HIV may not be detected by testing. This is because most HIV tests look for antibodies (the proteins the immune system generates in response to the virus) rather than the virus itself, and production of antibodies can take a few weeks. Most rapid tests and home tests are antibody tests.

People who have contracted HIV are highly infectious at this early stage, even if they show no symptoms, because virus levels in their blood are extremely high.

Clinical Latency Stage of HIV Infection

The symptoms during ARS may last for a few weeks, according to the National Institutes of Health.

After this point, the infection progresses to the clinical latency stage, a period during which the virus reproduces at very low levels, but it is still active.

Also known as asymptomatic HIV infection or chronic HIV infection, the clinical latency stage typically causes no HIV-related symptoms.

For people who are not taking any anti-retroviral medication for their infection, the clinical latency stage lasts for 10 years, on average, but it may progress quicker.

ART, though, can keep the virus from growing and multiplying, prolonging the clinical latency state for several decades.

It's important to note that people living with HIV in the clinical latency stage are contagious and can still transmit the virus to other people. But, as the CDC notes, people who take ART exactly as prescribed and maintain an undetectable viral load have “effectively no risk of transmitting HIV to their HIV negative-partner through sex.”

Late-Stage HIV Infection: AIDS Symptoms

The final stage of an HIV infection is AIDS, which occurs when the immune system is severely damaged.

It's diagnosed when your CD4 cells are very low or when you develop one or more opportunistic illnesses, such as pneumonia or tuberculosis, or specific cancers as a result of an HIV infection.

People with AIDS may experience:

- Rapid weight loss
- Recurring fever
- Profuse night sweats
- Pronounced fatigue and weakness
- Prolonged swollen lymph glands
- Chronic diarrhea, which lasts more than a week
- Sores that develop in the mucous membranes of the mouth, anus, or genitals
- Blotches (red, brown, pink, or purplish) on the skin, under the skin, or inside the mouth, nose, or eyelids
- Neurological issues, including memory loss and depression

Many of these symptoms, particularly those that are severe, may be related to other opportunistic infections that develop due to the weakened immune system.

These opportunistic infections can include tuberculosis and pneumonia, as well as candidiasis (fungal infections caused by yeast), when the fungal infection affects the esophagus or lower respiratory tract.

5. Discuss different complications of HIV

Opportunistic infections (OIs) capitalize on weakened immune systems. In general, complications of HIV don't occur if the body's CD4 count is higher than 500 cells per cubic millimeter. Most life-threatening complications occur when the CD4 count drops below 200 cells per cubic millimeter.

OI illnesses may have little to no significant impact on a person with a healthy immune system. However, they can cause devastating effects for people living with HIV. OIs typically present when the CD4 count drops below 200 cells per cubic millimeter. They are considered stage 3 HIV (or AIDS-defining) conditions.

In general, a person living with HIV will not present with OIs if their CD4 count is above 500 cells per cubic millimeter.

The following 20 OIs have been defined by the Centers for Disease Control and Prevention Trusted Source as stage 3 HIV (or AIDS-defining) illnesses.

Infections common with HIV

- **Candidiasis.** This is a common fungal infection that's also known as thrush. It can be treated with antifungal medications after a simple visual examination.
- **Coccidioidomycosis.** This common fungal infection can lead to pneumonia if left untreated.
- **Cryptococcosis.** This fungal infection often enters through the lungs. It can quickly spread to the brain, often leading to cryptococcal meningitis. Left untreated, this fungal infection is often fatal.
- **Cryptosporidiosis.** This diarrheal disease often becomes chronic. It's characterized by severe diarrhea and abdominal cramping.
- **Cytomegalovirus.** This common global virus affects most adults during their lifetime. It often presents with eye or gastrointestinal infections.
- **HIV-related encephalopathy.** This is often referred to as HIV-related dementia. It can be defined as a degenerative brain condition that affects people with CD4 counts of less than 100.
- **Herpes simplex (chronic) and herpes zoster.** Herpes simplex produces red, painful sores that appear on the mouth or genital area. Herpes zoster, or shingles, presents with painful blisters on skin surfaces. While there is no cure for either, medications are available to alleviate some symptoms.

- **Histoplasmosis.** This environmental fungal infection is commonly treated with antibiotics.
- **Isosporiasis.** This is a parasitic fungus. It develops when people drink or come into contact with contaminated food and water sources. It's currently treated with antiparasitic drugs.
- **Mycobacterium avium complex.** This is a type of bacterial infection. It often presents in people with severely compromised immune systems (CD4 cell counts of less than 50). If these bacteria enter the bloodstream, it often results in death.
- **Pneumocystis carinii pneumonia (PCP).** This OI is currently the leading cause of death in people living with HIV. Careful monitoring and antibiotic therapies are currently used to treat the person following diagnosis.
- **Chronic pneumonia.** Pneumonia is an infection in one or both lungs. It can be caused by bacteria, viruses, or fungi.
- **Progressive multifocal leukoencephalopathy (PML).** This neurological condition often affects people with CD4 cell counts below 200. While there is no current treatment for this disease, some response has been shown with antiretroviral therapies.
- **Toxoplasmosis.** This parasitic infection commonly strikes people with CD4 cell counts below 200. Prophylaxis treatments are used as a preventive measure for people posting low CD4 cell counts.
- **Tuberculosis.** This disease is most common in low-income areas of the world. It can be successfully treated in most cases if caught early.
- **Wasting syndrome (HIV-related).** This OI causes a total weight loss of more than 10 percent of your normal body weight. Treatment involves dietary management and continued antiretroviral therapy.
- **Kaposi's sarcoma.** This form of cancer often presents with either oral lesions or lesions covering the skin surfaces. Current treatments include radiation and chemotherapy to shrink the tumors. Antiretroviral therapy is also used to boost the body's CD4 cell count.
- **Lymphoma.** A variety of cancers frequently present in people living with HIV. Treatment will vary based upon the person's cancer type and health condition.
- **Cervical cancer.** Women living with HIV are at greater risk of developing cervical cancer. An impaired immune system presents challenges associated with treating this form of cancer.

Lesson 11: Description of Human Papilloma Virus

This is the ten sub unit of medical pathologies of urinary system, lesson deals with definition of description of HIV Infection, causes, pathophysiology, clinical manifestation, and medical investigation of description of Human Papilloma Virus.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to description of Human Papilloma Virus.
- Describe causes, risk factors and pathophysiology of description of Human Papilloma Virus
- Describe the signs and symptoms of description of Human Papilloma Virus.
- Enumerate the investigations requested for description of Human Papilloma Virus.
- Develop a medical and nursing management plan for patient with description of Human Papilloma Virus

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections especially description of Human Papilloma Virus. Also, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with description of Human Papilloma Virus. There is need of black board and chalks or flipcharts and markers.

Answers to Learning activity 4.2.5.

1. What are abnormal signs and symptoms that patient was presenting?

Symptoms of HPV may appear years after the initial infection. Some types of the virus cause warts to form, while others can increase the risk of cancer. Specifically, HPV can cause:

Genital warts

A person may have Trusted Source one small skin bump, a cluster of bumps, or stem-like protrusions. These warts can range in size and appearance, and they may be:

- Large or small
- Flat or cauliflower-shaped
- White, pink, red, purplish-brown, or skin-colored

They can form on the:

- Vulva
- Cervix
- Penis or scrotum
- Anus
- Groin area

These warts can cause itching, burning, and other discomfort.

Other types of warts

HPV can also cause common warts, plantar warts, and flat warts.

Common warts are rough, raised bumps that tend to form on the hands, fingers, and elbows.

Plantar warts are hard, grainy growths that often form on the feet, usually on the heels or balls of the feet.

Flat warts, meanwhile, are flat-topped, slightly raised lesions that are darker than the surrounding skin and often appear on the face or neck.

2. Basing on those signs and symptoms, what could be the medical problem of this patient?

Sexually Transmitted Infections

- Chlamydia.
- Gonorrhea.
- Syphilis.
- Genital Herpes.
- Acquired Immune Deficiency Syndrome (AIDS)
- Hepatitis B (HBV)
- Genital Warts.
- Trichomoniasis.

3. What are the investigations that have been ordered to guide the confirmation of the medical problem?

Healthcare providers diagnose STDs through **physical examination, blood tests, or swabbed cultures**. Diagnosis of STDs by self-obtained vaginal swabs was the focus of an NIAID-supported workshop. However, many people infected by an STD have little or no symptoms of the infection.

4. What was included in the management of this case at different levels of health care settings he visited?

Effective treatment is currently available for several STIs.

- Three bacterial STIs (chlamydia, gonorrhoea and syphilis) and one parasitic STI (trichomoniasis) are generally curable with existing single-dose regimens of antibiotics.
- For herpes and HIV, the most effective medications available are antivirals that can modulate the course of the disease, though they cannot cure the disease.
- For hepatitis B, antiviral medications can help to fight the virus and slow damage to the liver.

5. If not treated, what will be the consequences?

Untreated STDs can lead to many health complications, including **pelvic inflammatory disease, cervical cancer and future infertility**, among other things

Some of the complications that one can develop from an untreated STD are:

- Pelvic inflammatory disease and infertility by Chlamydia.
- Pelvic inflammatory disease and infertility by Gonorrhea.
- Meningitis and bladder issues by Genital herpes.
- Liver cancer and cirrhosis by Hepatitis B.
- Reduced life expectancy by HIV.

Answers to Self-assessment 4.2.5

1. What is Human Papilloma virus?

Human papillomavirus (HPV) is a small, non-enveloped deoxyribonucleic acid (DNA) virus that infects skin or mucosal cells. The circular, double-stranded viral genome is approximately 8-kb in length

2. Describe the causes and triggering factors contributing to the human Papilloma Virus development.

Risk factors you can possibly change

- Human papillomavirus (HPV) infection. ...
- Sexual history. ...
- Smoking. ...
- Having a weakened immune system. ...

- Chlamydia infection. ...
- Long-term use of oral contraceptives (birth control pills) ...
- Having multiple full-term pregnancies.

3. What are different treatment options for a patient with Human Papilloma virus infection?

If healthcare provider decides to treat the abnormal cells, they may use one of these methods:

- **Cryotherapy.** This involves freezing the abnormal cells with liquid nitrogen or carbon dioxide.
- **Conization.** This procedure removes the abnormal areas.
- **Laser therapy.** This uses light to burn away abnormal cells.
- **Loop electrosurgical excision procedure (LEEP).** The abnormal cells are removed with an electrical current. The goal is to remove all the abnormal cells, including most or all of the cells with HPV.

4. State the preventive measures to be taken to prevent Human Papilloma Virus

Protect Against HPV

- Get vaccinated. HPV vaccines can prevent most cases of cervical, vaginal, vulvar, and anal cancers.
- Use condoms. Consistent condom use can protect women from HPV infection.
- Avoid direct contact. ...
- Get tested.

5. What are possible investigations to be performed to diagnose HPV?

Sometimes, an intraductal papilloma is found on a mammogram or ultrasound, and then diagnosed by a needle biopsy. If there is a mass or nipple discharge, both mammogram and ultrasound should be performed.

6. If HPV is not well treated effectively, what could be the complications?

HPV can cause cervical and other cancers, including cancer of the vulva, vagina, penis, or anus. It can also cause cancer in the back of the throat (called oropharyngeal cancer). This can include the base of the tongue and tonsils. Cancer often takes years, even decades, to develop after a person gets HPV.

Lesson 12: Description of hepatitis B

This is the ten sub unit of medical pathologies of urinary system, lesson deals with definition of description of hepatitis B, causes, pathophysiology, clinical manifestation, and medical investigation of description of description of hepatitis B.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to description of description of hepatitis B.
- Describe causes, risk factors and pathophysiology of description of hepatitis B
- Describe the signs and symptoms of description of Human Papilloma Virus.
- Enumerate the investigations requested for description of Human Papilloma Virus. B
- Develop a medical and nursing management plan for patient with description of hepatitis B

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections especially description of Human Papilloma Virus. Also, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with description of Human Papilloma Virus. There is need of black board and chalks or flipcharts and markers

Answers to Learning activity 4.2.6

1. **Given the clinical case, what were the abnormal signs and symptoms the patient was presenting?**

On physical examination, she is alert and oriented, in no acute distress. Her vital signs are temperature of 38 degree celsius, pulse 78 beats/minute, respirations of 18 cycles/minute, and blood pressure of 121/78 mmHg. Her extraocular muscles are intact; however, mild scleral icterus is noted. Heart sounds are regular rate and rhythm without murmurs, and lungs are clear to auscultation bilaterally. The abdomen is soft and not tender, except the liver that is tender when palpated and extends 8 cm below the costal margin, with a smooth edge. Initial laboratory testing is performed and shown Complete blood count (CBC) that is within normal limits.

2. What is mostly the medical diagnosis?

Liver function tests are performed, and the significant findings are Alanine aminotransferase (ALT) 3817 U/L (Normal 7-55 U/L), Aspartate aminotransferase (AST) 2152 U/L (Normal 8-48 U/L), Alkaline phosphatase (ALP) 176 U/L (Normal 45-115 U/L), Albumin 3.4 g/dL (Normal 3.5-5 g/dL), Total protein 6.7 g/dL (Normal 6.3-7.9 g/dL), Total bilirubin 8.5 mg/dL (Normal 0.1-1.2 g/dL). Viral Serology for Hepatitis B revealed HBsAg Positive (hepatitis B surface antigen), HBeAg (hepatitis B envelope antigen) Positive, IgM Anti-HB core Positive, Ig (immunoglobulin) G Anti-HBe Negative, IgG Anti-HBs Negative, Hepatitis B Virus-DNA Positive

3. What are the causes and risk factors of developing the medical condition described above?

These risk factors include **lifetime number of sexual partners, having a new partner, and partner's sexual history** Other less consistent determinants are age of sexual debut, smoking, parity, and oral contraceptive use. Concurrent infection with multiple HPV types is common.

In addition, there is a certain positive association with tobacco use and the early initiation of sexual intercourse. In conclusion, the prevalence of HPV in men is high. The risk factors for HPV infection are **sexual promiscuity, early sexual debut, absence of circumcision, lack of condom use and smoking**.

4. What are different possible treatments of that medical condition?

If you're diagnosed with hepatitis B, your GP will usually refer you to a specialist, such as a hepatologist (liver specialist).

Many people do not have any troublesome symptoms, but if you do feel unwell, it can help to:

- Get plenty of rest
- Take over-the-counter painkillers, such as paracetamol or ibuprofen, for tummy pain
- Maintain a cool, well-ventilated environment, wear loose clothing, and avoid hot baths or showers if itching is a problem
- Take medication, such as metoclopramide, to stop you feeling sick, and chlorphenamine to reduce itching – your doctor can give you a prescription for these if necessary

Most people recover completely in a couple of months, but you'll be advised to have regular blood tests to check that you're free of the virus and have not developed chronic hepatitis B.

If blood tests show that you still have hepatitis B after 6 months, your doctor may recommend medication to reduce the risk of complications of hepatitis B and regular tests to assess the health of your liver.

Treatment is usually offered if:

- Your immune system is unable to control the hepatitis B by itself
- There's evidence of ongoing liver damage

Hepatitis B medications can help keep the virus under control and stop it damaging your liver, although they will not necessarily cure the infection and some people need lifelong treatment.

The main medicines for chronic hepatitis B include peginterferon alfa 2-a and antiviral medicines.

5. What are the complications related to that medical condition?

Having a chronic HBV infection can lead to serious complications, such as:

- Scarring of the liver (cirrhosis). The inflammation associated with a hepatitis B infection can lead to extensive liver scarring (cirrhosis), which may impair the liver's ability to function.
- Liver cancer. ...
- Liver failure. ...
- Other conditions.

Answers to Self-assessment 4.2.6

1. What are different modes of HBV transmission?

Hepatitis B is spread when blood, semen, or other body fluids from a person infected with the virus enters the body of someone who is not infected. This can happen through **sexual contact; sharing needles, syringes, or other drug-injection equipment; or from mother to baby at birth.**

2. Briefly described the pathogenesis of HBV infection.

Hepatitis B virus is dangerous because it attacks the liver, thus inhibiting the functions of this vital organ. The virus causes persistent infection, chronic hepatitis, liver cirrhosis, hepatocellular carcinoma, and immune complex disease.

3. What are different investigations used to the diagnosis of HBV?

Blood tests can detect signs of the hepatitis B virus in your body and tell your doctor whether it's acute or chronic. A simple blood test can also determine if you're immune to the condition. Liver ultrasound, A special ultrasound called transient elastography can show the amount of liver damage.

4. What are the complications resulting from HBV infection?

Having a chronic HBV infection can lead to serious complications, such as:

- Scarring of the liver (cirrhosis). The inflammation associated with a hepatitis B infection can lead to extensive liver scarring (cirrhosis), which may impair the liver's ability to function.
- Liver cancer. ...
- Liver failure. ...
- Other conditions.

Lesson 13: Description of genital herpes

This is the ten sub unit of medical pathologies of urinary system, lesson deals with definition of description of genital herpes, causes, pathophysiology, clinical manifestation, and medical investigation of description of genital herpes.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to description of description of genital herpes.
- Describe causes, risk factors and pathophysiology of description of genital herpes
- Describe the signs and symptoms of description of description of genital herpes.
- Enumerate the investigations requested for description of description of genital herpes
- Develop a medical and nursing management plan for patient with description of genital herpes

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections especially description of description of genital herpes. Also, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with description of description of genital herpes. There is need of black board and chalks or flipcharts and markers.

Answers to Learning activity 4.2.7

1. **What are the abnormal signs and symptoms that the patient was presenting?**

Patient presents the following signs and symptoms fever, headache, pain during sex intercourse, itching and sores in the vagina and anus area. The vital signs were the body temperature of 38.5 degree Celcius, blood pressure of 120/70 mm Hg, PR was 88bpm

2. **Basing on those signs and symptoms, what could be the medical problem of this patient?**

Medical problems that patient can present sexually transmitted infection,communicable diseases,

3. **What are the investigations that have been requested to confirm the medical condition of Mrs B.A?**

The necessary investigations are full blood account,urine culture,hemoculture

4. **What was included in the treatment plan of this case?**

Treatment of signs and symptoms :paracetmol,and antibiotic drugs after lab test.

5. **If not well treated, what will be the complications?**

Convulsions and cells damage such as neurone

Answers to Self-assessment 4.2.7

1. **What are the causes of genital Herpes?**

Two types of the herpes simplex virus (HSV) cause genital herpes:

- **HSV-1.** This type usually causes cold sores, but it can also cause genital herpes.
- **HSV-2.** This type usually causes genital herpes, but it can also cause cold sores.

The World Health Organization stated that in 2016, about 3.7 billion Trusted Source people under age 50 years had contracted HSV-1. In the same year, around 491 million people ages 15 to 49 years had an HSV-2 infection.

The viruses enter the body through skin abrasions or mucous membranes. Mucous membranes are the thin layers of tissue that line the openings of your body. They can be found in your nose, mouth, and genitals.

Once the viruses are inside the body, they incorporate themselves into the cells. Viruses tend to multiply or adapt to their environments very easily, which makes treating them difficult.

HSV-1 or HSV-2 can be found in bodily fluids, including:

- Saliva
- Semen
- Vaginal secretions

2. Describe the pathophysiology of genital herpes.

Intimate contact between a susceptible person (without antibodies against the virus) and an individual who is actively shedding the virus or with body fluids containing the virus is required for herpes simplex virus (HSV) infection to occur. Viral shedding occurs during the primary infection, during subsequent recurrences, and during periods of asymptomatic viral shedding. Contact during these periods must involve mucous membranes or open or abraded skin. Following exposure, the primary infection of HSV is established at the site of contact. Here, the viral envelope is fused with the cellular membranes of the skin and mucous membranes and HSV DNA is incorporated into the nucleus. HSV glycoprotein C protects the viral envelope and aids in viral entry.

3. What are the signs and symptoms of genital Herpes?

If you experience symptoms of genital herpes, they may include:

- Pain or itching. You may experience pain and tenderness in your genital area until the infection clears.
- Small red bumps or tiny white blisters. These may appear a few days to a few weeks after infection.
- Ulcers. ...
- Scabs

4. Which investigations should be requested to confirm the diagnosis of genital Herpes?

The healthcare provider usually can diagnose genital herpes based on a physical exam and the results of certain laboratory tests:

- Viral culture. This test involves taking a tissue sample or scraping of the sores for examination in the laboratory.
- Polymerase chain reaction (PCR) test. PCR is used to copy your DNA from a sample of your blood, tissue from a sore or spinal fluid. The DNA can then be tested to establish the presence of HSV and determine which type of HSV you have.

- Blood test. This test analyzes a sample of your blood for the presence of HSV antibodies to detect a past herpes infection.

5. What is the treatment plan of Genital Herpes?

There's no cure for genital herpes. Treatment with prescription antiviral medications may:

- Help sores heal sooner during an initial outbreak
- Lessen the severity and duration of symptoms in recurrent outbreaks
- Reduce the frequency of recurrence
- Minimize the chance of transmitting the herpes virus to another

Antiviral medications used for genital herpes include:

- Acyclovir (Zovirax)
- Valacyclovir (Valtrex)

6. What are the complications of Genital Herpes?

Complications associated with genital herpes may include:

- Other sexually transmitted infections. Having genital sores increases your risk of transmitting or contracting other sexually transmitted infections, including AIDS.
- Newborn infection. ...
- Bladder problems. ...
- Meningitis. ...
- Rectal inflammation (proctitis).

Lesson 14: Description of trichomoniasis

This is the ten sub unit of medical pathologies of urinary system, lesson deals with definition of description of trichomoniasis, causes, pathophysiology, clinical manifestation, and medical investigation of description of trichomoniasis.

a) Learning objectives

On completion this lesson, the learner will be able to:

- Define the concepts related to description of description of trichomoniasis.
- Describe causes, risk factors and pathophysiology of description of trichomoniasis
- Describe the signs and symptoms of description description of trichomoniasis
- Enumerate the investigations requested for description description of trichomoniasis

- Develop a medical and nursing management plan for patient with description of trichomoniasis

b) Teaching resources

The teacher could ask the students to read and answer the clinical case which simulate the patient who is having the signs and symptoms of urogenital tract infections especially description of trichomoniasis. Also, the teacher should present to the students the library textbooks on medical pathology related urinary tract infection and other resources such as video and YouTube on Google of patient with description of trichomoniasis. There is need of black board and chalks or flipcharts and markers.

Answers to Learning activity 4.2.8

1. What were the signs and symptoms was the patient presenting?

The patient presents wart-like lesions and pus oozing from the urethra.

2. What are the differential medical diagnoses that the patient was having?

The medical diagnosis are sexually transmitted diseases such as candidiasis, gonorrhea, syphilis

3. What were the investigations requested to look for accurate medical diagnosis?

Full blood account, swab test, urine analysis.

4. What was involved into his treatment plan?

Paracetamol and antibiotics, cefixime 400 mg oral single dose, doxycycline 100 mg 12 hourly for 7 days, and metronidazole 2 g single dose

5. If poorly treated, what will be the complications?

Infertility and septicemia

Answers to Self-assessment 4.2.8

1. What are the signs and symptoms of Trichomoniasis in man and woman?

Trichomoniasis is a common sexually transmitted infection caused by a parasite. **In women, trichomoniasis can cause a foul-smelling vaginal discharge, genital itching and painful urination. Men who have trichomoniasis typically have no symptoms**

2. Describe the pathophysiology of Trichomoniasis

The pathology of trichomoniasis **results from damage to the host epithelia, caused by a variety of processes during infection** and recent work has highlighted the complex interactions between the parasite and host, commensal microbiome and accompanying symbionts.

3. What are the investigations that should be requested to confirm the medical diagnosis of Trichomoniasis?

After a physical examination, your doctor or nurse may need to take a swab from either the vagina or penis. The swab will be analysed in a laboratory to check for signs of the trichomoniasis infection. It may take several days for the results to come back. In men, a urine sample can also be tested for trichomoniasis.

4. What is involved into the treatment plan of Trichomoniasis?

Trichomoniasis is **usually treated quickly and easily with antibiotics**. Most people are prescribed an antibiotic called metronidazole which is very effective if taken correctly. You'll usually have to take metronidazole twice a day, for 5 to 7 days. Sometimes this antibiotic can be prescribed in a single, larger dose

5. Explain the preventive measures for trichomoniasis.

Use condoms (male or female) every time you have vaginal or anal sex. if you have oral sex, cover the penis with a condom or the female genitals with a latex or polyurethane square (a dam) if you're a woman and rub your vulva against your female partner's vulva, one of you should cover your genitals with a dam.

6. What are the complications of trichomoniasis?

Trichomoniasis also appears to make it easier to become infected with human immunodeficiency virus (HIV), the virus that causes acquired immunodeficiency syndrome (AIDS). Trichomoniasis is associated with an **increased risk of cervical or prostate cancer**. Untreated, trichomoniasis infection can last for months to years

4.6. Summary of the unit

Almost urinary tracts Diseases of unit five affect the urogenital organs such as kidney, urethra, ureter, bladder, and external part of genital organs. The risk factors and causes of these diseases are similar, mode of transmissions, pathogenesis, medical diagnosis, prevention and treatment; the common causes of urogenital infection are bacteria, rare fungi and virus.

Medical diagnosis of these pathologies is due to laboratory test such urine analysis, culture of urine and full blood account, the role is to identify the germs. The mode of transmission is from person to another, sexual intercourse, treatment is antibiotic, antiviral and symptomatic treatment.

4.7. Additional informational for teacher

Fungal diseases: Vaginal Candidiasis

Candidiasis is an infection caused by a yeast (a type of fungus) called *Candida*. *Candida* normally lives inside the body (in places such as the mouth, throat, gut, and vagina) and on skin without causing any problems. Sometimes *Candida* can multiply and cause an infection if the environment inside the vagina changes in a way that encourages its growth. Candidiasis in the vagina is commonly called a “vaginal yeast infection.” Other names for this infection are “vaginal candidiasis,” “vulvovaginal candidiasis,” or “candida vaginitis.”

Symptoms

The symptoms of vaginal candidiasis include:

- Vaginal itching or soreness
- Pain during sexual intercourse
- Pain or discomfort when urinating
- Abnormal vaginal discharge

Although most vaginal candidiasis is mild, some women can develop severe infections involving redness, swelling, and cracks in the wall of the vagina.

Contact your healthcare provider if you have any of these symptoms. These symptoms are similar to those of other types of vaginal infections, which are treated with different types of medicines. A healthcare provider can tell you if you have vaginal candidiasis and how to treat it.

Risk & Prevention

Vaginal candidiasis is common, though more research is needed to understand how many women are affected. Women who are more likely to get vaginal candidiasis include those who:

- Are pregnant
- Use hormonal contraceptives (for example, birth control pills)
- Have diabetes

Wearing cotton underwear might help reduce the chances of getting a yeast infection. Because taking antibiotics can lead to vaginal candidiasis, take these medicines only when prescribed and exactly as the healthcare provider tells you. Learn more about when antibiotics work and when they should be avoided.

The healthcare provider can treat many yeast infections with over-the-counter creams or suppositories that you can buy without a prescription, especially if this isn't the first time you've had a yeast infection and you recognize the symptoms.

Antifungal Vaginal Creams

For severe yeast infections, the doctor or nurse may prescribe an antifungal vaginal cream. These usually come packaged with an applicator that helps you measure the right dose.

- Clotrimazole (Lotrimin and Mycelex)
- Miconazole (Monistat and Micatin)
- Tioconazole (Vagistat-1)
- Butoconazole (Gynazole-1)
- Terconazole (Terazol)

4.8. Additional activities

A. Remedial activities

Multiple choice questions:

1. **The most common cause of UTI is?**
 - a. Escherichia coli (E. coli)
 - b. Staphylococcus aureus (S.aureus)
 - c. Chlamydia
 - d. Mycoplasma
2. **Which is a common UTI risk factor in adults?**
 - a. Enlarged prostate
 - b. Catheter usage
 - c. Diabetes
 - d. All of the above
3. **What are the signs and symptoms of an UTI in adults?**
 - a. Frequent urge to urinate
 - b. Pain during urination
 - c. Milky / cloudy urine
 - d. All of the above
4. **To prevent UTI some doctors recommend that people drink which liquid?**
 - a. Lemonade
 - b. Cranberry juice
 - c. Green tea
 - d. Apple juice

- 5. On average, what percentage of pregnant women develop UTI?**
- a. 50%
 - b. 25%
 - c. 10 – 15 %
 - d. About 1.5 %
- 6. Which antibiotics are used in the treatment of uncomplicated UTIs?**
- a. Trimethoprim/ sulfamithoxazole (Bacterium, Septra cotrium)
 - b. Amoxicillin (Amoxil, Trimox, Wymox)
 - c. Ampicillin (Omnipen, Pollycillin, Prinicipen, Totacillin)
 - d. All of the above
- 7. What is not a common cause of UTIs in men?**
- a. Urinary stone
 - b. Erectile dysfunction
 - c. Catheter usage
 - d. Enlarged prostate
- 8. Which of the following may provide some relief from UTI pain?**
- a. A heating pad
 - b. Drinking plenty of water
 - c. Both (A) and (B)
 - d. None of the above
- 9. What percentage of women who have UTI will have another?**
- a. 5%
 - b. 50%
 - c. 20 – 30%
 - d. None of the above
- 10. A pregnant woman who develop UTI need proper treatment to avoid?**
- a. Premature delivery of the baby
 - b. High B.P.
 - c. Both (A) and (B)
 - d. None of the above

Answers:

- 1. (A) Escherichia coli
- 2. (D)

3. (D)
4. (B) Cranberry juice
5. (D) About 1.5%
6. (D)
7. (B) Erectile dysfunction
8. (C)
9. (C) 20 – 30 %
10. (C)

B. Consolidation activities

1. What are the main preventive measures of urinary tract infection?

- Wipe front to back. Since the rectum is a main source of Escherichia coli
- Drink plenty of fluids. Stay hydrated throughout the day. ...
- Avoid holding your pee. ...
- Urinate before and after sex. ... Empty your bladder soon after intercourse.
- Avoid scented products. ...
- Explore birth control options. ...
- Take probiotics. ...
- Get antibiotics.

2. What are the main preventive measures of sexually transmitted diseases?

- Abstain. The most effective way to avoid STIs is to not have (abstain from) sex.
- Stay with one uninfected partner. ...
- Wait and test. ...
- Get vaccinated. ...
- Use condoms and dental dams consistently and correctly. ...
- Don't drink alcohol excessively or use drugs. ...
- Communicate. ...
- Consider male circumcision

C. Extended activities

What Are the Best Antibiotics to Help Treat a Urinary Tract Infection?

UTIs can be caused by many different types of germs including bacteria or fungi — and in rare cases, even viruses. But bacterial UTIs are the most common.

If you have a bacterial UTI, the only way to treat it is by getting rid of the bacteria that's causing it. That's where antibiotics come in. They either stop those bacteria from growing or directly kill the bacteria altogether.

It's worth noting that antibiotics only treat UTIs and other infections caused by bacteria. If you have a fungal or viral UTI, antibiotics won't help.

All three antibiotics kill bacteria by destroying one of its most important components: the cell wall, which normally keeps bacteria structurally intact.

Common doses:

- **Amoxicillin/clavulanate:** 500mg twice a day for 5 to 7 days
- **Cefdinir:** 300 mg twice a day for 5 to 7 days
- **Cephalexin:** 250 mg to 500 mg every 6 hours for 7 days
- Nitrofurantoin 100 mg twice a day for 5 days
- One double-strength tablet (160 mg of trimethoprim/800 mg of sulfamethoxazole) twice a day for 3 days
- Ciprofloxacin: 250 mg twice a day for 3 days
- Levofloxacin: 250 mg once a day for 3 days

4.9. Expected answers to end unit 4 assessment

1. Enumerate different commonest causes of Urinary Tract Infection(UTI)

Bacteria are the most common cause of UTIs, although fungi rarely can also infect the urinary tract. E. coli bacteria, which live in the bowel, cause most UTIs. The female anatomy contributes to women's increased likelihood of contracting a UTI.

2. Pathophysiological, describe how a UTI can lead to acute kidney injury.

An uncomplicated UTI usually only involves the bladder. When bacteria invade the bladder mucosal wall, an inflammatory reaction called cystitis is produced. The majority of organisms causing a UTI are enteric coliforms that typically inhabit the per urethral vaginal introitus. These organisms ascend the urethra into the bladder and cause the UTI. Sexual intercourse is a common cause of a UTI as it promotes the migration of bacteria into the bladder. People who frequently void and empty the bladder tend to have a lower risk of a UTI.

Urine is an ideal medium for bacterial growth. Factors that make it less favorable for bacterial growth include: a pH less than 5, the presence of organic acids and high levels of urea. Frequent urination and high urinary volumes are also known to decrease the risk of UTI.

Bacteria that cause UTIs tend to have adhesions on their surface which allow the organism to attach to the urothelial mucosal surface. In addition, a short urethra also makes it easier for the uropathogen to invade the urinary tract. Premenopausal women have large concentrations of lactobacilli in the vagina and an acidic pH which prevents colonization with uropathogens. However, the use of antibiotics can erase this protective effect.

3. What are the goals for UTI treatment?

The goals of treatment for UTIs are **to relieve symptoms, get rid of the infection and keep it from coming back, and prevent unlikely but serious complications such as kidney damage and sepsis**. In pregnant women, treatment protects the woman and the fetus. Antibiotics can cure most UTIs.

4. What are general signs and symptoms of UTI.

The symptoms of a UTI can include:

- A burning feeling when you pee
- A frequent or intense urge to pee, even though little comes out when you do
- Cloudy, dark, bloody, or strange-smelling pee
- Feeling tired or shaky
- Fever or chills (a sign that the infection may have reached your kidneys)
- Pain or pressure in your back or lower abdomen

5. Describe different complications of UTI.

Patients with acute complicated UTI can also present with **bacteremia, sepsis, multiple organ system dysfunctions, shock, and/or acute renal failure, renal corticomedullary abscess, perinephric abscess, emphysematous pyelonephritis, or papillary necrosis** which can also be fatal.

6. Discuss different causes of urethritis.

Neisseria gonorrhea is the leading cause of urethritis. *Neisseria gonorrhea* is a gram-negative diplococci bacteria transmitted through sexual intercourse. The incubation period is 2-5 days. Patients are commonly co-infected with *Chlamydia trachomatis*

7. Discuss different causes and risk factors of pyelonephritis.

Risk Factors

- Kidney stones or calculi.
- Vesicoureteral reflux (VUR) abnormal backward flow or reflux of urine, can occur post surgically.
- Posterior urethral valve.
- Pregnancy.
- Urinary tract catheterization or stents.
- Drainage procedures (e.g. nephrostomy)
- Prostate disease (e.g. benign prostatic hyperplasia) in men

The main cause of acute pyelonephritis is **gram-negative bacteria**, the most common being *Escherichia coli*. Other gram-negative bacteria which causes acute pyelonephritis include *Proteus*, *Klebsiella*, and *Enterobacter*. In most patients, the infecting organism will come from their fecal flora.

8. Discuss different investigations helpful in diagnosis of pyelonephritis.

Two common laboratory tests are performed to diagnose kidney infections (pyelonephritis). **A urine sample is examined under a microscope to determine if white and/or red blood cells are present.** The urine is also sent to the lab to see if bacteria grow in a urine.

Pyelonephritis is defined as infection and inflammation of the kidney and renal pelvis. Its diagnosis is clinical, and symptoms include back or flank pain with **costovertebral angle tenderness** on examination, fever (temperature higher than 38 °C), bacteriuria, and possibly nausea and vomiting.

9. Different treatment options for pyelonephritis.

Doctors treat pyelonephritis with antibiotics. In most uncomplicated cases of pyelonephritis, the antibiotic can be given orally (by mouth), and treatment usually lasts for 7 to 10 days. Commonly used oral antibiotics include trimethoprim with sulfamethoxazole (Bactrim and others), ciprofloxacin (Cipro) or levofloxacin (Levaquin), but the choice of antibiotic will depend on your history of allergies and laboratory testing of the bacteria causing the infection.

10. What are the investigations to be requested for diagnosing the prostatitis?

Digital rectal exam: Your provider inserts a gloved, lubricated finger into the rectum to check the prostate gland for pain and swelling.

Urinalysis: A urinalysis and urine culture check for bacteria and UTIs.

Blood test: A blood test measures PSA (Prostate-specific antigen), a protein made by the prostate gland.

11. What are the investigations to request for diagnosing the syphilis?

Currently, cases of possible syphilis are commonly investigated **using the treponemal serological tests T. Pallidum IgG chemiluminescence immunoassay (CLIA) and the T. pallidum particle agglutination (TPPA)**. The nontreponemal rapid plasma reagin (RPR) flocculation test is used to assess disease activity.

12. What are different treatment options for gonorrhea?

Adults with gonorrhea are treated with antibiotics. Due to emerging strains of drug-resistant *Neisseria gonorrhoeae*, the Centers for Disease Control and Prevention recommends that uncomplicated gonorrhea be treated with the antibiotic **ceftriaxone — given as an injection — with oral azithromycin (Zithromax)**.

13. Discuss different ways of HIV contamination.

HIV anal sex transmission

Anal sex is the riskiest type of sex for getting or transmitting HIV.

Being the receptive partner (bottom) is riskier than being the insertive partner (top).

The bottom's risk is higher because the rectum's lining is thin and may allow HIV to enter the body during anal sex.

The top is also at risk. HIV can enter the body through the opening at the tip of the penis (urethra); the foreskin if the penis isn't circumcised; or small cuts, scratches, or open sores anywhere on the penis.

HIV vaginal sex transmission

Vaginal sex is less risky for getting HIV than receptive anal sex.

Either partner can get HIV during vaginal sex.

HIV can enter a person's body during vaginal sex through the delicate tissue that lines the vagina and cervix. Vaginal fluid and blood can carry HIV, which can pass through the opening at the tip of the penis (urethra); the foreskin if the penis isn't circumcised; or small cuts, scratches, or open sores anywhere on the penis

Mother Child HIV transmission

HIV can be transmitted from a mother to her baby during pregnancy, birth, or breastfeeding. However, it is less common because of advances in HIV prevention and treatment.

This is called perinatal transmission or mother-to-child transmission.

Mother-to-child transmission is the most common way that children get HIV.

Recommendations to test all pregnant women for HIV and start HIV treatment immediately have lowered the number of babies who are born with HIV

If a woman with HIV takes HIV medicine as prescribed throughout pregnancy and childbirth, and gives HIV medicine to her baby for 4 to 6 weeks after birth, the risk of transmission can be less than 1%.

Sharing needles, syringes HIV transmission

The high risk for getting HIV if you share needles, syringes, or other drug injection equipment (for example, cookers) with someone who has HIV. Never share needles or other equipment to inject drugs, hormones, steroids, or silicone.

- Used needles, syringes, and other injection equipment may have someone else's blood on them, and blood can carry HIV.
- People who inject drugs are also at risk for getting HIV (and other sexually transmitted diseases) if they engage in risky sexual behaviors like having sex without protection (such as condoms or medicine to prevent or treat HIV).
- Sharing needles, syringes, or other injection equipment increases your risk for getting hepatitis B and hepatitis C, and other infections.

Oral Sex HIV transmission

- Oral sex involves putting the mouth on the penis (fellatio), vagina or vulva (cunnilingus), or anus (rimming).
- Factors that may affect the risk of getting HIV include:
 - Ejaculation in the mouth with oral ulcers, bleeding gums, or genital sores.
 - The presence of other sexually transmitted diseases (STDs).
- You can get other STDs from oral sex. If you get feces in your mouth during anilingus, you can get hepatitis A and hepatitis B, parasites like Giardia, and bacteria like Shigella, Salmonella, Campylobacter, and E. coli.

Biting and Spitting

- The small number of documented cases have involved severe trauma with extensive tissue damage and the presence of blood. This rare transmission can occur through contact between broken skin, wounds, or mucous membranes and blood or body fluids from a person who has HIV.
- There is no risk of transmission through unbroken skin.
- There are no documented cases of HIV being transmitted through spitting as HIV is not transmitted through saliva.

Deep, Open-Mouth Kissing

- Very rarely, transmission has occurred if both partners have sores or bleeding gums.
- You can't transmit HIV through closed-mouth or "social" kissing with someone who has HIV.
- You can't transmit HIV through saliva.
- Touching involves putting your hands, other body parts, or sex toys on your partner's vagina, penis, or anus.
- The only possible risk would be if body fluids from a person with HIV touch the mucous membranes or damaged tissue of someone without HIV. Mucous membranes are found inside the rectum, vagina, opening of the penis, and mouth. Damaged tissue could include cuts, sores, or open wounds.
- You can get or transmit some other STDs (like human papillomavirus or HPV, genital herpes, and syphilis) through skin-to-skin contact.
- If you touch someone's anus and get feces on your hands or fingers, you can also get or transmit hepatitis A and hepatitis B. Infection with parasites like Giardia and bacteria like Shigella, Salmonella, Campylobacter, and E. coli can also occur.

Tattoos and Body Piercings

- There are no known cases in the United States of anyone getting HIV this way.
- It is possible to get HIV from tattooing or body piercing if the equipment or ink has someone else's blood in it. This is more likely to happen when the person doing the procedure is unlicensed because they may use unsterilized needles or ink.
- If you get a tattoo or a body piercing, be sure that the person doing the procedure is properly licensed and uses only new or sterilized equipment

14. Describe different preventive measures of HIV infection.

Anyone can get HIV, but you can take steps to protect yourself from HIV.

- Get tested for HIV. ...
- Choose less risky sexual behaviors. ...
- Use condoms every time you have sex. ...
- Limit your number of sexual partners. ...
- Get tested and treated for STDs. ...
- Talk to your health care provider about pre-exposure prophylaxis (PrEP).

15. Discuss different complications related to HIV infection.

HIV/AIDS and Opportunistic Infections. HIV attacks the body's white blood cells. This allows infections to take advantage of a weakened immune system, and can lead to illnesses, cancers, or neurological problems.

AIDS wasting syndrome occurs when you have AIDS and lose at least 10% of the body weight -- especially muscle.

Lipodystrophy, also called fat redistribution, is common in people with HIV and AIDS. Find out what causes it and how it's treated.

Pneumocystis pneumonia (PCP) is a serious infection that causes inflammation and fluid buildup in the lungs.

Cytomegalovirus (CMV) is related to the herpes virus that gives you cold sores. It can cause blindness and other serious problems if you're HIV-positive.

Tuberculosis is not a problem for most people. But this opportunistic infection is a leading cause of death for people with HIV. Find out why and what you can do about it.

Mycobacterium avium complex (MAC) is a group of bacteria that are related to tuberculosis and can severely affect those infected by HIV.

AIDS dementia complex -- also called ADC -- is a type of dementia that occurs in advanced stages of AIDS.

Non-Hodgkin's lymphoma, also known as AIDS-related lymphoma, is a cancer of specific white blood cells. Find out more about what it is and what you can do for it.

Kaposi's sarcoma is a type of cancer that people with AIDS often get. Find out more including its symptoms and treatment.

16. What are the risk factors of HPV infection?

While certain high-risk HPV strains are associated with certain cancers, scientists are still unsure why cancer will develop in some people with HPV and not others.

It is believed that genetics and family history play a part in this. At the same time, a person's environment, lifestyle, and general health (including past infections) can also contribute.

Beyond the HPV strain and location of the infection, there are other factors that can increase a person's risk of developing cancer from HPV. Among them:

- Persistent HPV infection (lasting longer than 24 months)
- HIV co-infection (and other forms of immune suppression)
- Chlamydia and possibly herpes simplex virus infection
- Oral contraceptives (increasing cervical cancer risk)
- Having more than three full-term pregnancies (increasing cervical cancer risk)
- Anal fistula (increasing anal cancer risk)
- Being a man who has sex with men (increasing anal cancer risk)
- Cigarette smoking (impacting all cancer types)

17. Basing on the pathogenesis, discuss how HPV can lead do cervical cancer.

HPV infects the squamous cells that line the inner surfaces of these organs. For this reason, most HPV-related cancers are a type of cancer called squamous cell carcinoma. Some cervical cancers come from HPV infection of gland cells in the cervix and are called adenocarcinomas.

18. Describe different preventive measures of HPV.

Get the HPV vaccine. Use condoms and/or dental dams every time you have vaginal, anal, or oral sex. Though condoms and dental dams are not as effective against HPV as they are against other STDs like chlamydia and HIV, safer sex can lower your chances of getting HPV.

19. What are different risk factors for development of Hepatitis B?

Infants born to mothers with hepatitis B, people who inject drugs or share needles, syringes, and other types of drug equipment, sex partners of people with hepatitis B, men who have sex with men, people who live with someone who has hepatitis B.

20. What are different investigations of diagnosing hepatitis B?

Acute hepatitis B is a clinical diagnosis identified by the detection of HBsAg, symptoms, high serum aminotransferases. Usually anti-HBc IgM can be detected and HBV DNA is present. HBeAg can also be identified in most acute phase of infections, but has little clinical importance. The diagnosis of chronic infection is based on the persistence of HBsAg for more than 6 months. Patients with chronic HBV infection are commonly diagnosed by laboratory means but not by clinical presentations. Past HBV infection is defined by the coexistence of anti-HBs and IgG anti-HBc.

21. What are different treatment options for hepatitis B?

Current treatments for hepatitis B fall into two general categories:

- Immune modulator Drugs – These are interferon-type drugs that boost the immune system to help get rid of the hepatitis B virus. They are given as a shot (similar to how insulin is given to people with diabetes) over 6 months to 1 year.
- Antiviral Drugs – These are drugs that stop or slow down the hepatitis B virus from reproducing, which reduces the inflammation and damage of your liver. These are taken as a pill once a day for at least 1 year and usually longer.
- **Pegylated interferon alfa-2a, entecavir, and tenofovir** are recommended as first-line treatment options for chronic hepatitis B.

22. What are the complications of hepatitis B virus infection?

Having a chronic HBV infection can lead to serious complications, such as: **Scarring of the liver (cirrhosis)**. The inflammation associated with a hepatitis B infection can lead to extensive liver scarring (cirrhosis), which may impair the liver's ability to function. Liver cancer.

23. What are different preventive measures of STDs?

Using a condom correctly every time you have sex can help you avoid STDs. Condoms lessen the risk of infection for all STDs. You still can get certain STDs, like herpes or HPV, from contact with your partner's skin even when using a condom.

UNIT 5

5.1 Key unit competence

Demonstrate understanding of the appropriate management of different common Medical Pathologies of endocrine system

5.2 Prerequisite (Knowledge, skills, attitude and values)

To achieve the above competence, the associate nurse student needs to have learnt the following subjects:

- **Human body anatomy and physiology:** Endocrine system
- **Fundamental of Nursing:** Vital signs and parameters measurements and interpretation, Drugs administration (PO and injectable), History taking, Complete health assessment from head to toes through interview and Physical assessment regarding Endocrine system.
- **Ethics and professional code of conduct:** Respect of principles of ethics during management of a patient with all medical diseases. The Associate Nurse student should demonstrate good behaviors while interacting with the patient.
- **Pharmacology:** drugs acting on endocrine system (oral hypoglycemic drugs injectable/insulin therapy, analgesics, anti-inflammatory, oxygen therapy, etc) with their posology and their mode of administration.

5.3 Cross-cutting issues to be addressed

Standardization culture

All health care facilities must use same standard and accurate equipment and techniques in the management of the medical conditions. During the field trips, the teacher should ensure the availability of standard medical equipment's and technics before selecting the health care facility to use. The learners have to learn the use of those standards equipment and technics in the management of patients with endocrine diseases.

Inclusive education

All students should participate in all activities without discrimination of a student with any disability. This may be challenging to students with special educational needs especially those with disabilities, slow learners, those with low self-esteem, etc. However, the teacher can make some arrangements like:

- Grouping students: Students with special educational needs are grouped with others and assigned roles basing on individual student's abilities. Providing procedure/checklists or protocols earlier before the practical work so that students get familiar with them. They can be written on the chalkboard or printed depending on available resources. If you have students with low vision remember to print in appropriate fonts. Also you are supposed to pay attention to all categories of learners.
- Every important point is written and spoken. The written points help students with hearing impairment and speaking aloud helps students with visual impairment.
- Remember to repeat the main points of the lessons.

Gender education

Emphasize to learners that anybody irrespective of their gender can be a health care professional. The teacher must present some role models of people who have been successful in medical and nursing professions in the area where the learners come from. Make sure that during practical work both boys and girls shares and participate equally in practices, arranging and proper hygiene after procedures.

5.4 Guidance on the introductory activity

During the introductory activity 5.0, learners will remember the anatomy and physiology of endocrine system and parts of endocrine disorders assessment mainly diabetes mellitus learnt in the unit of biology, and what they know about how to take and interpret capillary glycemia results. The learners will also be able to list all conditions that can lead to hyperglycemia. All these will guide the learners on this activity.

Teacher's activity

- Using brainstorming every learner is given opportunity to answer the questions
- Teacher writes on whiteboard the correct answers from the learners.

The expected answers to introductory activity 5.0

1. The instrument is called **Glucometer**
 - It used to measure the **capillary blood sugar levels**
2. **Interpretation is high capillary blood sugar levels/hyperglycemia (Normal Range is between 70 -110 mg/dl).**
3. **Some conditions that cause hyperglycemia therefore enabling use of Glucometer are:** endocrine conditions such as diabetes mellitus, gestational diabetes, Cushing syndrome that cause insulin resistance. Other possible causes include being less active than usual, physical stress (from illness, a cold, the flu, an infection, etc.), emotional stress (from family conflicts, emotional problems, school or work stresses, etc.), taking steroids for longtime, pancreatic diseases, surgery or trauma.

5.5 List of lessons/sub-heading (including assessment)

#	Lessons	Learning objectives	Number of periods
1	Description of endocrine system diseases (Introductory activity and learning activity)	• Through brain storming, learners will be able to know normal blood sugar levels and also some medical conditions that can lead to hyperglycemia. • Within the groups, learners will be able to answer all questions related to learning activity 5.1 • The teacher will also describe the endocrine system focusing on pancreas and its endocrine and exocrine function.	3
2	Description of different types of diabetes mellitus (definition, causes, causes and risk factors, pathophysiology)	• Define the key concepts of diabetes (prediabetes, type 1 and 2 diabetes mellitus and gestational diabetes) • List the common causes and risk factors of different types of diabetes mellitus and pathophysiology of diabetes.	3

3	Description of different types of diabetes mellitus (clinical manifestation and investigations of diabetes mellitus and their diagnosis)	- List the different signs and symptoms of different types of diabetes mellitus - Describe medical investigations of different types of diabetes and describe how to diagnose the diabetes mellitus disease.	2
4	Description of treatment plan of patient with diabetes mellitus, evolution and complications of diabetes mellitus)	- Explain different principles of management of patients with different types of diabetes mellitus. - Predict the evolution and complications of diabetes mellitus.	2
5	Description of diabetes mellitus complications (DKA and HHS)	Define DKA and HHS, and explain different signs and symptoms, ways of diagnosing those complications, and plan of management of those 2 complications	2
6	Self-assessment 5.1	- Learners will be into different groups and read the clinical case scenario, then after will answer all questions related. - Demonstrate understanding of the appropriate management of different common Medical Pathologies of endocrine system.	2
7	End unit 5 assessment	- Demonstrate understanding of the appropriate management of different common Medical Pathologies of endocrine system - Identify the strengths and gaps of learners on appropriate decisions in the management of common pathologies of endocrine system. - Prepare the feedback to students - Organize different additional learning activities.	2

Lesson 1: Description of endocrine system diseases (Introductory activity and learning activity).

a) Prerequisites

This is the first lesson of the fifth unit on medical pathologies of endocrine system. In this lesson you will be dealing with the common medical pathologies of endocrine. The learner will be able to revise the anatomy and physiology of endocrine system where he/she will be able to differentiate the endocrine to exocrine functions of the pancreas. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of endocrine system in biology, health assessment of endocrine system from fundamentals of nursing and let them discuss the questions as indicated in introductory activity and from the case study from learning activity 5.1 so that they can prepare themselves for this lesson.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Differentiate endocrine to exocrine glands
- Differentiate exocrine and endocrine functions of pancreas
- Normal blood glucose levels
- Medical conditions that lead to hyperglycemia
- Answer all basic questions from the diabetes mellitus case study

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(glucometer, needles, gauzes, alcohol for disinfection, glycaemia strips, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guide the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listen the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to brainstorm about while answering the questions related to use of glucometer.
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Brainstorm in answering the questions regarding use of glucometer.
- Form group and participate in the group work
- To read carefully the case study and answer the indicated
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Lesson 2: Description of different types of diabetes mellitus (definition, causes and risk factors, pathophysiology)

a) Prerequisites

This is the second lesson in unit 5 of medical pathologies of endocrine system, lesson deals with definition, causes and risk factors, and pathophysiology of different types of diabetes mellitus. The learner will be able to revise the anatomy and physiology of endocrine system where he/she will be able to differentiate the endocrine to exocrine functions of the pancreas. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of endocrine system in biology, health assessment of endocrine system from fundamentals of nursing and let them discuss the questions as indicated in the case study from learning activity 5.1 so that they can prepare themselves for this lesson.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Define the key concepts about diabetes mellitus (different types of diabetes mellitus)
- List the common causes and risk factors and pathophysiology of different types of diabetes mellitus.

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(glucometer, needles, gauzes, alcohol for disinfection, glycaemia strips, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guide the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listen the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Group students into small groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study and answer the indicated
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers and
- Make conclusion from what they have learnt.

Lesson 3. Description of different types of diabetes mellitus (clinical manifestation and investigations of diabetes mellitus and their diagnosis)

a) Prerequisites

This is the lesson 3 in unit 5 of medical pathologies of endocrine system, lesson deals with clinical manifestations, diagnostic measures of different types of diabetes mellitus. The learner will be able to revise the anatomy and physiology of endocrine system where he/she will be able to differentiate the endocrine to exocrine functions of the pancreas. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of endocrine system in biology, different concepts and causes and risk factors of different types of diabetes mellitus, health assessment of endocrine system from fundamentals of nursing and let them discuss the questions as indicated in the case study from learning activity 5.1 so that they can prepare themselves for this lesson.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Identify the signs and symptoms of different types of diabetes mellitus
- Identify different diagnostic measures used to diagnose diabetes mellitus

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(glucometer, needles, gauzes, alcohol for disinfection, glycaemia strips, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guide the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listen the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Group students into small groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study and answer the indicated
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers and
- Make conclusion from what they have learnt.

Lesson 4. Description of treatment plan of patient with diabetes mellitus, evolution and complications of diabetes mellitus

a) Prerequisites

This is the lesson 4 in unit 5 of medical pathologies of endocrine system, lesson deals with clinical manifestations, diagnostic measures of different types of diabetes mellitus. The learner will be able to revise the anatomy and physiology of endocrine system where he/she will be able to differentiate the endocrine to exocrine functions of the pancreas. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of endocrine system in biology, different concepts and causes, risk factors and pathophysiology of different types of diabetes mellitus, health assessment of endocrine system from fundamentals of nursing and let them discuss the questions as indicated in the case study from learning activity 5.1 so that they can prepare themselves for this lesson.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Know and explain different principles of management of patients with different types of diabetes mellitus.
- Know the evolution and complications of diabetes mellitus.

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(glucometer, needles, gauzes, alcohol for disinfection, glycaemia strips, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guide the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listen the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Group students into small groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study and answer the indicated
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers and
- Make conclusion from what they have learnt.

Lesson 5. Description of diabetes mellitus complications (DKA and HHS)

a) Prerequisites

This is the lesson 5 in unit 5 of medical pathologies of endocrine system, lesson deals with clinical manifestations, diagnostic measures of different types of diabetes mellitus. The learner will be able to revise the anatomy and physiology of endocrine system where he/she will be able to differentiate the endocrine to exocrine functions of the pancreas. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of endocrine system in biology, different concepts and causes, risk factors and pathophysiology of different types of diabetes mellitus, health assessment of endocrine system from fundamentals of nursing and let them discuss the questions as indicated in the case study from learning activity 5.1 so that they can prepare themselves for this lesson.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Define DKA and HHS, and explain different their different signs and symptoms, ways of diagnosing those complications, and plan of management of DKA and HHS complications.

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(glucometer, needles, gauzes, alcohol for disinfection, glycaemia strips, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guide the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listen the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Group students into small groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study and answer the indicated
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers and
- Make conclusion from what they have learnt.

Answer to activity 5.1

1. Abnormal signs and symptoms that the patient was presenting: excessive urination, weight loss, blurred vision, increased thirst, fatigue, excessive sweating, limited physical activities.
2. The medical condition that she was presenting in addition to hypertension is Diabetes mellitus
3. What are the investigations requested to diagnose that medical condition? Glycaemia that was high (hyperglycemia: 245mg/dl), glycated hemoglobin.
4. What was included into her plan of the management? Education about diet (avoid sugar intake, eat high fiber diet and less intake of carbohydrates), to do physical exercises, monitoring of blood sugar levels, oral hypoglycemics (metformin 500mg BID per day PO) and anti-hypertensive drugs (atenolol 50mg OD and Lasix 40mg BID per day).
5. If it is poorly managed, it leads to severe and acute complications like DKA and HHS and also can lead to long term several complications to cardiovascular system, nerve, kidneys, eyes, foot, skin, etc.

Possible answers to Self-assessment 5.1

1. Basing on the case presented above, the medical condition that the patient was presenting is Diabetes mellitus type one complicated into diabetic ketoacidosis.
2. The signs and symptoms that guided in thinking about that medical diagnosis are weakness, dizziness, polydipsia, polyuria, weight loss, abnormal vital signs (tachypnea, low blood pressure), signs of dehydration and paleness.
3. Different investigations requested to confirm that medical condition are Glycemia: elevated, electrolytes imbalances (sodium and potassium elevated, BUN elevated, glycated hemoglobin that is elevated, presence of glucose and ketones into the urine and PH that is low.
4. Possible treatment options to that medical condition include:
 - Monitoring blood glucose levels, dietary management, maintaining physical activity, keeping weight and stress under control, monitoring and adhering to oral medications or insulin use via injections. To help patients achieve this, the health care facility must offer self-management educational programs that emphasize individualized diabetes care.
 - Admission to hospital
 - Replace IV fluids: 2–3 L of 0.9% saline over first 1–3 h (10–15 mL/kg per hour)
 - Administer short-acting insulin: IV (0.1 unit/kg/hour) or IM/ SC (0.3 units/kg). Insulin increases peripheral glucose utilization and decreases hepatic glucose production. If initial serum potassium is < 3.3 mmol/L (3.3 meq/L), do not administer insulin until the potassium is corrected to > 3.3 mmol/L. Electrolytes replacement can also be important when they are low.
 - Assessment of mental status
 - Monitoring and recording of intake and output
 - Central venous pressure monitoring (if indicated)
 - Assessment of blood and urine for ketones
 - Assessment of cardiovascular and respiratory status and ECG monitoring
 - Assess patient: What precipitated the episode (noncompliance, infection, trauma, alcohol?)
 - Measure capillary glucose every 1–2 h; measure electrolytes (especially K⁺, bicarbonate, phosphate) and anion gap every 4 h for first 24 h.
 - Initiate appropriate workup for precipitating event (cultures, Chest X-Ray, ECG).

5. If the DKA is not properly managed, DKA can cause complications such as low levels of potassium (hypokalemia) that can cause severe problems like muscle weakness and heart rhythm problems which can cause death), swelling inside the brain (cerebral edema), fluid inside the lungs (pulmonary edema), damage to the kidney or other organs from the fluid loss. All these can lead to sudden death.

5.6 Summary of the Unit 5

Diabetes mellitus is a disorder of carbohydrate, protein, and fat metabolism resulting from an imbalance between insulin availability and insulin need. The disease can be classified as type 1 diabetes, in which there is destruction of beta cells and an absolute insulin deficiency, or type 2 diabetes, in which there is a lack of insulin availability or effectiveness. Type 1 diabetes can be further subdivided into type 1A immune-mediated diabetes, which is thought to be caused by autoimmune mechanisms, and Type 1B idiopathic diabetes, for which the cause is unknown.

Gestational diabetes mellitus develops during pregnancy, and although glucose tolerance often returns to normal after childbirth, it indicates an increased risk for the development of diabetes. The metabolic syndrome represents a constellation of metabolic abnormalities characterized by obesity, insulin resistance, high triglyceride levels and low HDL levels, hypertension, cardiovascular disease, insulin resistance, and increased risk for development of type 2 diabetes.

The most commonly identified symptoms of type 1 diabetes are polyuria, polydipsia, polyphagia, and weight loss despite normal or increased appetite. Although persons with type 2 diabetes may present with one or more of these symptoms, they are often asymptomatic initially. The diagnosis of DM is based on clinical signs of the disease, fasting blood glucose levels, random plasma glucose measurements, and results of the glucose tolerance test. Glycosylation involves the irreversible attachment of glucose to the hemoglobin molecule; the measurement of A1C provides an index of blood glucose levels over several months.

Self-monitoring provides a means of maintaining near-normal blood glucose levels through frequent testing of blood glucose and adjustment of insulin dosage. Dietary management focuses on maintaining a well-balanced diet, controlling calories to achieve and maintain an optimum weight, and regulating the distribution of carbohydrates, proteins, and fats. Two types of antidiabetic agents are used in the management of diabetes: injectable agents and oral diabetic drugs. Oral diabetic drugs include a variety of options. Type 1 diabetes (always), and type 2 (sometimes), requires treatment with injectable insulin. Oral antidiabetic drugs include the insulin secretagogues, biguanides, alpha-glucosidase inhibitors, etc. These drugs require a functioning pancreas and may be used in the treatment of type 2 diabetes. The

metabolic disturbances associated with diabetes affect almost every body system. The acute complications of diabetes include DKA, hyperglycemic hyperosmolar state (HHS), and hypoglycemia in people being treated with insulin.

5.7 Additional information

Insulotherapy:

Storage of Insulin: as a protein, insulin requires special storage considerations. Heat and freezing alter the insulin molecule. Insulin vials and insulin pens currently in use may be left at room temperature for up to 4 weeks unless the room temperature is higher than 86° F (30° C) or below freezing (less than 32° F [0° C]). Prolonged exposure to direct sunlight should be avoided. A patient who is traveling in hot climates may store insulin in a thermos or cooler to keep it cool (not frozen). Unopened insulin vials and insulin pens should be stored in the refrigerator.

Patients who are traveling or caregivers of patients who are sight impaired or who lack the manual dexterity to fill their own syringes may prefill insulin syringes. Prefilled syringes containing two different insulins are stable for up to 1 week when stored in the refrigerator, whereas syringes containing only one type of insulin are stable up to 30 days.

Syringes should be stored in a vertical position with the needle pointed up to avoid clumping of suspended insulin in the needle.

Administration of Insulin: routine doses of insulin are usually administered by subcutaneous injection. Regular insulin can be given IV when immediate onset of action is desired. Insulin is not taken orally because it is inactivated by gastric juices. Never assume that because the patient already uses insulin, he or she knows and practices the correct insulin injection technique. The patient may not have understood prior instructions, or changes in eyesight may result in inaccurate preparation. The patient may not see air bubbles in the syringe or may improperly read the scale on the syringe. The patient receiving mixed insulins in the same syringe needs to learn the proper technique for combining them if commercially prepared premixed insulins are not used.

The fastest subcutaneous absorption is from the abdomen, followed by the arm, thigh, and buttock. Although the abdomen is the preferred injection site, other sites are appropriate as well. Caution the patient about injecting into a site that is to be exercised. For example, the patient should not inject insulin into the thigh and then go jogging. Exercise of the injection site, together with the increased body heat and circulation generated by the exercise, may increase the rate of absorption and speed the onset of insulin action.

Teach patients to rotate the injection within one anatomic site, such as the abdomen, for at least 1 week before using a different site, such as the right thigh. This allows for better insulin absorption.

The **following instructions when teaching the patient and caregiver about insulin therapy** must be provided: (1) Wash hands thoroughly, (2) Always inspect insulin bottle before using it. Make sure that it is the proper type and concentration, expiration date has not passed, and top of bottle is in perfect condition. The insulin (except for NPH) should look clear and colorless. Discard if it appears discolored or if you see particles in the solution, (3) If insulin solutions are cloudy gently roll the insulin bottle between the palms of hands to mix the insulin, (4) Select proper injection site, (5) Cleanse the skin with soap and water or alcohol, (6) Pinch up the skin, and push the needle straight into the pinched-up area (90-degree angle), (7) Push the plunger all the way down, let go of pinched skin, leave needle in place for 5 sec to ensure that all insulin has been injected, and then remove needle, (8) Destroy and dispose of single-use syringe safely.

Types of Insulin with their examples and colors:

Classification	Examples	Clarity of Solution
Rapid-acting insulin	lispro (Humalog) aspart (NovoLog) glulisine (Apidra)	Clear
Short-acting insulin	regular (Humulin R, Novolin R)	Clear
Intermediate-acting insulin	NPH (Humulin N, Novolin N)	Cloudy
Long-acting insulin	glargine (Lantus) detemir (Levemir)	Clear
Combination therapy (premixed)	NPH/regular 70/30* (Humulin 70/30, Novolin 70/30) NPH/regular 50/50* (Humulin 50/50) lispro protamine/lispro 75/25* (Humalog Mix 75/25) lispro protamine/lispro 50/50* (Humalog Mix 50/50) aspart protamine/aspart 70/30* (NovoLog Mix 70/30)	Cloudy

Self-monitoring of Blood sugar levels:

Following instructions when teaching the patient and caregiver about self-monitoring of blood sugar levels: (1) Wash hands in warm water. It is not necessary to clean the site with alcohol, and it may interfere with test results. Finger should be dry before puncturing it, (2) If it is difficult to obtain an adequate drop of blood for testing, warm the hands in warm water or let the arms hang dependently for a few minutes before the finger puncture is made, (3) A penlet lancing device/needle is usually used. Place the lancet in the device, following the instructions that come with it. If the puncture is made on the finger, use the side of the finger pad rather than near the center. Fewer nerve endings are along the side of the finger pad. If an alternative site is used (e.g., forearm), special equipment may be needed. Refer to manufacturer's instructions for alternative site use, except during hypoglycemic episodes, (4) Set penlet/needle device to make a puncture just deep enough to obtain a sufficiently large drop of blood. Unnecessarily deep punctures may cause pain and bruising, (5) Follow instructions on monitor for testing the blood, (6) Record results. Compare with personal target blood glucose goals.

5.8 Additional activities

A. Remedial activities

1. Polydipsia and polyuria related to diabetes mellitus are primarily due to:
 - a. The release of ketones from cells during fat metabolism.
 - b. Fluid shifts resulting from the osmotic effect of hyperglycemia.
 - c. Damage to the kidneys from exposure to high levels of glucose.
 - d. Changes in RBCs resulting from attachment of excessive glucose to hemoglobin.
2. What is the priority action for the nurse to take if the patient with type 2 diabetes complains of blurred vision and irritability?
 - a. Call the physician.
 - b. Administer insulin as ordered.
 - c. Check the patient's blood glucose level.
 - d. Assess for other neurologic symptoms.

Answers to the remedial activities

1. B
2. C

B. Consolidations activities

1. Which statement would be correct for a patient with type 2 diabetes who was admitted to the hospital with pneumonia?
 - a. The patient must receive insulin therapy to prevent ketoacidosis.
 - b. The patient has islet cell antibodies that have destroyed the pancreas's ability to produce insulin.
 - c. The patient has minimal or absent endogenous insulin secretion and requires daily insulin injections.
 - d. The patient may have sufficient endogenous insulin to prevent ketosis but is at risk for hyperosmolar hyperglycemic syndrome.
2. Which are appropriate therapies for patients with diabetes mellitus?
 - a. Use of statins to treat dyslipidemia
 - b. Use of diuretics to treat nephropathy
 - c. Use of ACE inhibitors to treat nephropathy
 - d. Use of serotonin agonists to decrease appetite
 - e. Use of laser photocoagulation to treat retinopathy

Answers to consolidation activities

1. D
2. A, C, E.

C. Extended activities

1. From where is the hormone glucagon secreted?
 - a. F cells of the islets of Langerhans
 - b. β -Cells of the islets of Langerhans
 - c. α -Cells of the islets of Langerhans
 - d. Delta cells of the islets of Langerhans
2. How do hormones respond following the ingestion of a high-protein, carbohydrate-free meal?
 - a. Both insulin and glucagon are inhibited because blood glucose levels are unchanged.
 - b. Insulin is inhibited by low glucose levels and glucagon is released to promote gluconeogenesis.
 - c. Insulin is released to facilitate the breakdown of amino acids into glucose and glucagon is inhibited.
 - d. Glucagon is released to promote gluconeogenesis and insulin is released to facilitate movement of amino acids into muscle cells.

3. In addition to promoting the transport of glucose from the blood into the cell, what does insulin do?
 - a. Enhances the breakdown of adipose tissue for energy
 - b. Stimulates hepatic glycogenolysis and gluconeogenesis
 - c. Prevents the transport of triglycerides into adipose tissue
 - d. Accelerates the transport of amino acids into cells and their synthesis into protein
4. A patient with diabetes is learning to mix regular insulin and NPH insulin in the same syringe. The nurse determines that additional teaching is needed when the patient does what?
 - a. Withdraws the NPH dose into the syringe first
 - b. Injects air equal to the NPH dose into the NPH vial first
 - c. Removes any air bubbles after withdrawing the first insulin
 - d. Adds air equal to the insulin dose into the regular vial and withdraws the dose
5. The home care nurse should intervene to correct a patient whose insulin administration includes
 - a. Warming a prefilled refrigerated syringe in the hands before administration.
 - b. Storing syringes prefilled with nph and regular insulin needle-up in the refrigerator.
 - c. Placing the insulin bottle currently in use in a small container on the bathroom countertop.
 - d. Mixing an evening dose of regular insulin with insulin glargine in one syringe for administration.
6. When teaching the patient with type 1 diabetes, what should the nurse emphasize as the major advantage of using an insulin pump?
 - a. Tight glycemic control can be maintained.
 - b. Errors in insulin dosing are less likely to occur.
 - c. Complications of insulin therapy are prevented.
 - d. Frequent blood glucose monitoring is unnecessary.
7. Which class of oral glucose-lowering agents is most commonly used for people with type 2 diabetes because it reduces hepatic glucose production and enhances tissue uptake of glucose?
 - a. Insulin
 - b. Biguanide
 - c. Meglitinide
 - d. Sulfonylurea

8. To prevent hyperglycemia or hypoglycemia related to exercise, what should the nurse teach the patient using glucose-lowering agents about the best time for exercise?
 - a. Only after a 15-g carbohydrate snack is eaten
 - b. About 1 hour after eating when blood glucose levels are rising
 - c. When glucose monitoring reveals that the blood glucose is in the normal range
 - d. When blood glucose levels are high, because exercise always has a hypoglycemic effect
9. The nurse assesses the diabetic patient's technique of self-monitoring of blood glucose (SMBG) 3 months after initial instruction. Which error in the performance of SMBG noted by the nurse requires intervention?
 - a. Doing the SMBG before and after exercising
 - b. Puncturing the finger on the side of the finger pad
 - c. Cleaning the puncture site with alcohol before the puncture
 - d. Holding the hand down for a few minutes before the puncture
10. The patient with diabetes has been diagnosed with autonomic neuropathy. What problems should the nurse expect to find in this patient?
 - a. Painless foot ulcers
 - b. Erectile dysfunction
 - c. Burning foot pain at night
 - d. Loss of fine motor control
 - e. Vomiting undigested food
 - f. Painless myocardial infarction
11. Following the teaching of foot care to a diabetic patient, the nurse determines that additional instruction is needed when the patient makes which statement?
 - a. "I should wash my feet daily with soap and warm water."
 - b. "I should always wear shoes to protect my feet from injury."
 - c. "If my feet are cold, I should wear socks instead of using a heating pad."
 - d. "I'll know if I have sores or lesions on my feet because they will be painful."
12. A 72-year-old woman is diagnosed with diabetes. What does the nurse recognize about the management of diabetes in the older adult?
 - a. It is more difficult to achieve strict glucose control than in younger patients.
 - b. It usually is not treated unless the patient becomes severely hyperglycemic.
 - c. It does not include treatment with insulin because of limited dexterity and vision.
 - d. It usually requires that a younger family member be responsible for care of the patient.

Answers to extended activities

- 1. c.** The alpha-cells in the islets of Langerhans in the pancreas produce and secrete the hormone glucagon. The F cells secrete pancreatic polypeptide. The Beta-cells produce and secrete insulin and amylin. The delta cells produce and secrete somatostatin.
- 2. d.** Usually insulin and glucagon function in a reciprocal manner, except after a high-protein, carbohydrate-free meal, in which both hormones are secreted. Glucagon increases gluconeogenesis and insulin facilitates transport of amino acids across muscle membranes for protein synthesis.
- 3. d.** Insulin is an anabolic hormone that is responsible for growth, repair, and storage. It facilitates movement of amino acids into cells, synthesis of protein, storage of glucose as glycogen, and deposition of triglycerides and lipids as fat into adipose tissue. Glucagon is responsible for hepatic glycogenolysis and gluconeogenesis. Fat is used for energy when glucose levels are depleted.
- 4. a.** When mixing regular and intermediate-acting insulin, regular insulin should always be drawn into the syringe first to prevent contamination of the regular insulin vial with intermediate-acting insulin additives. Air is added to the neutral protamine Hagedorn (NPH) vial. Then air is added to the regular vial and the regular insulin is withdrawn, bubbles are removed, and the dose of NPH is withdrawn.
- 5. d.** Insulin glargine (Lantus), a long-acting insulin that is continuously released with no peak of action, cannot be diluted or mixed with any other insulin or solution. Mixed insulins should be stored needle-up in the refrigerator and warmed before administration. Currently used bottles of insulin can be kept at room temperature out of sunlight.
- 6. a.** Insulin pumps provide tight glycemic control by continuous subcutaneous insulin infusion based on the patient's basal profile, with bolus doses at mealtime at the patient's discretion and related to blood glucose monitoring. Errors in insulin dosing and complications of insulin therapy are still potential risks with insulin pumps.
- 7. b.** Biguanides (e.g., metformin [Glucophage]) are most commonly used with type 2 diabetes. They reduce glucose production by the liver and increase insulin sensitivity at the tissue level that improves glucose transport into the cells. Insulin is not taken orally, as it is ineffective. Meglitinides and sulfonylureas increase insulin production from the pancreas.
- 8. b.** During exercise, a diabetic person needs both adequate glucose to prevent exercise-induced hypoglycemia and adequate insulin, because counter regulatory hormones are produced during the stress of exercise and may

cause hyperglycemia. Exercise after meals is best but a 15-g carbohydrate snack may be taken if exercise is performed before meals or is prolonged. Blood glucose levels should be monitored before, during, and after exercise to determine the effect of exercise on the levels.

9. **c.** Cleaning the puncture site with alcohol is not necessary and may interfere with test results and lead to drying and splitting of the fingertips. Washing the hands with warm water is adequate cleaning and promotes blood flow to the fingers. Blood flow is also increased by holding the hand down. Punctures on the side of the finger pad are less painful. Self-monitored blood glucose (SMBG) should be performed before and after exercise.
10. **b. e. f.** Autonomic neuropathy affects most body systems. Manifestations of autonomic neuropathy include erectile dysfunction in men and decreased libido, gastroparesis (nausea, vomiting, gastroesophageal reflux and feeling full), painless myocardial infarction, postural hypotension, and resting tachycardia. The remaining options would occur with sensory neuropathy.
11. **d.** Complete or partial loss of sensitivity of the feet is common with peripheral neuropathy of diabetes and patients with diabetes may suffer foot injury and ulceration without ever having pain. Feet must be inspected during daily care for any cuts, blisters, swelling, or reddened areas.
12. **a.** Older adults have more conditions that may be treated with medications that impair insulin action. Hypoglycemic unawareness is more common, so these patients are more likely to suffer adverse consequences from blood glucose–lowering therapy. Because the clinical manifestations of longterm complications of diabetes take 10 to 20 years to develop, the goals for glycemic control are not as rigid as in the younger population. Treatment is indicated and insulin may be used if the patient does not respond to oral agents. The patient's needs rather than age determine the responsibility of others in care.

5.9. Answers to end unit assessment 5

1. Pancreas serves both endocrine and exocrine functions.

Exocrine function: the pancreas contains exocrine glands that produce enzymes important to digestion. These enzymes include trypsin and chymotrypsin to digest proteins; amylase for the digestion of carbohydrates; and lipase to break down fats. When food enters the stomach, these pancreatic juices are released into a system of ducts that culminate in the main pancreatic duct. The pancreatic duct joins the common bile duct to form the ampulla of Vater which is located at the first portion of the small intestine, called the duodenum. The common bile duct originates in the liver and the gallbladder and produces another important digestive juice called bile. The pancreatic juices and bile that are released into the duodenum, help the body to digest fats, carbohydrates, and proteins.

Endocrine function: the endocrine component of the pancreas consists of islet cells (islets of Langerhans) that create and release important hormones directly into the bloodstream. Two of the main pancreatic hormones are insulin, which acts to lower blood sugar, and glucagon, which acts to raise blood sugar. Maintaining proper blood sugar levels is crucial to the functioning of key organs including the brain, liver, and kidneys.

2. By definition, the difference between diabetes mellitus type one and two:

In type 1 diabetes mellitus (formerly called **insulin-dependent diabetes** or **juvenile-onset diabetes**), the body’s immune system attacks the insulin-producing cells of the pancreas, and more than 90% of them are permanently destroyed. The pancreas, therefore, produces little or no insulin. Most people who have type 1 diabetes develop the disease before age 30, although it can develop later in life.

In type 2 diabetes mellitus (formerly called **non-insulin-dependent diabetes** or **adult-onset diabetes**), the pancreas often continues to produce insulin, sometimes even at higher than normal levels, especially early in the disease. However, the body develops resistance to the effects of insulin, so there is not enough insulin to meet the body’s needs. As type 2 diabetes progresses, the insulin producing ability of the pancreas decreases.

3. Five risk factors of type one and two of diabetes mellitus.

RISK FACTORS	
TYPE 1 DIABETES MELLITUS	TYPE 2 DIABETES MELLITUS
1. Under 30	1. Older age
2. Genetics	2. Overweight
3. Autoimmune	3. Hypertension
4. Environment	4. Inactivity
5. Viral infection	5. Gestational diabetes

4. General **signs and symptoms of diabetes mellitus** include increased thirst (polydipsia), frequent urination (polyuria), extreme hunger (polyphagia), unexplained weight loss, presence of ketones (are a byproduct of the breakdown of muscle and fat that happens when there’s not enough available insulin) in the urine, fatigue, irritability, blurred vision, numbness or tingling into the hands or feet, slow-healing sores.
5. What are the **investigations** that are relevant into the diagnosis of **diabetes mellitus**: blood glucose levels (fasting, and after eating, etc), glycated hemoglobin, and urine analysis for ketonuria or glycosuria?

6. **Different management principles of diabetes mellitus:** People with diabetes must take responsibility for their day-to-day care. This includes monitoring blood glucose levels, dietary management and maintaining physical activity (diet that is free of sugar, low carbohydrates, etc), keeping weight and stress under control, monitoring and adhering to oral medications or insulin use via injections. To help patients achieve this, the health care facility must offer self-management educational programs that emphasize individualized diabetes care. Patient must also be taught about carefulness while cutting the nails and also improve on the foot care. For medications, there are oral hypoglycemics (class of biguanides like metformin, class of glitazones and class of alpha-glucosidase inhibitors like miglitol, etc) and Insulin therapy (short acting and long acting).
7. **Diabetes mellitus can lead to nerve, kidney, eye and foot problems through these process:**

Nerve damage (neuropathy): Excess sugar can injure the walls of the tiny blood vessels (capillaries) that nourish the nerves, especially in the legs. This can cause tingling, numbness, burning or pain that usually begins at the tips of the toes or fingers and gradually spreads upward. Left untreated, it can lead to loss of all sense of feeling in the affected limbs. Damage to the nerves related to digestion can cause problems with nausea, vomiting, diarrhea or constipation. For men, it may lead to erectile dysfunction.

Kidney damage (nephropathy): The kidneys contain millions of tiny blood vessel clusters (glomeruli) that filter waste from the blood. Diabetes can damage this delicate filtering system. Severe damage can lead to kidney failure or irreversible end-stage kidney disease, which may require dialysis or a kidney transplant.

Eye damage (retinopathy): Diabetes can damage the blood vessels of the retina (diabetic retinopathy), potentially leading to blindness. Diabetes also increases the risk of other serious vision conditions, such as cataracts and glaucoma.

Foot damage: Nerve damage in the feet or poor blood flow to the feet increases the risk of various foot complications. Left untreated, cuts and blisters can develop serious infections, which often heal poorly. These infections may ultimately require toe, foot or leg amputation.

8. **Basing on the causes and signs and symptoms, the difference between DKA and HHS:**

Causes of DKA

- DKA is the initial manifestation of diabetes in 20% of adults and 30–40% of children with type 1 diabetes.
- In patients with established diabetes, causes of DKA include:
 - Infection (30%-50%)

Most common infections urinary tract infection and pneumonia

- Noncompliance with insulin
- Psychological stress

Clinical manifestations of DKA include: Hyperglycemia, Ketosis: ketonuria, serum ketone (ketonemia), ketone smelling (fruity odor), Metabolic acidosis, Hyperlipoproteinemia, Nausea, Signs of acidosis (Kussmaul respiration, acetone breath), Signs of volume depletion/ dehydration, Polyuria, polydipsia, polyphagia, weight loss, Fever due to underlying infection is common (if present), Gastrointestinal signs (abdominal pain, vomiting), Neurological signs (hemiparesis and seizures) related to metabolic acidosis.

HHS: This is a complication of type 2 diabetes mellitus especially for the elderly people. Hyperglycemia induces an osmotic diuresis that leads to intravascular volume depletion, which is exacerbated by inadequate fluid replacement (impaired patient's perception of thirst due to underlying cerebrovascular disease). The polyuria disappears early because of the severe dehydration.

Clinical manifestations of HHS:

- Severe dehydration (fluid deficit of 8-9 L)
- Severe hyperglycemia (plasma glucose may be >55.5 mmol/L (1000 mg/dL)
- Hyperosmolarity (>350 mosmol/L)

9. Different management principles of DKA:

- Monitoring blood glucose levels, dietary management, maintaining physical activity, keeping weight and stress under control, monitoring and adhering to oral medications or insulin use via injections. To help patients achieve this, the health care facility must offer self-management educational programs that emphasize individualized diabetes care.
- Admission to hospital
- Replace IV fluids: 2–3 L of 0.9% saline over first 1–3 h (10–15 mL/kg per hour)
- Administer short-acting insulin: IV (0.1 unit/kg/hour) or IM/ SC (0.3 units/kg). Insulin increases peripheral glucose utilization and decreases hepatic glucose production. If initial serum potassium is < 3.3 mmol/L (3.3 meq/L), do not administer insulin until the potassium is corrected to > 3.3 mmol/L. Electrolytes replacement can also be important when they are low.
- Assessment of mental status
- Monitoring and recording of intake and output
- Central venous pressure monitoring (if indicated)
- Assessment of blood and urine for ketones

- Assessment of cardiovascular and respiratory status and ECG monitoring
 - Assess patient: What precipitated the episode (noncompliance, infection, trauma, alcohol)?
 - Measure capillary glucose every 1–2 h; measure electrolytes (especially K⁺, bicarbonate, phosphate) and anion gap every 4 h for first 24 h.
 - Initiate appropriate workup for precipitating event (cultures, Chest X-Ray, ECG).
- 10. d.** Insulin is an anabolic hormone that is responsible for growth, repair, and storage. It facilitates movement of amino acids into cells, synthesis of protein, storage of glucose as glycogen, and deposition of triglycerides and lipids as fat into adipose tissue. Glucagon is responsible for hepatic glycogen lysis and gluconeogenesis. Fat is used for energy when glucose levels are depleted.
 - 11. b.** The counter regulatory hormones have the opposite effect of insulin by stimulating glucose production and output by the liver and by decreasing glucose transport into the cells. The counter regulatory hormones and insulin together regulate the blood glucose level.
 - 12. a. b. c. d. e. f.** Type 2 diabetes is characterized by insulin resistance, β -cell exhaustion, altered production of adipokines, genetic predisposition, inherited defect in insulin receptors, and inappropriate glucose production by the liver.
 - 13. d.** Prediabetes is defined as impaired glucose tolerance and impaired fasting glucose or both. Fasting blood glucose results between 100 mg/dL (5.56 mmol/L) and 125 mg/dL (6.9 mmol/L) indicate prediabetes. A diagnosis of impaired glucose tolerance is made if the 2-hour oral glucose tolerance test (OGTT) results are between 140 mg/dL (7.8 mmol/L) and 199 mg/dL (11.0 mmol/L).
 - 14. a, e.** To reduce the risk of developing diabetes, the patient with prediabetes should learn to monitor for symptoms of diabetes, have blood glucose and glycosylated hemoglobin (A1C) tested regularly, maintain a healthy weight, exercise regularly, and eat a healthy diet.
 - 15. b.** U100 insulin must be used with a U100 syringe but for those using low doses of insulin, syringes that have increments of 1 unit instead of 2 units are available. Errors can be made in dosing if patients switch back and forth between different sizes of syringes. Aspiration before injection of the insulin is not recommended, nor is the use of alcohol to clean the skin. Because the rate of peak serum concentration varies with the site selected for injection, injections should be rotated within a particular area, such as the abdomen, before changing to another area.

- 16. c.** The patient's elevated glucose on arising may be the result of either dawn phenomenon or Somogyi effect. The best way to determine whether the patient needs more or less insulin is by monitoring the glucose at bedtime, between 2:00 am and 4:00 am, and on arising. If predawn levels are below 60 mg/dL, the insulin dose should be reduced. If the 2:00 am to 4:00 am blood glucose is high, the insulin should be increased.
- 17. c.** Rapid deep respirations are symptoms of diabetic ketoacidosis (DKA), so this is the priority of care. Stage II pressure ulcers and bilateral numbness are chronic complications of diabetes.
- 18. c.** When insulin is insufficient and glucose cannot be used for cellular energy, the body releases and breaks down stored fats and protein to meet energy needs. Free fatty acids from stored triglycerides are released and metabolized in the liver in such large quantities that ketones are formed. Ketones are acidic and alter the pH of the blood, causing acidosis. Osmotic diuresis occurs as a result of elimination of both glucose and ketones in the urine.
- 19. a. b. c. d. e. f.** In DKA, ketosis leads to ketonuria in trying to decrease the blood glucose and ketonemia. The metabolic acidosis leads to the Kussmaul respirations trying to decrease the acid in the system. The sweet, fruity breath odor is from DKA. Thirst and dehydration are found with both DKA and hyperosmolar hyperglycemic syndrome (HHS).
- 20. c.** The management of DKA is similar to that of HHS except that HHS requires greater fluid replacement because of the severe hyperosmolar state. Bicarbonate is not usually given in DKA to correct acidosis unless the pH is <7.0 because administration of insulin will reverse the abnormal fat metabolism. Total body potassium deficit is possible in both conditions, requiring potassium administration, and in both conditions glucose is added to IV fluids when blood glucose levels fall to 250 mg/dL (13.9 mmol/L).
- 21. d.** If a diabetic patient is unconscious, immediate treatment for hypoglycemia must be given to prevent brain damage and IM or subcutaneous administration of 1 mg of glucagon should be done. If the unconsciousness has another cause, such as ketosis, the rise in glucose caused by the glucagon is not as dangerous as the low glucose level. Following administration of the glucagon, the patient should be transported to a medical facility for further treatment and evaluation. Insulin is contraindicated without knowledge of the patient's glucose level and oral carbohydrates cannot be given when patients are unconscious.
- 22. c. 1; b. 2; a. 3; e. 4; d. 5; f. 6.** As with all patients, first establish an airway. With a patient with diabetes and abnormal behavior, the blood glucose must then be checked to determine if the patient's symptoms are related to the diabetes. In this case, it is hyperglycemia, so an IV must be started for

fluid resuscitation and insulin administration. The last food intake and times at which medications were recently taken may establish a cause for the hyperglycemia and aid in determining further treatment.

- 23. b. d.** Macrovascular disease causes coronary artery disease and ulceration and results in amputation of the lower extremities. However, neuropathy may also contribute to not feeling ulcerations. The remaining options are related to microvascular complications of diabetes.

UNIT 6

6.1 Key unit competence

Demonstrate understanding of the appropriate management of different common Medical Pathologies of Neurological system

6.2 Prerequisite (Knowledge, skills, attitude and values)

To achieve the above competence, the associate nurse student needs to have learnt the following subjects:

- **Human body anatomy and physiology:** Neurological system
- **Fundamental of Nursing:** Vital signs and parameters measurements and interpretation, Drugs administration (PO and injectable), History taking, Complete health assessment from head to toes through interview and Physical assessment regarding Neurological system.
- **Ethics and professional code of conduct:** Respect of principles of ethics during management of a patient with all medical diseases. The Associate Nurse student should demonstrate good behaviors while interacting with the patient.
- **Pharmacology:** drugs acting on Neurological system (NSAIDs, severe headache and migraine drugs, anti-epileptic drugs, etc) with their posology and their mode of administration.

6.3 Cross-cutting issues to be addressed

Standardization culture

All health care facilities must use same standard and accurate equipment and techniques in the management of the medical conditions. During the field trips, the teacher should ensure the availability of standard medical equipment and technics before selecting the health care facility to use. The learners have to learn the use of those standards equipment and technics in the management of patients with endocrine diseases.

Inclusive education

All students should participate in all activities without discrimination of a student with any disability. This may be challenging to students with special educational needs especially those with disabilities, slow learners, those with low self-esteem, etc. However, the teacher can make some arrangements like:

- Grouping students: Students with special educational needs are grouped with others and assigned roles basing on individual student's abilities. Providing procedure/checklists or protocols earlier before the practical work so that students get familiar with them. They can be written on the chalkboard or printed depending on available resources. If you have students with low vision remember to print in appropriate fonts. Also you are supposed to pay attention to all categories of learners.
- Every important point is written and spoken. The written points help students with hearing impairment and speaking aloud helps students with visual impairment.
- Remember to repeat the main points of the lessons.

Gender education

Emphasize to learners that anybody irrespective of their gender can be a health care professional. The teacher must present some role models of people who have been successful in medical and nursing professions in the area where the learners come from. Make sure that during practical work both boys and girls shares and participate equally in practices, arranging and proper hygiene after procedures.

6.4 Guidance on the introductory activity

During the introductory activity 6.0, learners will observe all abnormal features from the image illustrated, and will remember the anatomy and physiology of neurological system learnt in the unit of biology and parts of neurological assessment learnt in unit of fundamentals of nursing. From all these prerequisites, learners will be requested to observe picture illustrated and be able to list all medical conditions that can lead to signs and symptoms mentioned.

Teacher's activity

- Using brainstorming every learner is given opportunity to observe the image and answer the questions related to the image illustrated.
- Teacher writes on whiteboard the correct answers from the learners.

The expected answers to introductory activity 6.0

1. **Abnormal observations from the person on the image are that this person** might be having headache, sleeplessness, eye pain, pain at the frontal part of the head/brain, altered vision, lightheadedness, scalp tenderness, visual disturbances, sensitive to light, alteration of consciousness (syncope, dizziness, seizures, confusional state), etc.
2. **Medical conditions/pathologies** that might cause all the listed signs and symptoms: Tension headache, migraine, epilepsy, brain disorders (tumors, bleeding, etc), eye disorders (glaucoma, etc), etc.

6.5 List of lessons/sub-heading (including assessment)

#	Lessons	Learning objectives	Number of periods
1	Description of Neurological system diseases (Introductory activity 6.0 and learning activity 6.1)	- Through brain storming, learners will be able to know all common medical pathologies of neurological system and the general signs and symptoms. - Within the groups, learners will be able to answer all questions related to introductory activity 6.0 and learning activity 6.1 - The teacher will also facilitate learners to describe nervous system, and the neurological system disorders focusing on headache and its types, migraine and epilepsy.	1
2	Description of headache (definition, causes and risk factors, and pathophysiology)	- Define the key concepts about headache - List the common causes and risk factors and describe pathophysiology of headache.	1
3	Description of headache (clinical manifestation depending on the type, useful investigations for someone who is having headache and management plan of a patient with headache).	- List the different signs and symptoms depending on different types of headaches. - Describe medical investigations and describe how to diagnose the headache. - Explain different approaches of management of headache	1
4	Description of migraine type of headache (definition, causes and risk factors and pathophysiology of migraine)	- Define migraine concept - List common causes and risk factors of migraine and describe pathophysiology of migraine.	1

5	Description of migraine (signs and symptoms and different investigations to diagnose migraine and its causes)	- List all signs and symptoms of migraine - Explain different useful investigations to be requested for a patient with migraine	1
6	Description of migraine (plan of treatment and evolution and complications of migraine type of headache)	- EE Explain different treatment options are available to treat migraine - List and explain all complications related to migraine	1
7	Self-assessment 6.1 and self-assessment 6.2	Demonstrate understanding of the appropriate management of different common Medical Pathologies of neurological system (Headache and Migraine).	1
8	Description of epilepsy (learning activity 6.3)	Students will be into groups and facilitated to read and understand the case study from Learning activity 6.3 and answer related questions.	1
9	Description of epilepsy (definition, causes, risk factors and pathophysiology of epilepsy)	- Define epilepsy and be able to differentiate it from seizures) - Identify all possible causes and risk factors of developing epilepsy - Describe different phenomena involved into the pathophysiology of epilepsy.	1
10	Description of epilepsy (signs and symptoms of each type of epilepsy and investigations to be requested for a patient with epilepsy)	- List all signs and symptoms of each type of epilepsy - Identify all investigations needed to diagnose epilepsy and its causes	2
11	Description of epilepsy (plan of treatment/ management and evolution and complications)	- Describe different treatment options are available to manage the epilepsy - Be able to describe the adequate medical diagnosis of epilepsy and list all complications of epilepsy	1

12	Self-assessment 6.3 and End unit 6 assessment	• Demonstrate understanding of the appropriate management of epilepsy. • Demonstrate understanding of the appropriate management of different common Medical Pathologies of Neurological system (Headache, Migraine and Epilepsy) • Identify the strengths and gaps of learners on appropriate decisions in the management of common pathologies of neurological system. • Prepare the feedback to students • Organize different additional learning activities.	1
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Lesson 1: Description of neurological system diseases (introductory activity 6.0 and learning activity 6.1)

a) Prerequisites

This is the first lesson of the sixth unit on medical pathologies of neurological system. In this lesson you will be dealing with the common medical pathologies of neurological system. The learner will be able to revise the anatomy and physiology of neurological system. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of nervous system in biology, health assessment of neurological system from fundamentals of nursing and let them discuss the questions as indicated in introductory activity 6.0 and from the case study from learning activity 6.1 so that they can prepare themselves for this lesson.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- List all signs and symptoms that the patient on the image was presenting
- List all Medical conditions that lead to all signs and symptoms listed
- Describe some neurological disorders, mainly headache and migraine.

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(all materials for physical examination focusing on neurological system

assessment, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to brainstorm while answering the questions related to the image in the introductory activity 6.0.
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study in learning activity 6.1.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Brainstorm in answering the questions regarding the introductory activity 6.0.
- Form group and participate in the group work
- To read carefully the case study from learning activity 6.1 and answer the questions
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Lesson 2: Description of headache (definition, causes and risk factors, and pathophysiology)

a) Prerequisites

This is the second lesson of the sixth unit on medical pathologies of neurological system. In this lesson you will be dealing with definition of headache, causes and risk factors and pathophysiology of headache as the one among the common medical pathologies of neurological system. The learner will be able to revise the anatomy and physiology of neurological system. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of nervous system in biology, health assessment of neurological system from fundamentals of nursing and let them discuss the questions from the case study from learning activity 6.1 so that they can prepare themselves for this lesson.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Define the key concepts about headache
- List the common causes and risk factors and describe pathophysiology of headache.

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(all materials for physical examination focusing on neurological system assessment, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to form different groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study in learning activity 6.1.

- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study from learning activity 6.1 and answer the questions
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Lesson 3: Description of headache (clinical manifestation depending on the type, useful investigations for someone who is having headache and management plan of a patient with headache).

a) Prerequisites

This is the 3rd lesson of the sixth unit on medical pathologies of neurological system. In this lesson you will be dealing with clinical manifestations of different types of headache, investigations needed to be requested for a patient with headache and the treatment options of a patient with headache. The learner will be able to revise the anatomy and physiology of neurological system. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of nervous system in biology, health assessment of neurological system from fundamentals of nursing, causes and risk factors of headache, neurological medicines taught in pharmacology and let them discuss the questions from the case study from learning activity 6.1 so that they can prepare themselves for this lesson.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- List the different signs and symptoms depending on different types of headaches
- Describe different investigations needed and describe how to diagnose the headache.
- Explain different approaches of treatment plan of headache.

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(all materials for physical examination focusing on neurological system assessment, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to form different groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study in learning activity 6.1.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study from learning activity 6.1 and answer the questions
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Lesson 4: Description of migraine type of headache (definition, causes and risk factors and pathophysiology of migraine)

a) Prerequisites

This is the 4th lesson of the sixth unit on medical pathologies of neurological system. In this lesson you will be dealing with definition of migraine, causes and risk factors of migraine and its pathophysiology. The learner will be able to revise the anatomy and physiology of neurological system. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of nervous system in biology, health assessment of neurological system from fundamentals of nursing, and neurological medicines taught in pharmacology so that they can prepare themselves for this lesson. Using the case study from learning activity 6.1, learners will be given time to read it and answer the questions.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Define migraine
- List common causes and risk factors of migraine and describe the pathophysiology of migraine.

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(all materials for physical examination focusing on neurological system assessment, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to form different groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study in learning activity 6.1.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study from learning activity 6.1 and answer the questions
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Lesson 5: Description of migraine (signs and symptoms and different investigations to diagnose migraine and its causes)

a) Prerequisites

This is the 5th lesson of the sixth unit on medical pathologies of neurological system. In this lesson you will be dealing with definition of migraine, causes and risk factors of migraine and its pathophysiology. The learner will be able to revise the anatomy and physiology of neurological system. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of nervous system in biology, health assessment of neurological system from fundamentals of nursing, and neurological medicines taught in pharmacology so that they can prepare themselves for this lesson. Using the case study from learning activity 6.1, learners will be given time to read it and answer the questions.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Define migraine concept
- List common causes and risk factors of migraine and describe the pathophysiology of migraine.

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(all materials for physical examination focusing on neurological system assessment, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to form different groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study in learning activity 6.1.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study from learning activity 6.1 and answer the questions
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Lesson 6: Description of migraine (plan of treatment and evolution and complications of migraine type of headache)

a) Prerequisites

This is another lesson of the sixth unit on medical pathologies of neurological system. In this lesson you will be dealing with plan of treatment and evolution and complications of migraine as a very severe type of headache. The learner will be able to revise the anatomy and physiology of neurological system. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of nervous system in biology, health assessment of neurological system from fundamentals of nursing, and neurological medicines taught in pharmacology so that they can prepare themselves for this lesson. Learners will also be requested to review what they have learnt into the lessons 4 and 5 about the causes, risk factors, investigations and signs and symptoms before they move on with lesson 6. Using the case study from learning activity 6.1, learners will be given time to read it and answer the questions.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Explain different treatment options available to treat migraine
- List and explain different complications related to migraine

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(all materials for physical examination focusing on neurological system assessment, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to form different groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study in learning activity 6.1.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study from learning activity 6.1 and answer the questions
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Lesson 7: Self-assessment 6.1 and 6.2

a) Prerequisites

This is another lesson of the sixth unit on medical pathologies of neurological system. In this lesson you will be dealing with the assessment of contents covered into this unit 6 mainly about headache and migraine. The learners will be requested to review what they have learnt from the lessons 1,2,3,4,5 and 6 before they move on by answering questions from self-assessment 6.1 and 6.2. Learners will be given time to read the questions and provide answers.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Demonstrate the understanding of the appropriate management of different common Medical Pathologies of neurological system (Headache and Migraine)

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(all materials for physical examination focusing on neurological system assessment, etc), teaching methods (lecture, brainstorming, course work, small group discussion) in addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as: taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Give learners time to read questions
- Ask learners to provide answers individually
- Make corrections and identify the correct answers
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Read the questions individually
- Provide answers to questions
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Possible answers from self-assessment 6.1 and 6.2

1. Difference between different types of headache basing on signs and symptoms:

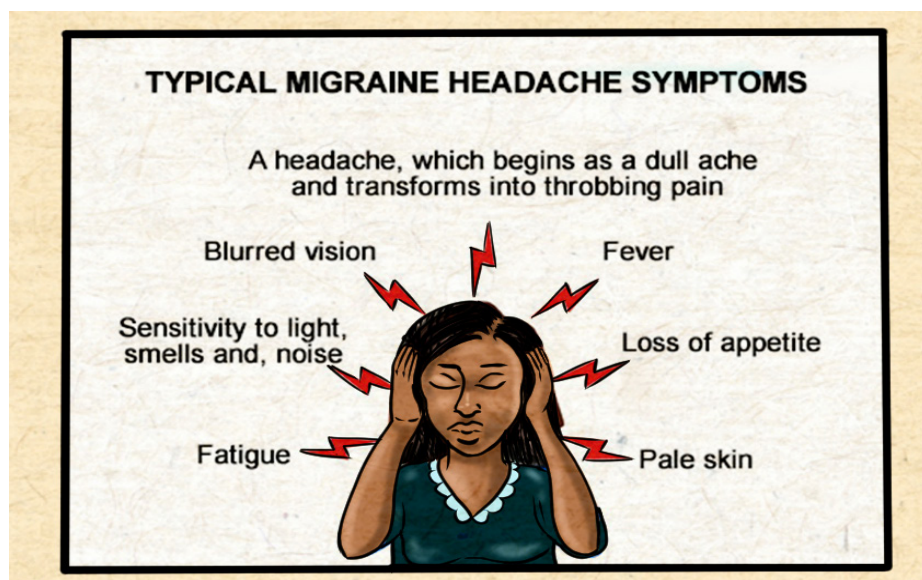
Headaches	
	Tension Pain experienced as a squeezing band around the head
	Sinus Pain behind browning and/or cheekbones
	Cluster Pain localized in one eye
	Migraine Typical signs are pain, nausea and alfered vision

2. The risk factors of migraine:

Although many of the causes of migraines are not well understood, both genetic and environmental factors appear to play a role. Other triggers are hormonal changes, food, feeling of stimulation, physical exertion, changes of the environment, medicines, changes in trigeminal nerve.

3. Signs and symptoms of migraine:

A typical migraine attack causes some or all of the following signs and symptoms: moderate to severe headache, which may be limited to one side of the head or may affect both sides, fluctuating headache, pain that gets worse with physical activity, pain interferes with regular activities, nausea with or without vomiting, sensitive to light (photophobia) and sound, lightheadedness, scalp tenderness, visual disturbances (Photopsia), paresthesias, vertigo, alteration of consciousness (syncope, seizures, confusional state) and sometimes diarrhea.



4. Different treatment options of migraine:

Treatments include NSAIDs, Triptans, Ergots, anti-nausea, anti-depressants, and sometimes anti-epileptic drugs. There is also lifestyle and remedies modifications as self-care.

5. The complications of migraine:

Complications of migraine include depression and anxiety, vertigo, sleeplessness/insomnia, **nausea and vomiting, serotonin syndrome (use of combined triptans and antidepressants can cause the serotonin levels which can cause agitation, confusion, diarrhea, twitchy muscles), stomach problems, rebound headache,**

etc. Migraines are associated with a small increased risk of ischaemic strokes, and a very small increased risk of mental health problems (depression, bipolar disorders, anxiety disorders, panic disorders, etc.). Severe migraine can lead to status migrainosus, migraine triggered seizure, etc.

Lesson 8: Description of epilepsy (learning activity 6.3):

a) Prerequisites

This is another lesson of the sixth unit on medical pathologies of neurological system. In this lesson, you will be dealing with reading the case scenario from learning activity 6.3 about epilepsy and answer all related questions. The learner will be able to revise the anatomy and physiology of neurological system. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of nervous system in biology, health assessment of neurological system from fundamentals of nursing, and neurological medicines taught in pharmacology so that they can prepare themselves for this lesson. Using the case study from learning activity 6.3, learners will be given time to read it and answer the questions.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Demonstrate the ability in management of patient with epilepsy

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials (all materials for physical examination focusing on neurological system assessment, etc.), teaching methods (lecture, brainstorming, course work, small group discussion). In addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to form different groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study in learning activity 6.3.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study from learning activity 6.3 and answer the questions
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Lesson 9: Description of epilepsy (definition, causes, risk factors and pathophysiology of epilepsy)

a) Prerequisites

This is another lesson of the sixth unit on medical pathologies of neurological system. In this lesson, you will be dealing with definition, causes, risk factors and pathophysiology of epilepsy. The learner will be able to revise the anatomy and physiology of neurological system. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of nervous system in biology, health assessment of neurological system from fundamentals of nursing, and neurological medicines taught in pharmacology so that they can prepare themselves for this lesson. Using the case study from learning activity 6.3, learners will be given time to read it and answer the questions.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Define epilepsy and be able to differentiate epilepsy from seizures
- Identify all possible causes and risk factors of developing epilepsy
- Describe different phenomena involved into the pathophysiology of epilepsy

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials (all materials for physical examination focusing on neurological system assessment, etc.), teaching methods (lecture, brainstorming, course work, small group discussion). In addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to form different groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study in learning activity 6.3.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study from learning activity 6.3 and answer the questions
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Lesson 10: Description of epilepsy (signs and symptoms of each type of epilepsy and investigations to be requested for a patient with epilepsy)

a) Prerequisites

This is another lesson of the sixth unit on medical pathologies of neurological system. In this lesson you will be dealing with signs and symptoms of each type of epilepsy and investigations to be requested for a patient with epilepsy. The learner will be able to revise the anatomy and physiology of neurological system. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of nervous system in biology, health assessment of neurological system from fundamentals of nursing, and neurological medicines taught in pharmacology so that they can prepare themselves for this lesson. Learners will also be able to revise what they have learnt from lesson 9 and then using the case study from learning activity 6.3, learners will be given time to read it and answer the questions.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- List all signs and symptoms of each type of epilepsy
- Identify all needed investigations to diagnose the epilepsy and its causes

c) Teaching resources

This lesson will be taught with different aids and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials(all materials for physical examination focusing on neurological system assessment, etc.), teaching methods (lecture, brainstorming, course work, small group discussion). In addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to form different groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study in learning activity 6.3.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study from learning activity 6.3 and answer the questions
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Lesson 11: Description of epilepsy (plan of treatment/management and evolution and complications)

a) Prerequisites

This is another lesson of the sixth unit on medical pathologies of neurological system. In this lesson, you will be dealing with plan of treatment of epilepsy and evolution and complications of epilepsy. The learner will be able to revise the anatomy and physiology of neurological system. The first thing to do before starting teaching is to remind learners what they have learnt about structure and function of nervous system in biology, health assessment of neurological system from fundamentals of nursing, and neurological medicines taught in pharmacology so that they can prepare themselves for this lesson. Learners will also be able to revise what they have learnt from lessons 9 and 10 and then using the case study from learning activity 6.3, learners will be given time to read it and answer the questions.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Describe different treatment options available to manage the epilepsy and its causes
- Describe adequate medical diagnosis of epilepsy and list all the complications

c) Teaching resources

This lesson will be taught with different aids, and methods in order to achieve learning objectives, these aids and teaching methods are teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials (all materials for physical examination focusing on neurological system assessment, etc.), teaching methods (lecture, brainstorming, course work, small group discussion). In addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Ask learners to form different groups
- Supervise the work where the learners are grouped in small group and teacher facilitates them to answer the questions by using the case study in learning activity 6.3.
- Ask learners to present what they have done in group
- Identify the correct answers and complete those ones that are incomplete.
- Correct the answers that are false.
- Note on the blackboard the main student's ideas.
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Form group and participate in the group work
- To read carefully the case study from learning activity 6.3 and answer the questions
- Group representatives will present their work
- Other students will follow when group representatives will be presenting
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Lesson 12: Self-assessment 6.3 and End unit 6 assessment:

a) Prerequisites

This is another lesson of the sixth unit on medical pathologies of neurological system. In this lesson you will be dealing with the assessment of contents covered into this unit 6 mainly about epilepsy. The learners will be requested to review what they have learnt from the lessons 8,9,10 and 11 before they move on by answering questions from self-assessment 6.3 and End unit 6 assessment. Learners will be given time to read the questions and provide answers.

b) Learning objectives

On completion of this lesson, the learner will be able to:

- Demonstrate the understanding of the appropriate management of different common Medical Pathologies of neurological system (Headache and Migraine and Epilepsy)

c) Teaching resources

This lesson will be taught with different aids, and methods in order to achieve learning objectives, these aids and teaching methods are: teaching materials (white board, flip chart, marker, computer, screen, hand out, textbook, video), didactic materials (all materials for physical examination focusing on neurological system assessment, etc.), teaching methods (lecture, brainstorming, course work, small group discussion). In addition the teacher guides the learners where they can find the supporting resources such computer lab, Nursing skills lab, and Library.

d) Learning activities

Learning activities should be directly related to the learning objectives of the course, and provide experiences that will enable students to engage in practice, and gain feedback on specific progress towards those objectives. The various learning activities will be carried out such as taking notes, course work, and read textbook related to the lesson, group assignment, listening to the video and summarize the content, engagement in debate and other clinical learning activities such as case study.

Teacher's activity

- Give learners time to read questions
- Ask learners to provide answers individually
- Make corrections and identify the correct answers
- Help learners to summarize what they have learnt and make conclusion.

Student activity:

- Read the questions individually
- Provide answers to questions
- Take notes from the correct answers
- Make conclusion from what they have learnt.

Possible answers from self-assessment 6.3

1. Difference between epilepsy and seizures:

Epilepsy is a neurological condition while seizures are clinical manifestations of the epilepsy. Epilepsy is a central nervous system (neurological) disorder in which brain activity becomes abnormal, and is a chronic non-communicable disease of the brain characterized by recurrent seizures, which are brief episodes of involuntary movement that may involve a part of the body (partial) or the entire body (generalized), and are sometimes accompanied by loss of consciousness and control of bowel or bladder function.

2. The difference between two major types of epilepsy basing on signs and symptoms are:

- **Partial/Focal seizures:** when seizures appear to result from abnormal activity in just one area of your brain, they are called **focal seizures**. These seizures fall into two categories: **Focal seizures without loss of consciousness:** also called simple partial seizures, these seizures do not cause a loss of consciousness. They may alter emotions or change the way things look, smell, feel, taste or sound. Some people experience “déjà vu». This type of seizure may also result in involuntary jerking of one body part, such as an arm or leg, and spontaneous sensory symptoms such as tingling, dizziness and flashing lights.
- **Focal seizures with impaired awareness:** also called complex partial seizures, these seizures involve a change or loss of consciousness or awareness. This type of seizure may seem like being in a dream. During a focal seizure with impaired awareness, the patient may stare into space and not respond normally to the environment or perform repetitive movements, such as hand rubbing, chewing, swallowing or walking in circles. An important additional subgroup comprises those seizures that begin as partial seizures and then spread diffusely throughout the cortex, i.e., partial seizures with secondary generalization.
- **Generalized seizures:** these are the seizures that appear to involve all areas of the brain are called **generalized seizures**. Six types of generalized seizures exist:

- **Absence seizures:** absence seizures, previously known as petit mal seizures, typically occur in children. They are characterized by staring into space with or without subtle body movements such as eye blinking or lip smacking and only last between 5-10 seconds.

These seizures may occur in clusters, happening as often as 100 times per day, and cause a brief loss of awareness.

- **Tonic seizures:** tonic seizures cause stiff muscles and may affect consciousness. These seizures usually affect muscles in your back, arms and legs and may cause you to fall to the ground.
- **Atonic seizures:** atonic seizures, also known as drop seizures, cause a loss of muscle control. Since this most often affects the legs, it often causes you to suddenly collapse or fall down.
- **Clonic seizures:** clonic seizures are associated with repeated or rhythmic, jerking muscle movements.

These seizures usually affect the neck, face and arms.

- **Myoclonic seizures:** myoclonic seizures usually appear as sudden brief jerks or twitches and usually affect the upper body, arms and legs.
- **Tonic-clonic seizures:** tonic-clonic seizures, previously known as grand mal seizures, are the most dramatic type of epileptic seizure. They can cause an abrupt loss of consciousness and body stiffening, twitching and shaking. They sometimes cause loss of bladder control or biting your tongue.

3. The mechanisms involved into pathophysiology of epilepsy:

During epilepsy development, the seizures develop into these mechanisms: excitation of a group of nerves. This is caused by inward currents of Na, Ca and involvement of excitatory neurotransmitters like Glutamate and Aspartate, too little inhibition, and epileptogenesis (process whereby a previously normal brain is functionally altered and biased towards the generation of the abnormal paroxysmal electrical activity that defines chronic seizures) and hyperexcitability and hypersynchronization of neurons that facilitates spread. There has to be abnormal synchronization which is a property of a population of neurons to discharge together independently. Alone, a hyperexcitable neuron cannot generate a seizure.

4. The examples of drugs used to treat different types of seizures:

Types	First-Line	Alternatives
Partial seizures	Carbamazepine (tegretol), Phenytoin (Dilantin), Valproic acid (Depakine)	Phenobarbital (PO or IV)
Absence seizures	Valproic acid	Phenobarbital (PO or IV)
Primary generalized tonic-clonic seizures	Valproic acid	Phenytoin, Phenobarbital (PO or IV)

6.6. Summary of Unit 6

Head pain/headache is a common disorder that is caused by a number of conditions. Some headaches represent primary disorders and others occur secondary to another disease state in which head pain is a symptom. Primary headache disorders include migraine headache, tension-type headache, cluster headache, and chronic daily headache. Although most causes of secondary headache are benign, some are indications of serious disorders such as meningitis, brain tumor, or cerebral aneurysm. Temporomandibular joint (TMJ) syndrome is one of the major causes of headaches. It usually is caused by an imbalance in joint movement because of poor bite, teeth grinding, or joint problems such as inflammation, trauma, and degenerative changes.

The International Classification of Epileptic Seizures determines seizure type by clinical symptoms and EEG activity. It divides seizures into two broad categories: Focal seizures begin in a specific area of the cerebral hemisphere. There are two major groups for focal seizures: without impairment of consciousness and with impaired consciousness. Generalized seizures begin simultaneously in both cerebral hemispheres. They include unconsciousness and involve varying bilateral degrees of symmetric motor responses without evidence of localization to one hemisphere. These seizures are divided into six categories: tonic-clonic, absence, myoclonic, clonic, tonic, and atonic.

Seizures are caused by spontaneous, uncontrolled, paroxysmal, transitory discharges from cortical centers in the brain. Seizures may occur as a reversible symptom of another disease condition or as a recurrent condition called epilepsy. Epileptic seizures are classified as focal or generalized seizures. Focal seizures have evidence of local onset, beginning in one hemisphere. Generalized seizures involve both hemispheres from the start and include unconsciousness and rapidly occurring, widespread, bilateral symmetric motor responses. They include minor motor seizures such as absence and akinetic seizures, and major motor or grand mal seizures. Control of seizures is the primary goal of treatment and is accomplished with anticonvulsant medications. Anticonvulsant medications interact with each other and need to be monitored closely when more than one drug is used. Status epilepticus is a medical emergency and, if not promptly treated, may lead to respiratory failure and death.

6.7. Additional information

Descending levels of consciousness and their characteristics:

Full consciousness: Awake, alert, and oriented to time, place, and person; comprehends spoken and written word and is able to express ideas.

Confusion: Disoriented to time, place, or person; memory difficulty; difficulty following commands.

Lethargy: Oriented to time, place, and person; very slow in mental processes, motor activity, and speech; responds to pain appropriately.

Obtundation: Responds verbally with a word; arousable with stimulation; responds appropriately to painful stimuli; follows simple commands; appears very drowsy.

Stupor: Unresponsive except to vigorous and repeated stimuli; responds appropriately to painful stimuli; lies quiet with minimal spontaneous movement; may have incomprehensible sounds and/or eye opening.

Coma: Does not respond appropriately to stimuli; sleeplike state with eyes closed; does not make any verbal sounds.

Following instructions when teaching the patient with a headache and the patient's caregiver: (1) Keep a diary or calendar of headaches and possible precipitating events, (2) Avoid factors that can trigger a headache like foods containing amines like cheese, chocolate, nitrites/meats, vinegar, onions, monosodium glutamate; Fermented or marinated foods; Caffeine; Oranges; Tomatoes; Aspartame; Nicotine; Ice cream; Alcohol (particularly red wine); Emotional stress; Fatigue; Drugs such as ergot-containing preparations (ergotamine tartrate/Ergoma] and monoamine oxidase inhibitors (e.g., rasagiline/Azilect), (3) Learn the purpose, action, dosage, and side effects of drugs taken, (4) Self-administer sumatriptan (Imitrex) subcutaneously if prescribed, (5) Use stress management techniques such as relaxation, (6) Participate in regular exercise, (7) Contact health care provider if any of the following occurs (symptoms become more severe, last longer than usual, or are resistant to medication, Nausea and vomiting (if severe or not typical), change in vision, or fever occurs with the headache, Problems occur with any drugs.

Following information should be in the teaching plan for the patient with a seizure disorder: (1) Take drugs as prescribed. Report any and all side effects of drugs to the health care provider. When necessary, blood is drawn to ensure that therapeutic levels are maintained, (2) Use nondrug techniques, such as relaxation therapy and biofeedback training, to potentially reduce the number of seizures, (3) Be aware of availability of resources in the community, (4) Wear a medical alert bracelet or necklace, and carry an identification card, (5) Avoid excessive alcohol

intake, fatigue, and loss of sleep, (6) Eat regular meals and snacks in between if feeling shaky, faint, or hungry.

Caregivers of patient with epilepsy should receive the following information:

(1) For first aid treatment of tonic-clonic seizure, it is not necessary to call an ambulance or send the patient to the hospital after a single seizure unless the seizure is prolonged, another seizure immediately follows, or extensive injury has occurred; (2) During an acute seizure, it is important to protect the patient from injury. This may involve supporting and protecting the head, turning the patient to the side, loosening constrictive clothing, and easing the patient to the floor, if seated.

6.8. Additional activities

A. Remedial activities

1. How do generalized seizures differ from focal seizures?
 - a. Focal seizures are confined to one side of the brain and remain focal in nature.
 - b. Generalized seizures result in loss of consciousness whereas focal seizures do not.
 - c. Generalized seizures result in temporary residual deficits during the postictal phase.
 - d. Generalized seizures have bilateral synchronous epileptic discharges affecting the whole brain at onset of the seizure.
2. Which type of seizure occurs in children, is also known as a petit mal seizure, and consists of a staring spell that lasts for a few seconds?
 - a. Atonic
 - b. Simple focal
 - c. Typical absence
 - d. Atypical absence
3. The patient is diagnosed with complex focal seizures. Which characteristics are related to complex focal seizures?
 - a. Formerly known as grand mal seizure
 - b. Often accompanied by incontinence or tongue or cheek biting
 - c. Psychomotor seizures with repetitive behaviors and lip smacking
 - d. Altered memory, sexual sensations, and distortions of visual or auditory sensations
 - e. Loss of consciousness and stiffening of the body with subsequent jerking of extremities
 - f. Often involves behavioral, emotional, and cognitive functions with altered consciousness

4. In diagnosing seizure disorder, which of the following is the most beneficial?
- a. Brain scan
 - b. Skull radiographs
 - c. Lumbar puncture
 - d. Electroencephalogram

Answers to remedial activities

1. **d.** Generalized seizures have bilateral synchronous epileptic discharge affecting the entire brain at onset of the seizure. Loss of consciousness is also characteristic but many focal seizures also include an altered consciousness. Focal seizures begin in one side of the brain but may spread to involve the entire brain. Focal seizures that start with a local focus and spread to the entire brain, causing a secondary generalized seizure, are associated with a transient residual neurologic deficit postictally known as Todd's paralysis.
2. **c.** The typical absence seizure is also known as petit mal and the child has staring spells that last for a few seconds. Atonic seizures occur when the patient falls from loss of muscle tone accompanied by brief unconsciousness. Simple focal seizures have focal motor, sensory, or autonomic symptoms related to the area of the brain involved without loss of consciousness. Staring spells in atypical absence seizures last longer than those in typical absence seizures and are accompanied by peculiar behavior during the seizure or confusion after the seizure.
3. **c. d. f.** Complex focal seizures are psychomotor seizures with automatisms such as lip smacking. They cause altered consciousness or loss of consciousness producing a dreamlike state and may involve behavioral, emotional, or cognitive experiences without memory of what was done during the seizure. In generalized tonic-clonic seizures (previously known as grand mal seizures) there is loss of consciousness and stiffening of the body with subsequent jerking of extremities. Incontinence or tongue or cheek biting may also occur.
4. **d.** Electroencephalogram: An electroencephalogram recognizes abnormal electrical activity in the brain. The pattern of multiple spikes can assist in the diagnosis of particular seizure disorders.

B. Consolidation activities

1. Name the corresponding cranial nerve to these numbers and their main functions:

- I: Name of cranial nerve: _____ Function: _____
- II: Name of cranial nerve: _____ Function: _____
- III: Name of cranial nerve: _____ Function: _____
- IV: Name of cranial nerve: _____ Function: _____
- V: Name of cranial nerve: _____ Function: _____
- VI: Name of cranial nerve: _____ Function: _____
- VII: Name of cranial nerve: _____ Function: _____
- VIII: Name of cranial nerve: _____ Function: _____
- IX: Name of cranial nerve: _____ Function: _____
- X: Name of cranial nerve: _____ Function: _____
- XI: Name of cranial nerve: _____ Function: _____
- XII: Name of cranial nerve: _____ Function: _____

2. Nursing care for a patient who is experiencing a convulsive seizure includes all of the following except:

- a. Loosening constrictive clothing.
- b. Opening the patient's jaw and inserting a mouth gag
- c. Positioning the patient on his or her side with head flexed forward.
- d. Providing for privacy.

3. A seizure characterized by loss of consciousness and tonic spasms of the trunk and extremities, rapidly followed by repetitive generalized clonic jerking, is classified as a:

- a. Focal seizure
- b. Generalized seizure
- c. Jacksonian seizure
- d. Partial seizure.

4. The leading cause of seizures in the elderly is: _____.

5. A major potential complication of epilepsy is: _____.

6. List six “triggers” known to cause migraine headaches:
- _____, _____,
- _____, _____,
- _____, and _____.

Answers of consolidation activities

1.

I: Olfactory; Smell

II: Optic; Vision

III: Oculomotor; Eye movement

IV: Trochlear; Eye movement

V: Trigeminal; Facial sensation

VI: Abducens; Eye movement

VII: Facial; Taste and expression

VIII: Vestibulocochlear; Hearing and equilibrium

IX: Glossopharyngeal; Taste

X: Vagus; Swallowing, gastric motility, and secretion

XI: Spinal accessory; Trapezius and sternomastoid muscles

XII: Hypoglossal; Tongue movement

2. B

3. B

4. Cerebrovascular disease

5. Status epilepticus

6. Answer should include six of the following: bright lights, stress, depression, sleep deprivation, fatigue, foods containing tyramine, monosodium glutamate or nitrates, aged cheese, and oral contraceptives.

C. Extended activities

1. A patient with a seizure disorder is being evaluated for surgical treatment of the seizures. The nurse recognizes that what is one of the requirements for surgical treatment?

- a. Identification of scar tissue that is able to be removed
 - b. An adequate trial of drug therapy that had unsatisfactory results
 - c. Development of toxic syndromes from long-term use of antiseizure drugs
 - d. The presence of symptoms of cerebral degeneration from repeated seizures
2. During the diagnosis and long-term management of a seizure disorder, what should the nurse recognize as one of the major needs of the patient?
 - a. Managing the complicated drug regimen of seizure control
 - b. Coping with the effects of negative social attitudes toward epilepsy
 - c. Adjusting to the very restricted lifestyle required by a diagnosis of epilepsy
 - d. Learning to minimize the effect of the condition in order to obtain employment
 3. Describe the nursing management of a patient during a seizure.
 4. Describe the clinical manifestations of a migraine headache from prodrome phase to the recovery phase.

Answers of extended activities

1. **b.** Most patients with seizure disorders maintain seizure control with medications but if surgery is considered, three requirements must be met: the diagnosis of epilepsy must be confirmed, there must have been an adequate trial with drug therapy without satisfactory results, and the electroclinical syndrome must be defined. The focal point must be localized but the presence of scar tissue is not required.
2. **b.** One of the most common complications of a seizure disorder is the effect it has on the patient's lifestyle. This is because of the social stigma attached to seizures, which causes patients to hide their diagnosis and to prefer not to be identified as having epilepsy. Medication regimens usually require only once- or twice-daily dosing and the major restrictions of lifestyle usually involve driving and high-risk environments. Job discrimination against the handicapped is prevented by federal and state laws and patients only need to identify their disease in case of medical emergencies.
3. The overall goals are that the patient with seizures will (1) be free from injury during a seizure, (2) have optimal mental and physical functioning while taking anti-seizure drugs, and (3) have satisfactory psychosocial functioning. **Nursing management of patient with seizures** must focus on teach patient about factors that increase risk for seizures, such as alcohol use, fatigue, inadequate sleep, and stress; Teach patient about prescribed

antiseizure medications, including drug regimen, side effects, and required monitoring of drug levels; Assess and document details of seizure events, including events preceding the seizure; length of each phase of the seizure; course and nature of the seizure activity; and the level of consciousness, vital signs, and activity during the postictal period; Assess airway patency and position patient to maintain airway after any seizures.

Other goals are administer IV anti-seizure medications to the patient experiencing status epilepticus; Make appropriate referrals as soon as possible where applicable and advocacy to agencies to assist patient with financial problems, work training, employment, and living arrangements; Teach family members and caregivers about management of seizures and status epilepticus; In the ambulatory and home care setting, evaluate patient self-management of medications, and lifestyle.

4. Clinical manifestations per different stages of a migraine:

- A. Prodrome:** One or two days before a migraine, patient might notice subtle changes that warn of an upcoming migraine, including constipation, mood changes from depression to euphoria, food cravings, neck stiffness, increased thirst and urination or frequent yawning.
- B. Aura:** For some people, aura might occur before or during migraines. Auras are reversible symptoms of the nervous system. They're usually visual, but they also can include other disturbances. Each symptom usually begins gradually, builds up over several minutes and lasts 20 minutes to one hour. Examples of auras include visual phenomena, such as seeing various shapes, bright spots or flashes of light, vision loss, "Pins-and-needles" sensations in an arm or leg, weakness or numbness in the face, or one side of the body, difficulty speaking, hearing noises or music, uncontrollable jerking or other movements.
- C. Attack:** A migraine usually lasts from four to 72 hours if untreated, and the frequency varies by the person. Migraines might occur rarely or strike several times a month. During a migraine, patient might have pain, usually on one side of your head, but often on both sides, pain that throbs or pulses, sensitivity to light, sound, and sometimes smell and touch, nausea and vomiting.
- D. Post-drome/recovery:** After a migraine attack, patient might feel drained, confused and washed out for up to a day. Some people report feeling elated. Sudden head movement might bring on pain again briefly.

6.9. Possible answers to End unit assessment 6

SECTION A: ANSWERS TO SHORT ANSWER QUESTIONS

1. Elements of neurological diseases assessment:

A neurological exam is an evaluation of a person's nervous system that can be done in the healthcare provider's office. It may be done with instruments, such as lights and reflex hammers. The nervous system consists of the brain, the spinal cord, and the nerves from these areas. There are many aspects of this exam, including an assessment of motor and sensory skills, balance and coordination, mental status (the patient's level of awareness and interaction with the environment), reflexes, and functioning of the cranial nerves.

2. Difference between headache to migraine:

Headache pain results from signals interacting among the brain, blood vessels and surrounding nerves. During a headache, an unknown mechanism activates specific nerves that affect muscles and blood vessels. These nerves send pain signals to the brain. **Tension headaches:** tension headaches are the most common type of headache. Tension headache pain tends to be consistent without throbbing, mild to moderate, on both sides of the head (bilateral), responsive to over-the-counter treatment, worse during routine activities (such as bending over or walking upstairs).

Migraines: migraines are the second most common type of primary headaches. Symptoms of migraine include moderate to severe pain, nausea and vomiting, pounding or throbbing pain, pain that lasts four hours to three days, sensitivity to light, noise or odors, stomach upset or abdominal pain. Migraines result when unstable nerve cells overreact to various factors (triggers). The nerve cells send out impulses to blood vessels and cause chemical changes in the brain. The result is disabling pain.

3. The risk factors to develop the migraine:

Although many of the causes of migraines are not well understood, both genetic and environmental factors appear to play a role. Other triggers are hormonal changes, food, feeling of stimulation, physical exertion, changes of the environment, medicines, changes in trigeminal nerve.

4. Describe different treatment options of migraine:

Treatments include NSAIDs, Triptans, Ergots, anti-nausea, anti-depressants, and sometimes anti-epileptic drugs. There are also lifestyle and remedies modifications as self-care.

5. Definition of epilepsy and differentiation of epilepsy to seizures and convulsions:

Epilepsy is a neurological condition while seizures are clinical manifestations of the epilepsy. Epilepsy is a central nervous system (neurological) disorder, in which brain activity becomes abnormal, and is a chronic non-communicable disease of the brain characterized by recurrent **seizures**, which are brief episodes of involuntary movement that may involve a part of the body (partial) or the entire body (generalized) and are sometimes accompanied by loss of consciousness, and control of bowel or bladder function. **Convulsion**, a term sometimes applied to seizures, refers to the jerky, contract-relax (tonic-clonic) movement associated with some seizures.

6. Basing on signs and symptoms, difference between two major types of epilepsy:

- A. **Partial/Focal seizures:** when seizures appear to result from abnormal activity in just one area of your brain, they are called focal seizures. These seizures fall into two categories: **Focal seizures without loss of consciousness:** also called simple partial seizures, these seizures do not cause a loss of consciousness. They may alter emotions or change the way things look, smell, feel, taste or sound. Some people experience déjà vu. This type of seizure may also result in involuntary jerking of one body part, such as an arm or leg, and spontaneous sensory symptoms such as tingling, dizziness and flashing lights. **Focal seizures with impaired awareness:** also called complex partial seizures, these seizures involve a change or loss of consciousness or awareness. This type of seizure may seem like being in a dream. During a focal seizure with impaired awareness, the patient may stare into space and not respond normally to the environment or perform repetitive movements, such as hand rubbing, chewing, swallowing or walking in circles. An important additional subgroup comprises those seizures that begin as partial seizures and then spread diffusely throughout the cortex, i.e., partial seizures with secondary generalization.
- B. **Generalized seizures:** these are the seizures that appear to involve all areas of the brain are called generalized seizures. Six types of generalized seizures exist: **Absence seizures:** absence seizures, previously known as petit mal seizures, typically occur in children. They are characterized by staring into space with or without subtle body movements such as eye blinking or lip smacking and only last between 5-10 seconds. These seizures may occur in clusters, happening as often as 100 times per day, and cause a brief loss of awareness. **Tonic seizures:** tonic seizures cause stiff muscles and may affect consciousness.

These seizures usually affect muscles in your back, arms and legs and may cause you to fall to the ground. **Atonic seizures:** atonic seizures, also

known as drop seizures, cause a loss of muscle control. Since this most often affects the legs, it often causes you to suddenly collapse or fall down. **Clonic seizures:** clonic seizures are associated with repeated or rhythmic, jerking muscle movements. These seizures usually affect the neck, face and arms. **Myoclonic seizures:** myoclonic seizures usually appear as sudden brief jerks or twitches and usually affect the upper body, arms and legs. **Tonic-clonic seizures:** tonic-clonic seizures, previously known as grand mal seizures, are the most dramatic type of epileptic seizure. They can cause an abrupt loss of consciousness and body stiffening, twitching and shaking. They sometimes cause loss of bladder control or biting your tongue.

7. Different complications of epilepsy:

People with epilepsy tend to have more physical problems (such as fractures and bruising from injuries related to seizures), as well as higher rates of psychological conditions, including anxiety and depression. Similarly, the risk of premature death in people with epilepsy is up to three times higher than in the general population. **The other complications related to epilepsy are drowning, car accidents, pregnancy complications, emotional and psychological health issues** problems, especially depression, anxiety, and suicidal thoughts and behaviors. Other life-threatening complications of epilepsy that might occur are status epilepticus and sudden unexpected death.

8. Preventive strategies of epilepsy are:

Education (recognition of signs and symptoms of prodroma and aura, so that the patient may avoid the fall in a very risk area i.e. fire, stairs...), Avoid driving, working with machinery, working at heights, swimming and other activities that may cause serious injuries, Psychosocial support (Counseling to minimize depression, anxiety due to social stigmatization, lack of job, frequent hospitalization...), Preventing head injury is the most effective way to prevent post-traumatic epilepsy, Adequate perinatal care can reduce new cases of epilepsy caused by birth injury, The use of drugs and other methods to lower the body temperature of a feverish child can reduce the chance of febrile seizures, The prevention of epilepsy associated with stroke is focused on cardiovascular risk factor reduction, e.g. measures to prevent or control high blood pressure, diabetes and obesity, and the avoidance of tobacco and excessive alcohol use, Central nervous system infections are common causes of epilepsy in tropical areas, elimination of microorganisms/parasites in the environments and education on how to avoid infections can be effective ways to reduce epilepsy worldwide.

9. Description of the status epilepticus:

Status epilepticus is the condition that occurs if a patient is in a state of continuous seizure activity lasting more than five minutes or if there is frequent recurrent seizures without regaining full consciousness in between them. People with status epilepticus have an increased risk of permanent brain damage and death.

SECTION B: ANSWERS FOR MULTIPLE CHOICE QUESTIONS

1. **b.** Migraine headaches are frequently unilateral and usually throbbing. They may be preceded by a prodrome and frequently there is a family history. Cluster headaches are also unilateral with severe bone-crushing pain but there is no prodrome or family history. Frontal-type headache is not a functional type of headache. Tension-type headaches are bilateral with constant, squeezing tightness without prodrome or family history.
2. **b. c. d. f.** Cluster headaches have only alcohol as a dietary trigger and have an abrupt onset lasting 5 minutes to 3 hours with severe, sharp, penetrating pain. Cluster headaches maybe accompanied by unilateral ptosis, lacrimation, rhinitis, facial flushing or pallor and commonly recur several times each day for several weeks, with months or years between clustered attacks. Family history and nausea, vomiting, or irritability may be seen with migraine headaches. Bilateral pressure occurring between migraine headaches and intermittent occurrence over long periods of time are characteristics of tension-type headaches.
3. **d.** The primary way to diagnose and differentiate between headaches is with a careful history of the headaches, requiring assessment of specific details related to the headache. Electromyography (EMG) may reveal contraction of the neck, scalp, or facial muscles in tension type headaches but this is not seen in all patients. CT scans and cerebral angiography are used to rule out organic causes of the headaches.
4. **c.** The associate nurse is able to obtain equipment from the supply cabinet or department. The RN may need to provide a list of necessary equipment and should set up the equipment and ensure proper functioning. The RN is responsible for the initial history and assessment as well as teaching the patient about the room's call system. Padded tongue blades are no longer used and no effort should be made to place anything in the patient's mouth during a seizure.
5. **d.** Generalized seizures have bilateral synchronous epileptic discharge affecting the entire brain at onset of the seizure. Loss of consciousness is also characteristic but many focal seizures also include an altered consciousness. Focal seizures begin in one side of the brain but may spread to involve the entire brain. Focal seizures that start with a local focus and spread to the entire brain, causing a secondary generalized seizure, are

associated with a transient residual neurologic deficit postictally known as Todd's paralysis.

6. **c. d. f.** Complex focal seizures are psychomotor seizures with automatisms such as lip smacking. They cause altered consciousness or loss of consciousness producing a dreamlike state and may involve behavioral, emotional, or cognitive experiences without memory of what was done during the seizure. In generalized tonic-clonic seizures (previously known as grand mal seizures) there is loss of consciousness and stiffening of the body with subsequent jerking of extremities. Incontinence or tongue or cheek biting may also occur.
7. **d.** Tonic-clonic status epilepticus is most dangerous because the continuous seizing can cause respiratory insufficiency, hypoxemia, cardiac dysrhythmia, hyperthermia, and systemic acidosis, which can all be fatal. Subclinical seizures may occur in a patient who is sedated, so there is no physical movement. Myoclonic seizures may occur in clusters and have a sudden, excessive jerk of the body that may hurl the person to the ground. Psychogenic seizures are psychiatric in origin and diagnosed with video-electroencephalography (EEG) monitoring.
8. **c.** A seizure is a paroxysmal, uncontrolled discharge of neurons in the brain, which interrupts normal function, but the factor that causes the abnormal firing is not clear. Seizures may be precipitated by many factors and although scar tissue may make the brain neurons more likely to fire, it is not the usual cause of seizures. Epilepsy is established only by a pattern of spontaneous, recurring seizures.
9. **b.** In the postictal phase of generalized tonic-clonic seizures, patients are usually very tired and may sleep for several hours and the nurse should allow the patient to sleep as long as necessary. Suctioning is performed only if needed and decreased level of consciousness is not a problem postictally unless a head injury has occurred during the seizure.
10. **b.** One of the most common complications of a seizure disorder is the effect it has on the patient's lifestyle. This is because of the social stigma attached to seizures, which causes patients to hide their diagnosis and to prefer not to be identified as having epilepsy. Medication regimens usually require only once- or twice-daily dosing and the major restrictions of lifestyle usually involve driving and high-risk environments. Job discrimination against the handicapped is prevented by federal and state laws and patients only need to identify their disease in case of medical emergencies.

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