NATIONAL OPEN UNIVERSITY OF NIGERIA

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE:NSS 321

COURSE CODE TITLE:MEDICO-SURGICAL NURSING I

COURSE GUIDE

NSS 321
MEDICO-SURGICAL NURSING I

Course Team Dr. Clara Agbedia (Developer/Writer) - DELSU
Prof. O.C. Nwana (Programme Leader) - NOUN
Simeon K.Olubiyi (Coordinator) - NOUN

NATIONAL OPEN UNIVERSITY OF NIGERIA

National Open University of Nigeria
Headquarters
14/16 Ahmadu Bello Way
Victoria Island
Lagos

Abuja Office
No. 5 Dar es Salaam Street
Off Aminu Kano Crescent
Wuse II, Abuja
Nigeria

e-mail: centralinfo@nou.edu.ng
URL: www.nou.edu.ng

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CONTENTS PAGE

Introduction

Nursing is a profession that serves the needs of society in the area of health. The practice of nursing addresses a range of health problems, both actual and potential, requiring of its practitioners a specialised body of knowledge and skills to meet client needs and a value system that recognises the client as an autonomous human being with rights. As a profession, nursing has served a vital role within the health care system through history.

The rapid changes in health, technological advances, knowledge explosion, demographic changes and advance medical science, demand that nurses be educationally prepared to provide or plan care across the continuum of setting – from hospital or clinic to home or community and during all phases of illness.

The course you are about to study is Medico-Surgical Nursing, and is taught in four parts, namely Medico-Surgical nursing I, II, III, IV. Medico-Surgical Nursing I lays the foundation for the other three Med-surgical courses. Medico-Surgical Nursing 1 deals with the basic concepts of health and illness, ways in which the body defends and responds physiologically to disease states, the use of the nursing process as a framework in providing comprehensive care to patients, basic nursing concepts, principles and practices of rehabilitation and conditions that threaten body's adaptation mechanism. You will also gain understanding of the varied diagnostic measures used in medical-surgical nursing. At the end of Medico-Surgical II, you should be able to identify clients/patients suffering from specific medical or surgical conditions, formulate and implement nursing care plans based on the needs of individuals. You will also learn how to manage patients before, during and after diagnostic and nursing procedures.

Medical-Surgical III, is designed in such a way that you will continue to learn to identify clients/patients suffering from specific medical or surgical conditions. Continue to utilise the nursing process in the care of patient health problems. Formulate and implement nursing care plans based on the needs of individuals. Manage patients before, during and after specific diagnostic and nursing procedures. Demonstrate understanding of emergency and disaster nursing care. Demonstrate the ability to perform a simple surgical wound-dressing and skill in use of various nursing equipments.

The Course

Medico-Surgical Nursing I is divided into three modules.

Module 1 lays the foundation for Medico-Surgical Nursing practices and provides you with knowledge of general concepts in medical-surgical practice. Basic concepts and terminologies in Medico-Surgical Nursing are discussed with special reference to health-illness continuum. It also deals extensively with the use of the nursing process as a framework for nursing practice. An overview of selected nursing theories and models are included. You need to understand the uses of this essential tool in nursing as well as the concept of evidence-based practice.

Module 2 deals with nursing history and physical examination of patients. It also focuses on common concepts in the practice of medical-surgical nursing. These include quality assessment fluid and electrolyte distribution and imbalances, shock, pain, infection, disease and neoplasm.

Module 3 deals with the challenges of surgical nursing. The unit on surgical patient deals with pre-operative nursing of a patient undergoing surgery with special emphasis on general assessment, preparation and intervention for patient experiencing surgery. The final unit deals with tools that enhance nursing practice, accountability, pain and pain management are discussed. Diagnostic measures in medical-surgical condition are also discussed.

Course Aim

The goal of this course (Medico-Surgical Nursing) is to provide you with the necessary knowledge of the art and science of adult medico-

surgical nursing and the therapeutic skills needed for effective management of systemic disorders in the body.

Course Objectives

This course is set to assist you achieve the following objectives:

1. Understand the basic concept and terminologies in Medical Surgical Nursing.
2. Understand the concept and Philosophy of rehabilitation.
3. Understand the use of nursing process in the care of client/patient.
4. Understand the problems associated with body defence mechanism.
5. Learn the diagnostic measures in medical surgical conditions.
6. Explain the role of the nurse in pre-operative care of a surgical patient.
7. Learn the pre-operative management of the surgical patient.

Working through the Course

This course requires extensive reading. The contents of this material also require a lot of time to study. Despite the great effort to make it comprehensible, the effort required of you is still tremendous. You are therefore advised to avail yourself of the tutorial sessions opportunity to compare notes with your peers.

The Course Material

You will be provided with the following materials:

Course Guide
Study Units.

Study Units

The study units covered on this course are:

Module 1 General Introduction to the Course

Unit 1 Framework of Nursing Practice
Unit 2 Nursing Process
Unit 3 Application of the Nursing Process

Module 2 Medical-Surgical Conditions

Unit 1 Fluid and Electrolyte Distribution

Text Books and References

In addition, the course comes with a list of recommended textbooks, which though are not compulsory for acquisition, are indeed, valuable supplements to the course material.

Barbara Kozier, Glenora Erb. [No date]. *Fundamentals of Nursing. Concepts and Procedures.* (2nd ed.)

Brunner & Suddarth. *Medical Surgical Nursing*. (10th ed) Lippincott Wilkins, 2004.

Schultz, A. *Predicting and Preventing Pressure Ulcers in Surgical Patients AORN Journal* 81; Issue No. 986 – 1006, 2005.

Assessment

There are two components of assessment for this course. The Tutor-Marked Assignment (TMA) and the end of course examination.

Tutor-Marked Assignment

The TMA is the continuous assessment component of your course. It accounts for 30% of the total score. You will be given four TMAs to answer. Three of these must be answered before you are allowed to sit for the course examination. The TMAs would be given to you by your facilitator and returned after you have done the assignment.

Final Examination and Grading

This examination concludes the assessment for the course. It constitutes 70% of the whole course. You will be informed of the time for the examination.

Summary

This course intends to provide you with the necessary knowledge of the art and science of adult medico-surgical nursing and the therapeutic skills needed for effective management of systemic disorders in the body.

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Abuja Office
No. 5 Dar es Salaam Street
Off Aminu Kano Crescent
Wuse II, Abuja
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CONTENTS PAGE

MODULE 1 GENERAL INTRODUCTION TO THE COURSE

UNIT 1 FRAMEWORK OF NURSING PRACTICE

CONTENTS

1.0 INTRODUCTION

Since the 1960s, there has been a growing interest in developing nursing theories. This interest emerged from the desire to clarify the nature of nursing. Margaret Newman described three general approaches that nurses use to develop nursing theory. One approach is to borrow theory from other disciplines and integrate it into the science of nursing. An example of this approach is the use of systems theory as seen in Johnson's behavioral system model for nursing. A second approach is to analyse nursing practice situations for the theoretical underpinnings. Orem's self-care nursing model is representative of this approach. The third approach is to develop a conceptual model from which theories can be derived. This is the aim of most nurse theorists. At present, nursing

frameworks and models reflect a synthesis of the first two approaches. They combine scientific theories with analyses from nursing practice. They focus on the interactions between the client and nurse by describing the nursing activities or the relationship between the client and nurse.

Most nursing theorists prefer to call their work models, because they do not meet the narrow criteria of theories as a way of collectively describing nursing frameworks and models. This unit begins with an overview of selected theories and frameworks for professional nursing practice, followed by a discussion on the use of the nursing process as a framework for nursing practice.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- differentiate between a concept, theory, conceptual framework, and model
- identify and define the four central concepts of nursing theories
- compare and contrast selected theories of nursing.

3.0 MAIN CONTENT

A concept is a building block of theory. It is an idea or word that describes objects, events, or properties, bring up a mental image of the phenomenon.

A theory is a statement or group of statements that describes, explains, or predicts the relationship between concepts (e.g. objects events or properties). Theories may be broad or limited in scope, thus varying in their ability to describe, explain or predict.

A conceptual framework provides the orienting scheme or world view that helps focus our thinking. A conceptual framework can be visualised as an umbrella under which many theories can exist. The major distinction between a conceptual framework and a theory is the level of abstraction, with a conceptual framework being more abstract than a theory.

3.1 Why Does Nursing Need Theory?

The purpose of a theory in nursing is to achieve desired outcomes for nursing. To do this, a theory must arise from the systematic abstraction of nursing reality. A systematically developed theory will produce a well-founded basis for the continued use of these purposes in nursing practice. This process challenges thinking, provides new analytic skills, and helps all practitioners become more purposeful in their actions. Thus, theory development depicts collective efforts of nurses to define and direct the profession and provide the basis for continued theoretical development. A theory is of value in guiding or channelling the function of the profession, including the guiding of education, research, and practice with potential or actual links between the three."

3.2 Components of Nursing Theories

These are:- (a) The Nature of Nursing (b) The Individual (c) Society and Environment (d) Health.

Nature of Nursing

In nursing theory, the nature of nursing is generally represented as being a helping discipline, with the primary focus on interpersonal interactions occurring between nurse and client. This general idea does not clearly distinguish nursing from other helping disciplines, but it does provide an important focus for formulating propositions regarding nursing actions and the knowledge needed to develop and improve nursing practice. This description of the nature of nursing distinguishes nursing clearly from medicine, in that medicine focuses on surgical and pharmacologic interventions with interpersonal interactions as an adjunct to these interventions. In contrast, interpersonal interactions are primary for nursing, while technical and medical interventions are an adjunct to primary interpersonal interactions.

While different authors generally present a conceptualisation of the

nature of nursing that is consistent with the underlying commitment that interpersonal interactions are a primary focus, there are important differences in the various definitions and conceptualisations. For some authors, the interpersonal process involved in nursing rests heavily upon the traits and will of the individual receiving care. That is, the client largely or totally, defines the direction of the interaction and the specific actions that are taken in achieving the goals of the interaction. The nurse's role in the interaction is primarily one of facilitator.

Conversely, other theories present a view of the interpersonal process as one that is either shared or initiated by the nurse. In this view, nursing processes and actions rest heavily upon initiative, knowledge, and approaches actively taken by the nurse to reach the goal or purposes of the interaction.

It can be argued that both views are consistent with nursing reality in that nurses encounter situation in which the client primarily directs the interaction and those in which the nurse is primarily the initiator.

The Individual

All existing nursing theories and models deal with the recipient of nursing, usually an individual, but sometimes groups of people such as families or communities. The most consistent philosophic component of the idea of the individual is the dimension of wholeness or a holistic view of the person. Holism means that the whole is greater than the sum of the parts and that the whole cannot be reduced to parts without losing something in the process. Thus an individual cannot be viewed in isolation ozone body part take precedence over another. Early nursing theories and models made some attempts to deal with the individual as a whole person, but these ideas have become increasingly developed with more recent conceptualizations.

Society and Environment

The concept of society and environment are consistently viewed as central to the discipline of nursing. Several nursing theories deal primarily with society and view society as a critical interacting force with the individual. The environment was central for Nightingale in her concepts of nursing. Nightingale believed that the primary focus for nursing actions was to alter the environment in order to place the human body in the best possible condition for the reparative processes of nature to occur.

Health

The concept of health is usually identified as the purpose or goal of nursing. Contemporary nursing theories are remarkably congruent with this early conceptualisation. Most theories and models of the early twentieth century were based on a conceptualization of a health-illness continuum, and nursing purpose was to assist the ill client to achieve the best level of health possible. More recently, nurse authors have begun to seriously examine the concept of health and to represent health as more than, or different from, the absence of disease. Health is viewed in current nursing theories as a dynamic state or process that changes with time and varies according to circumstances.

3.2.1 Selected Nursing Theories

The theoretical perspectives presented here include a brief overview, basic assumptions about the individual and the environment, definitions of health and illness, a description of nursing including the goal of nursing, and definition of concepts and sub-concepts specific to each theory. You are encouraged to consult other books to gain a full appreciation of the depth, scope, and extent of the relationships put forth.

Nightingale's Environmental Theory

The environment is critical to health and the nurse's role in caring for the sick is to provide a clean, quiet, peaceful environment to promote healing. Florence Nightingale conceptualized disease as a reparative process and described the nurse's role as manipulating the environment to facilitate and encourage this process. Her directions regarding ventilation, warmth, light, diet, cleanliness, variety, and noise are discussed in her classic nursing textbook.

The Individual

Individuals are responsible, creative, in control of their lives and health, and desire good health.

Environment

The environment is external to the person but affects the health of both sick and well persons. The environment includes pure air, pure water, efficient drainage, cleanliness, and light.

Health

Health, in this context, is defined as a state of being well and using one's powers to the fullest. Illness or disease is the reaction of nature against the conditions in which we have placed ourselves. Disease is a reparative mechanism, an effort of nature to remedy a process of poisoning or decay.

Nursing

Nursing's role is to promote or provide the proper environment for the patients. These include fresh air, light, pure water, cleanliness, warmth, quiet, and appropriate diet. The goal of nursing is to promote the reparative process by manipulating the environment.

This model identifies some relationships- environment, and the nurse's relationship with the patient. Nursing's role is to manipulate the environment to encourage healing. This includes the proper use of fresh air, light, warmth, cleanliness, quiet, and the proper selection and administration of diet. According to Florence Nightingale, the *sine qua non* of all good nursing is never to allow a patient to be awakened, intentionally or accidentally. "A good nurse will always make sure that no blind or curtains should flap. If you wait till your patient tells you or reminds you of these things, where is the use of their having a nurse?" (p. 27).

3.2.2 Henderson's Complementary-Supplementary Model

According to Henderson, a nurse' role is that of a substitute for the patient, a helper to the patient, and a partner with the patient. She later identified fourteen basic patients' needs that are essential components of nursing care. In the book, *The Nature of Nursing* (1966), she indicated that the "unique function of the nurse is to assist the individual, sick or well in the performance of those activities contributing to the health or its recovery (or a peaceful death) that he would perform unaided if he had the necessary strength, will or knowledge" (p. 15).

The Individual

Since individuals will achieve or maintain health if they have the necessary strength, will, or knowledge (1966: 15), it therefore follows that assistance may be necessary to achieve health.

Environment

According to Henderson, this is an aggregate of all the external conditions and influences affecting the life and development of an organism.

Health: Health, in this Henderson's theory, is equated with independence. Conversely, it can be inferred that illness is a lack of independence.

Nursing

Nursing has a unique function of assisting sick or well individuals in a supplementary or complementary role. The goal of nursing is to help the individual gain independence as rapidly as possible.

Key Concepts

Henderson identifies fourteen basic needs as essential components of nursing care. These are:

1. Breathe normally.
2. Eat and drink adequately.
3. Eliminate body wastes.
4. Move and maintain desirable position.
5. Sleep and rest.
6. Select suitable clothes.
7. Maintain body temperature within normal range by adjusting clothing and modifying the environment.
8. Keep the body clean and well groomed to protect the integument.
9. Avoid dangers in the environment and avoid injuring others.
10. Communicate with others in expressing emotions, needs fears, or opinions.
11. Worship according to one's faith.
12. Work in such a way that there is a sense of accomplishment.
13. Play or participate in various forms of recreation.
14. Learn, discover, or satisfy the curiosity that leads to normal development and health and use available health facilities.

3.2.3 Orem's Theory of Self-Care

Orem (1950), focuses on nursing as a deliberate human action and notes that all individuals can benefit from nursing when they have health-derived or health-related limitations for engaging in self-care or care of dependent others. To Orem, self-care practices are a set of learned behaviors, to sustain life, to maintain or restore functioning, and to bring about a condition of well-being. The role of the nurse is to assist clients with self-care when there is a deficit in their ability to perform.

The Individual

The individual is viewed as a unity whose functioning is linked with the environment and who, with the environment, forms an integrated, functional whole. “Human beings are capable of self-determined actions” (1990, p. 76) and function biologically, symbolically, and socially.

Environment

The environment is linked to the individual, forming an integrated and interactive system. It implied that the environment is external to the individual.

Health and Illness

Health, which has physical, psychological, interpersonal, and social aspects, is a state in which human beings are structurally and functionally whole. Illness occurs when an individual is incapable of maintaining self-care as a result of health-related limitations.

Nursing

Nursing involves assisting the individual with his or her self-care practices to sustain life and health, recover from disease or injury, and cope with their effects. The goal of nursing is to move a patient toward responsible self-care or meeting existing health care needs of those who have health care deficits for purposes of maintaining, protecting, or promoting their functioning as human beings.

Key Concepts

Self-care – This involves learned activities and sequences of actions that individuals initiate and perform on their own behalf to maintain life, health, and well-being.

Self-care requisites – These are actions “performed by or for individuals in the interest of controlling human and environmental factors” (1990: 121). There are three categories of self-care requisites:

Universal – This is common to all human beings. They are concerned with the promotion and maintenance of structural and functional integrity.

Developmental – This is associated with conditions that promote known developmental processes at each stage of the life cycle.

Health-deviation – This is associated with genetic and constitutional defects and deviations that impair the individual's ability to perform self-care.

Therapeutic self-care demands – This is the totality of self-care actions performed by the nurse and/or self in order to meet known self-care deficit requisites.

Self-care deficits – These are gaps between known therapeutic self-care demands and the ability to perform self-care or dependent care.

Nursing systems – This refers to actions of nurses and patients that "regulate patient's self-care capabilities and meet patient's self-care needs". This can be (a) whole compensation (b) partial compensation.

In the context of wholly compensatory, the nurse compensates for the individual's total inability to perform self-care activities. When the nurse compensates for the individual's inability to perform some (but not all) self-care activities, this is called partly compensatory. In **supportive–educative system**, the patient performs or learns to perform required measures of therapeutic self-care that they cannot do so without assistance.

3.2.4 King's Theory of Goal Attainment

The Theory of Goal Attainment is advanced by Imogere King in her publication *Toward a Theory for Nursing* (1981). The Theory identified the focus of nursing as being on interacting with their environments, leading to a state of health, which is the ability to function in roles.

Individual

The individual is viewed as open systems that interacts with their environment and are conceptualized as social, sentient, rational, perceiving, controlling purposeful, action-oriented beings.

Environment

As an open system, it is implied that the individual and the environment interact and that both the internal and external environments generate stressors.

Health and illness

Health is described as an individual's ability to function in social roles, which implies optimal use of one's resources to achieve continuous adjustment to internal and external environmental stressors. Illness is a deviation from the norm, an imbalance in a person's biological structure, psychological makeup, or social relationships.

Nursing

In a process of action, reaction, and interaction, the nurse and client communicate, set goals, and explore means to achieve those goals. "The domain of nursing includes promoting, maintaining and restoring health, caring for the sick and injured and caring for the dying" (1981: 4). The goal of nursing is to assist individuals to maintain their health so they can function in their roles.

Key Concepts

Two sets of concepts are subsumed in the theory, one relating to the parties involved in the nurse-client relationship and the other pertaining to goal attainment.

Personal System – This refers to an individual.

Interpersonal System – It refers to two or more interacting individuals.

Social System – This describes communities and societies that the patient lives.

Concepts of Goal Attainment – This is an interaction of contextual variable.

Interaction – This refers to a process of perception between the person and environment or one or more persons, represented by verbal and nonverbal behaviors that are goal-directed.

Perception – This is an individual's representation of reality.

Communication – This is the process of giving information from one person to another.

Transaction – It refers to observable behavior or individuals interacting with their environment.

Role – It refers to a set of behaviors displayed by an individual who occupies a given position in a social system.

Stress – This is a dynamic state of interaction with the environment needed to maintain balance for growth, development, and performance.

Growth and Development – This refers to "continuous changes in individuals occurring at molecular, cellular and behavioral levels".

Time – This is the duration between one event and another.

Space – It can be defined by "gestures, postures and visible boundaries erected to mark off personal space" (1981. 148).

3.2.5 Johnson's Behavioral System Model

Johnson views the individual as a behavioral system that is continually striving for balance. The nurse serves as an external regulatory force to preserve and maintain this system balance.

The Individual

As a behavioral subsystem, the individual strives to attain and maintain behavioral system balance. This often will require adaptation and modification.

Environment

The internal or external natural forces constitute the environment in which the behavioral system exists.

Health

Health, within the theory occurs when there is an equilibrium, to the extend that the behavioral system is self-maintaining and self-perpetuating, and interrelationships between the subsystems are harmonious. Illness is a state of disorganization and dysfunction of the system.

Nursing

In this context, nursing is described as an external regulatory force, imposes external controls to fulfill the functional requirements of the subsystems. According to Johnson, the goal of nursing is to restore, maintain, or attain behavioral system balance and stability at the highest possible level for the individual

Key Concepts

Behavioral System – This consists of seven behavioral subsystems that are integrated in and characterise each person's life.

Behavioral Subsystem – This is a formed set of behavioural responses that seem to share a common drive but that are modified over time, through maturation or learning. The seven subsystems are:

Affinitive

This suggests intimacy, and the formation and maintenance of a strong social bond.

Dependency

Refers to succoring behavior that calls for the response of nurturing or physical assistance.

Ingestive

Refers to appetite satisfaction determined by social and psychological considerations.

Eliminative

Describes elimination of body wastes as a learned behaviour.

Sexual

Refers to gender role identity and the broad range of behaviours dependent on one's biologic sex.

Achievement

Refers to mastery or control over some aspect of the self or environment. This may include intelligence, physical, creative, mechanical, and social skills.

Aggressive

Refers to protection and preservation of self and society within the limits approved by society.

3.2.6 Roy's Adaptation Model

Sister Calista Roy describes the individual as a biopsychosocial adaptive system and nursing as a humanistic discipline that "places emphasis on the person's own coping abilities" (1984. 32). The individual and the environment are thus sources of stimuli that require modification to promote adaptation. Thus the role of the nurse promotes adaptation by modifying external stimuli.

The Individual

The individual is in constant interaction with a changing environment and must respond positively to environmental change, for proper adaptation. However, the person's adaptation level is determined by the combined effect of three classes of stimuli – focal, contextual, and residual. The individual uses both innate and acquired biologic, psychological, or social adaptive mechanisms and has four modes of adaptation.

Environment

This comprises of situation and circumstances surrounding or influencing the development and behaviour of persons and groups. The environment is constantly changing and consists of both internal and external components.

Health

In this model, health is described as a process of being and becoming an integrated and whole person. Conversely, illness is a lack of integration.

Nursing

As an external regulatory force, or the goal of nursing is to promote the person's adaptation in the four adaptive modes, thus contributing to health, the quality of life, and dying with dignity.

Key Concepts

Adaptation – Refers to the individual's ability to cope with the constantly changing environment.

Adaptive system – This consists of two major internal control processes:

(a) Receives Input from the external environment and from changes in the person's internal state.

(b) Input from external and internal stimuli that involves psychological, social, physical, and physiological factors, and processes it through cognitive pathways.

Adaptive Modes

Refers to ways a person adapts. Adaptative Model includes:

Physiological

This is determined by need for physiological integrity derived from the basic physiological needs.

Self-Concept

This is determined by need for interactions with others and psychic integrity regarding perception of self.

Role Function

This is determined by the need for social integrity, it also refers to the performance of duties based on given positions within society.

Interdependence

Refers to ways of seeking help, affection, and attention.

Adaptive Level

Refers to a combination of stimuli. These are focal stimuli (stimuli which immediately confront the individual), contextual stimuli (other stimuli present) and residual stimuli (beliefs, attitudes, or traits that have effect on the present situation).

3.2.7 Leininger's Theory of Transcultural Nursing

Madeleine Leininger's Theory of Transcultural Nursing analyses different cultures and subcultures in the world with respect to their caring behavior, nursing care, health-illness values, and patterns of behavior with the goal of developing a scientific and humanistic body of knowledge needed for culture-specific and culture-universal nursing care practices.

The Individual

Clients from different cultures perceive health, illness, caring, curing, dependence, and independence differently.

Environment

The environment is defined as a social structure, that includes the following elements, the political (including legal) economic, social (including kinship) educational, technical, religious and cultural systems

Health

Leininger asserts that worldviews, social structure, and cultural beliefs influence perceptions of health and illness, therefore health cannot be universally defined.

Nursing

The goal of nursing is directed toward promoting and maintaining health behaviors or recovery from illness in a way that is culturally congruent.

Key Concepts

Among the core concepts of transcultural nursing theory are:

Care

This refers to assistive, supportive, or enabling behaviour on individual with evident or anticipated needs. The main purpose is to ease or improve a human condition.

Culture

This encompases values, beliefs, norms, and lifeway practices of a particular group, that guide thinking, decisions, actions, and patterned ways.

Cultural Care

Entails cognitively known values, beliefs, and patterned expressions that assist, support, or enable another individual or group to maintain well-being, improve a human condition, or to face death.

Cultural Care Diversity

Refers to the variability of meaning, patterns, values, or symbols of care that are culturally derived for health or to improve a human condition.

Cultural Care Universality

These are common, similar, or uniform meanings, patterns, values or symbols of care that are culturally designed for health or to improve a human condition.

3.2.8 Watson's Science of Caring

According to Watson's theory, though caring is central to nursing practice, it is a moral ideal rather than a task-oriented behaviorur. Jean Watson's theoretical formulations focus on the philosophy and science of caring, the core of nursing.

The Individual

Individuals (i.e., both the nurse and client) are nonreducible and are interconnected with others and nature

Environment

The client's environment contains both external and internal variables and it is the responsibility of the nurse to promote a caring environment to allow individuals to make choices relative to the best action for himself at that point in time.

Health

Health is more than the absence of illness.

Nursing

The practice of nursing is different from curing and consists of 10 curative factors as described below. Thus the goal of nursing is to promote and restore health and prevent illness by offering a relationship that the client can use for personal growth and development.

Key concepts

Ten curative factors form the core of nursing and delineate the domain of nursing practice. These are:

1. Formation of a humanistic-altruistic system of values.
2. Instillation of faith-hope to promote wellness.

3. Cultivation of sensitivity to self and to others.
4. Development of a helping-trust relationship.
5. Promotion and acceptance of the expression of positive and negative.
6. Systematic use of the scientific problem-solving method for decision-making.
7. Promotion of interpersonal teaching-learning.
8. Provision for a supportive, protective, or corrective mental, physical, socio-cultural, and spiritual environment.
9. Assistance with the gratification of human needs.
10. Allowance for existential-phenomenological forces.

3.2.9 Rogers' Science of Unitary Human beings

The individual is viewed as an irreducible four-dimensional energy field that is integral with the environment. Rogers views nursing as a science and art that focuses on the nature and direction of human development and human betterment. The role of the nurse is to promote symphonic interactions between humans and their environments

The Individuals

The individual is a unified whole, manifesting characteristics that are more than and different from the sum of his or her parts, and is continuously evolving irreversibly and unidirectional along a space-time continuum.

Environment

The individual and the environment are continually exchanging matter and energy with each other, resulting in changing patterns in both the individual and the environment.

Health

Health and illness are value-laden and culturally defined. They are not dichotomous but are part of the same continuum. Health seems to occur when patterns of living conflict with environmental change. While illness occurs when patterns of living conflict with environmental change and are deemed unacceptable.

Nursing

According to Rogers, nursing is a science and an art. The science of nursing should be concerned with studying the nature and direction of

unitary human development and the relationship. The art of nursing refers to the use of scientific principles in the delivery of nursing care for human betterment. The goal of nursing is the attainment of the best possible state of health for the individual who is continually evolving by promoting symphonic interactions between humans and environments.

Key Concepts

Energy Fields

They are dynamic fields having no real boundaries. Energy fields are of two types, human energy field and environmental energy field.

Openness

As energy fields, the individual and environment are continuously open and extending to infinity.

Pattern and Organisation

Refers to characterised human and environmental fields.

Principles of Nursing Science

Refers to the nature and direction of unitary human development and it is also called Principles of Homeodynamics, which are as follows:

Helicy

It is "the continuous, innovative, probabilistic increasing diversity of human and environmental field patterns characterized by repeating helymicities".

Resonancy

This is the continuous change from lower to higher frequency wave patterns in human and environmental fields.

Integrality

Refers to the continuous mutual human and environmental field process.

3.2.1.0 Neuman's Systems Model

This theory offers a holistic view of the client system. It also includes the concepts of open systems, environment, stressors, prevention, and reconstitution. Nursing is concerned with the whole person. Neuman believes that nursing encompasses a holistic client systems approach to help individuals, families, communities, and society reach and maintain wellness.

The Individual

The client is viewed as an open system in interaction with the environment the client is a dynamic composite of interrelationships between physiological, psychological, sociocultural, developmental, and spiritual variables.

Environment

The environment includes all the factors affecting and affected by the system. This may include interpersonal, intrapersonal, and extrapersonal that might disturb the person's normal line of defence.

Health

In this context, health is equated with optimal system stability.

Nursing

Nursing is concerned with all of the variables affecting the individual's response to stress. The major concern of nursing is in keeping the client system stable through accuracy in both the assessment of effects and possible effects of environmental stressors and in assisting client adjustments required for an optimal wellness level.

Key Concepts

The nurse is concerned with all the variables affecting an individual's response to stressors:

Primary prevention reduces the possibility of encounter with stressors and strengthens the flexible lines of defence.

Secondary prevention protects the basic structure by strengthening the internal lines of resistance.

Tertiary prevention focuses on readaptation and stability. A primary goal is to strengthen resistance to stressors by reeducation to help prevent recurrence of reaction or regression.

4.0 CONCLUSION

Nursing theories and frameworks can be accommodated within the framework of the nursing process, but the focus differs according to the specific theory that is guiding the care. For example, a nurse using Orem's theory would focus on the concept of self-care in all stages of the nursing process, assessing for self-care deficits, and planning interventions to compensate for or alleviate those deficits. Similarly, a nurse using Roy's adaptation model would assess biopsychosocial aspects of the individual and design interventions to modify stimuli to promote adaptation in the four adaptive modes.

5.0 SUMMARY

- **Conceptual Models** are similar to theories. However; they are more abstract than theories.

- **Four Component of Nursing Theories** a) The nature nursing (b) the individual (c) society and environment (d) health.

- A number of conceptual models have been developed in nursing. Example, **Roy's** model describes adaptation as the primary phenomenon of interest to nursing, and it identifies the elements she considers essential to adaptation. **Orem** considers self-care to be the phenomenon central to nursing. Her model explains how nurses facilitate the self-care of clients. **Rogers** sees human beings as the central phenomenon of interest to nursing, and her model is designed to explain the nature of human beings. The essence of Hildegard Peplau Interpersonal Model is the relationship between an individual who is sick or in need of health services and a nurse educated to recognize and to respond to the need for help. Peplau views the individual as an organism living in an unstable equilibrium.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss any five theories of nursing.

7.0 REFERENCES/FURTHER READING

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UNIT 2 THE NURSING PROCESS

CONTENTS

1.0 INTRODUCTION

Overview of the Nursing Process

The nursing process has been described as the core and essence of nursing. It is central to all nursing actions, applicable in any setting and within any conceptual reference. It is flexible and adaptable, yet sufficiently structured to provide a base from which all systematic nursing actions can precede. It is organized, methodical, and deliberate (Yura & Walsh, 1988). As illustrated in Fig. 1, the nursing process is continuous and can accommodate changes in the client's health status and/or failure to achieve expected outcomes through a feedback mechanism. This mechanism allows the nurse to reenter the nursing process at the appropriate stage to collect additional data, restructure nursing diagnoses, design a new plan, or change implementation strategies.

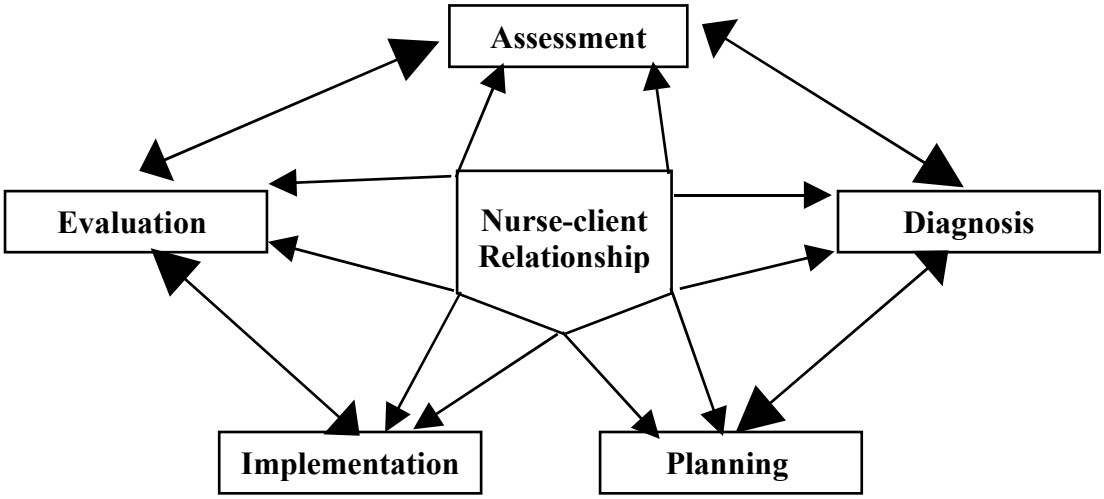


Table1

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- demonstrate that the nursing process, as a systematic approach to nursing, establishes the scientific basis of nursing as a profession
- explain the relationship between the "scientific method," and the nursing process
- describe the four steps of the nursing process assessment, planning, implementation, and evaluation
- identify the three major skills and their related sub skills in the execution of the nursing process: intellectual, technical, and interpersonal.

3.0 MAIN CONTENT

3.1 The Scientific Method and the Nursing Process

In using the nursing process, the nurse deliberately analyses the client's health problems and decides how she will act to meet these problems. This progression is identical to the scientific method developed by scientists such as Sir Francis Bacon and Sir Isaac Newton. The scientific method can be stated as follows:

1. Recognise and define the problem.
2. Collect data.
3. Formulate and implement a solution.
4. Evaluate the solution.

The scientific method and the nursing process are almost identical in form, but they are different in purpose. While the scientist is looking for new knowledge, the nurse is usually looking for answer to an immediate problem in a particular setting. Also, while scientists deal with facts, a nurse deals primarily with people. It is not necessary for every nursing action to be backed up by carefully reasoned scientific principles. The scientific method is also adapted to the nursing process in other ways. Recognition and definition of the problem are dependent on assessment. The scientist assesses data collected from observation and experiments while the client's physical status (appearance and function) and his psychosocial and mental status are included in nursing assessment. Therefore, data collection is an essential step in any scientific inquiry as well as nursing.

3.1.1 Uses of the Nursing Process

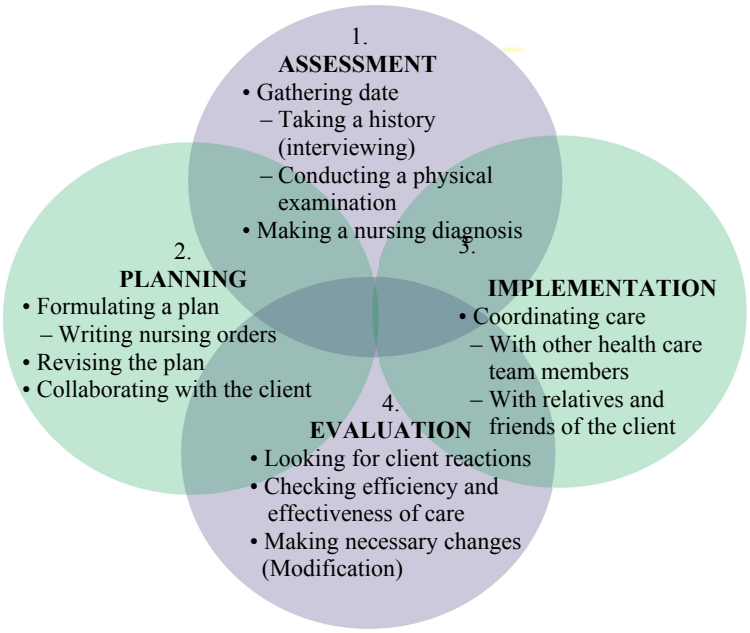
1. The intelligent use of the nursing process helps one to avoid the extremes. A nurse, who is only a technician, who works in an automated "cookbook" fashion, does not benefit clients. In other words, a nurse who thinks only in terms of a specific duty and carries it out, oblivious of the total picture, does not benefit them.

2. When nursing care is given in a disorganized or instinctive fashion (even though sincere and compassionate), the client is likely to become puzzled and uncooperative. The nurse in turn may become frustrated or resentful because the client seems ungrateful.

3. The framework of a nursing plan is based on information about why a person needs care and judgments made about what kind of care he needs.

3.2 Concept of Nursing Process

The nursing process generally is described as a four or five steps process. Some experts describe the four steps as: (1) Assessment, (2) Plan, (3) Implementation, and (4) Evaluation (Reilly & Hermann, 1985; Yura & Walsh, 1988). Others identify five steps: (1) Assessment, (2) diagnosis, (3) Plan, (4) Implementation, and (5) Evaluation (Oermann, 1995). In conceptualizing nursing process as a four-step process, diagnosis is considered to be the final component of assessment. As five or more steps, nursing diagnosis becomes a separate phase of the process, distinct from the other steps. Regardless of whether nursing diagnosis is viewed as a separate step, it is an essential phase of the nursing process from which the plan and interventions are generated. The five phases of the nursing process are described in Table 2



The nursing process is primarily a cognitive or intellectual process that requires skill in clinical judgment and the use of psychomotor skills in the collection of data through physical assessment and in terms of interventions to be carried out.

In addition to the necessary cognitive skills, three types of nursing knowledge guide the use of the nursing process. These are (1) scientific knowledge, which includes nursing models and theories, concepts and theories from other disciplines that are applied to nursing, and research findings; (2) ethics of practice nursing; and (3) knowledge based on intuition, tradition, and experience (Benner, 1984). Such knowledge provides guidelines for the nurse to determine what data to collect, ascribe meaning to the data, make a judgment regarding the nursing diagnosis, and formulate a plan. Theory and research also direct the nurse in selecting nursing measures and evaluating care. The nurse's experience influence decision in the practice setting. Competency in nursing practice improves as the nurse acquires experience with similar clinical situations. This experience enables the nurse to approach a client with an expectation of the typical problems and nursing approaches for this particular patient, thereby providing a framework for decision-making.

3.1 Components of the Nursing Process

3.3.1 Assessment

Assessment is the first step of the nursing process, other steps rest on it. Assessment is an interactive process in that the nurse, through interaction with the client, family, and other, collects essential data to identify health problems. The two steps in the assessment phase are (1) problem recognition and (2) collection of data.

3.3.1.1 Problem Recognition

The first step within assessment begins with problem recognition, in which the nurse identifies a possible health problem, that data gathering. Initial problem recognition assists the nurse in collecting the most relevant guides data needed for diagnosis and planning care. This process saves time and makes data gathered more manageable. It may be the nurse who initially recognizes actual and potential problems, or the client, the family, or other health care professionals may communicate those problems to the practitioner.

3.3.1.2 Collection of Data

The second step within assessment involves the actual collection of data. Yura and Walsh (1988) identify the nursing history and physical assessment as two major sources of data for determining the client's actual and potential health problems. Other sources are records and reports. Both subjective (described by the patient, family, and other) and objective (observable) data are gathered in the assessment process. The data to be collected and the organization of the data vary with the conceptual model of nursing used.

3.3.2 Diagnosis

The second step of the nursing process begins with an analysis of data obtained in assessment and results in the statement of nursing diagnoses about the client. The diagnoses provide the basis for planning care and selecting interventions. Independent nursing actions involving the client arise from these diagnoses. When the nurse has collected information from the client that suggests an actual or potential health problem, the process of clinical judgment is initiated. Clinical judgment is the cognitive or thinking process used by the nurse for analyzing data, deriving a nursing diagnosis from the information, and deciding on appropriate interventions. Gordon (1987b) describes four components of the diagnostic process: (1) collecting information (i.e., assessment); (2) interpreting the information; (3) clustering the information; and (4)

naming the cluster (p. 19). The actual nursing diagnosis, the statement of the client's health problem, is the end product of this thinking. Data analysis is more than interpreting individual pieces of data; the nurse must see relationships among the data to identify the health problems.

In interpreting the information, the nurse assigns meaning to the data; the nurse interprets cues to the client's health status. Cues include data about the status, responses, and environment of the client. These data suggest a possible nursing diagnosis. Once cues are recognised, the nurse makes an inference or judgment about the meaning of the data. For example, a cue might be 5'3'', weight of 200 pounds, which will lead the nurse to infer obesity. An inference of anxiety or fear might be drawn from the following cues: increased pulse and respiratory rate, elevated blood pressure, voice tremors rapid speech, and dry mouth. The nurse clusters data cues with common properties into groups and then decides how the data 'fit' a nursing diagnosis then the nurse applies the diagnostic label to the cluster of cues and makes the nursing diagnosis.

Nursing diagnoses are actual or potential health problems of an individual, family, or group for which nursing can intervene. An actual problem is an existing health deficit. Whereas potential problems are factor predisposing individuals, families, and even communities to health problems. In addition to nursing diagnoses, in many health care settings nurses also identify collaborative problems, which are actual or potential problems resulting from complications of diseases, treatments, or diagnostic studies in which nursing intervenes in collaboration with physicians and other health professionals. Collaborative problems cannot be resolved by nursing care alone. Whereas nursing diagnoses represent health problems requiring independent nursing interventions, collaborative problems necessitates interventions by nurses and other health professionals.

PES Format, Gordon (1987b) identifies three essential components of a nursing diagnoses and refers to these components as the PES format

P: health problem of the individual, family or community.

E: etiologic or related factors.

S: defining signs and symptoms

PES format provides a structure for writing nursing diagnoses for clients, other uses include means of communicating to other practitioners the type of health problem, the contributing factors, and a cluster signs and symptom often found with that particular problem. The problem (P) represents a description of the health status of the client:

individual, family, or community. The health problem may be an actual health deficit or a potential problem based on the presence of risk factors identified by the nurse. The health problem should be stated clearly and concisely, **preferably in two or three words**. For example, activity intolerance, ineffective breathing pattern, and pain are concise descriptions of the health problem. The North American Nursing Diagnosis Association (NANDA), the national group responsible for generating nursing diagnoses, provides a list of diagnoses for the nurse (Table2). Each of the diagnoses on the list represents a health problem of the client that is incorporated into a nursing diagnosis.

The etiology (E) or related factors are the probable factors that are causing or contributing to the client's health problems. They may be situational, pathophysiologic, treatment-related, or maturational in nature. The etiologic and contributing factors are connected to the diagnostic label with a "**related to**." For example, in

P = shock
E = related to heamorrage

The phrase "related to" implies a relationship between these two parts of the diagnostic statement. When the etiologic factors are unknown, this wording may be included in the nursing diagnosis; for example, "altered family processes related to unknown etiology." The defining characteristics are a cluster of signs and symptoms (S) that are generally observed with a particular nursing diagnosis. They represent the data used for making a diagnosis. Not all the defining characteristics need to be present to decide on a diagnosis. The nurse judges whether or not the signs and symptoms present in the patient represent a particular health problem. These characteristics, then, permit the nurse to discriminate among diagnoses and determine a diagnostic label that represents the cluster of signs and symptoms. In the previous example, the defining characteristics include, for instance, sweating, cold clammy skins and decreased pulse and respiration rate, and a fall in blood pressure.

The nursing diagnosis statement includes at least two parts: (1) the client's health problem (P) and (2) etiologic (E) or related factors. The problem describes the client's health state amenable to nursing intervention. When specific characteristics are present, the nurse is able to select a diagnostic category from an accepted list, such as NANDA, or write his or her own diagnosis if a diagnostic that actually describes the health problem is not on the list. The "related to" phrase links the diagnostic label with the etiologic or contributing factors. Thus, the diagnostic statement in the previous example, would be

P + E

or shock related to heamorrage. The defining characteristics were present for the nurse to make this diagnosis.

Alfaro (1986) suggests that the defining characteristics (signs and symptoms) be included with the diagnostic statement, thus resulting in a three-part statement:

P = shock

E = related to heamorrage

S = as manifested (or evidenced) by sweeting, cold clammy skins and decreased pulse and respiration rate, fall in blood pressure.

A three-part diagnostic statement is possible only with an actual nursing diagnosis, because the signs and symptoms are present. When potential nursing diagnoses are written, signs and symptoms are not present; thus, only a two-part statement is possible.

3.3.2.1 Nursing Diagnosis Taxonomy

A taxonomy is a classification system, a system of labelled groups or classes organized according to some criterion. In nursing, efforts are now directed toward developing a system for classifying nursing diagnoses. The NANDA Taxonomy I Revised is the first official taxonomy of nursing diagnoses. This list is being refined, revised and expanded. The revised taxonomy includes nine major categories that present central human response patterns:

1. Exchange: mutual giving and receiving
2. Communicating: sending messages
3. Relating: establishing bounds
4. Valuing: assigning relative worth
5. Choosing: selection of alternatives
6. Moving: activity
7. Perceiving: reception of information
8. Knowing: meaning associated with information
9. Feeling: subjective awareness of information

Table 3 depicts Taxonomy I Revised and related diagnoses (NANDA, 1988).

NANDA APPROVED NURSING DIAGNOSIS

The nine human response patterns is the currently accepted classification system for Nursing Diagnosis. They include:

Pattern I: Exchange

A human response pattern involving mutual giving and receiving.

1.1.2.1. Altered Nutrition: More than body requirements
1.1.2.2. Altered Nutrition: Less than body requirements
1.1.2.3. Altered Nutrition: Potential for more than body requirements.
1.2.1.1. Potential for Infection
1.2.2.1 Potential Altered Body Temperature
1.2.2.2 Hypothermia
1.2.2.3 Hyperthermia
1.2.2.4 Ineffective Thermoregulation
1.2.3.1. Dysreflexia
1.3.1.1. Constipation
1.3.1.1.1. Perceived Constipation
1.3.1.1.2. Colonic Constipation
1.3.1.2. Diarrhoea
1.3.1.3. Bowel Incontinence
1.3.2. Altered Urinary Elimination
1.3.2.1.1. Stress Incontinence
1.3.2.1.2. Reflex Incontinence
1.3.2.1.3. Urge Incontinence
1.3.2.1.4. Functional Incontinence
1.3.2.1.5. Total Incontinence
1.3.2.2. Urinary Retention
1.4.1.1. Altered Tissue Perfusion (Specify Type) (Renal, Cerebral, Cardiopulmonary, Gastrointestinal, Peripheral)
1.4.1.2.1. Fluid Volume Excess
1.4.1.2.2.1. Fluid Volume Deficit
1.4.1.2.2.2. Potential Fluid Volume Deficit
1.4.2.1. Decreased Cardiac Output
1.5.1.1. Impaired Gas Exchange
1.5.1.2. Ineffective Airway Clearance
1.5.1.3. Ineffective Breathing Pattern
1.6.1. Potential for Injury
1.6.1.1. Potential for Suffocation
1.6.1.2. Potential for Poisoning
1.6.1.3. Potential for Trauma
1.6.1.4. Potential for Aspiration
1.6.1.5. Potential for Disuse Syndrome
1.6.2. Altered Protection
1.6.2.1. Impaired Tissue Integrity
1.6.2.1.1. Altered Oral Mucous Membrane
1.6.2.1.2.1 Impaired Skin Integrity
1.6.2.1.2.2 Potential Impaired Skin Integrity

Pattern 2: Communicating

A human response pattern involving sending messages

2.1.1.1. Impaired Verbal Communication

Pattern 3: Relating

A human response pattern involving establishing bonds.

3.1.1. Impaired Social Interaction
3.1.2. Social Isolation
3.2.1. Altered Role Performance
3.2.1.1.1. Altered Parenting
3.2.1.1.2. Potential Altered Parenting
3.2.1.2.1. Sexual Dysfunction
3.2.2. Altered Family Processes
3.2.3.1. Parental Role Conflict
3.3. Altered Sexuality Patterns.

Pattern 4: Valuing

A human response pattern involving the assigning of relative worth.

4.1.1 Spiritual Distress (distress of the human spirit)

Pattern 5: Choosing

A human response pattern involving the selection of alternatives

5.1.1.1 Ineffective Individual Coping
Impaired Adjustment
Defensive Coping
Ineffective Denial
Ineffective Family Coping: Disabling
Ineffective Family Coping: Compromised
Family Coping: Potential for Growth
Non Compliance (Specify)
5.3.1.1. Decisional Conflict (Specify)
5.4.1.1 Health Seeking Behaviours (Specify)

Pattern 6: Moving

A human response pattern involving activity

Impaired Physical Mobility

Activity Intolerance
Fatigue
Potential Activity Intolerance
Sleep Pattern Disturbance
Diversional Activity Deficit

6.4.1.1. Impaired Home Maintenance Management
6.4.2. Altered Health Maintenance
6.5.1.9. Feeding Self Care Deficit
6.5.1.1. Impaired Swallowing
6.5.1.2. Ineffective Breast-feeding
6.5.1.3. Effective Breast-feeding
6.5.2. Bathing / Hygiene Self Care Deficit
6.5.3. Dressing / Grooming Self Care Deficit
6.5.4. Toileting Self Care Deficit
6.6. Altered Growth and Development

Pattern 7: Perceiving

A human response pattern involving the reception information

Body Image Disturbance
Self Esteem Disturbance
Chronic Low Self Esteem
Situational Low Self Esteem
Personal Identify Disturbance
Sensory/Perceptual Alterations (Specify) (Visual, Auditory, Kinesthetic, Gustatory, Tactile, Olfactory)
Unilateral Neglect

Hopelessness
Powerlessness

Pattern 8: Knowing

A human response pattern involving the meaning associated with information

8.1.1. Knowledge Deficit (Specify)
8.2. Altered Thought Processes

Pattern 9: Feeling

A human response pattern involving the subjecting awareness of information

Pain
Chronic Pain

9.2.1.1. Dysfunctional Grieving
9.2.1.2. Anticipatory Grieving
9.2.1.3. Potential for Violence: Self-directed or directed at others
9.2.1.4. Post-Trauma Response
9.2.1.5. Rape-Trauma Syndrome
9.2.1.5.1. Rape-Trauma Syndrome: Compound Reaction
9.2.1.5.2. Rape-Trauma Syndrome: Silent Reaction
9.3.1.1. Anxiety
9.3.1.2. Fear.

3.3.3 Planning

The basis for the next phase of the nursing process is nursing diagnosis. Planning care to address the client's health problems. Planning includes setting priorities, establishing goals, and selecting interventions.

3.3.3.1 Setting Priorities

In most cases, multiple nursing diagnoses are identified for a client, and priorities need to be set because not all diagnoses and goals can be or should be addressed at the same time. The first step in prioritizing problems is to identify the most important ones for the client. Some problems are life-threatening and may have deleterious effects on the client; these must be taken care of immediately. Other factors that may influence the priorities set by the nurse are, the nature of the health problems, their immediate and potential effects on the client, and the client's overall health status. Treatments received may have high priority if they adversely affect the patient. In setting priorities, the client should be closely involved. These processes will result in a preferential order of goals that provides direction in planning care.

3.3.3.2 Establishing Goals of Care

Developing goals is an important step in the planning process because it identifies the desired outcomes of care. Yura and Walsh (1988) define goals as the expected behavioural outcomes specified in relation to each nursing diagnosis (p. 139). Goals represent the desired level of wellness for the client. Goals set by nursing must be congruent with goals of other health professionals to ensure a coordinated approach to care. The two types of goals are (1) short-term goals, which are achieved quickly or as interim steps to meeting a goal that requires more time; and (2) long-term goals, which are met over a longer period. In some instances, long-term goals describe an overall goal of the plan of care, often referred to as discharge goal for the client.

Below are some characteristics of goal:

(1) Goals are stated in terms of client outcomes or what the client will be able to accomplish rather than what the nurse plans to do.

(2) Goals should be specific to the client.

(3) Should be both realistic and attainable.

(4) Goals are derived from the problem statement (P). For example, with the nursing diagnosis of ineffective airway clearance related to postoperative immobility, a goal might be stated as follows: "The client will maintain a clear airway."

(5) Goals represent the expected behaviors of the client and are derived from the nursing diagnoses.

(6) Goals need to be stated in measurable terms because they provide criteria for determining the effectiveness of nursing interventions. Measurable verbs describe the exact behaviour of the patient, family, or group. These behaviours may be cognitive (knowledge); psychomotor (skill); or affective (value). Below is a list of verbs in each of these three domains, all of which are measurable and, therefore, appropriate for use in stating client goals

Verbs Appropriate for Writing Objectives in the Cognitive, Affective, and Psychomotor Domains	
1. Cognitive Define Identify Name Recognize Give examples of State in own Words Choose Demonstrate use Of Describe Explain Differentiate Discriminate Interpret	2. Affective Acknowledge Show awareness of Discuss willingly Express satisfaction In Seek opportunities Accept Agree Cooperate with Participate in Respect Support Assume Responsibility Declare

Select Conclude Predict Apply Use Relate Compare Contract Detect Distinguish Evaluate Classify Design Develop Modify Organize Synthesize Assess Judge	Defend Act consistently Is accountable 3. Psychomotor Follow example of Imitate Follow procedure Practice Demonstrate skill Perform Carry out

3.3.3.3 Selecting Intervention Strategies

The planning process involves the selection of nursing interventions, nursing activities, and action directed toward the achievement of the goals. Nursing interventions are the treatments for specific nursing diagnoses. Interventions are directed toward the etiology component of the nursing diagnostic statement and are planned to eliminate or at least reduce the effects of these contributing factors. For example, with the nursing diagnosis of ineffective airway clearance related to postoperative immobility, interventions would be planned to reduce the effect of the immobility following surgery. With potential nursing diagnoses, interventions frequently focus on assessing client status to monitor the problem and avoid its becoming a reality.

Nursing practice requires multiple intervention strategies to meet client needs. Some patient problems are accompanied by prescribed nursing measures, actions typically performed for clients with a particular problem, such as interventions to reduce the effect of being immobilized, including positioning, turning, coughing, and deep breathing. In other situations, however, the nurse needs to decide creatively on the best interventions for a particular patient and plan care because prescribed activities have not yet been established. In these situations, the nurse considers alternatives and consequences of different approaches to care if selected and determines the best action to take in terms of its benefits. Such decision-making is important in choosing

interventions that meet the client's needs and have an underlying scientific basis for their use.

The final step in the planning process is to document or write the plan of care. Documentation is essential for continuity of care and evaluation. The nursing care plan includes important data about the client; the data are organized so that they communicate clearly the nursing diagnoses, goals, and intervention strategies.

3.3.4 Implementation

Implementation is the action phase of the nursing process in which the nurse carries out the plan of care. Critical thinking, problem solving, and the decision-making skills are essential for implementing the nursing plan as well as ability to perform psychomotor skills. Also important are the attitudes and values of the nurse because they influence the way in which the nurse interacts with the patient and family and carries out care. Respect for the dignity and worth of others is of particular importance in the implementation of care.

During implementation, the nurse continually assesses client responses and movement toward goals and obtains data for use in evaluating the effectiveness of nursing interventions and the need for alternative actions. Implementation also includes keeping a chart on or documenting nursing care. "Charting" provides a means of communicating data about the patient and status and assists others in assessment of client responses.

3.3.5 Evaluation

Evaluation, the final phase of the nursing process, it measures the effectiveness of nursing care in promoting achievement of client goals. The two types of evaluation are (1) Formative and (2) Summative. Formative evaluation occurs throughout the nursing process, particularly in the implementation phase as the nurse is providing care. It is ongoing in nature and provides feedback to the nurse on the client's health status and progress toward meeting goals. Summative evaluation occurs after care has been provided, enabling the nurse to judge whether or not the goals have been achieved. Donabedian (1969) identifies three components in the evaluation of the quality of health care: (1) Outcomes of care, (2) Process of care, and (3) Structure in which the care is provided. This framework for evaluation has been adopted widely for evaluating the quality of nursing care.

Outcome evaluation focuses on changes in the client as a result of nursing interventions. In this context, the nurse determines the degree to

which client goals were achieved. The goals thus become the criteria for evaluation. Process evaluation is another type of evaluation of the nursing process, but the focus is on the nurse rather than the client. Evaluation addresses the process of care for the client from assessment through implementation in terms of quality of nursing actions. The ANA (1973) standards of nursing practice provide a framework for process evaluation because they specify characteristics of quality for each step of the nursing process. The nursing audit is a means of evaluating the process of care. Structure evaluation focuses on the health care setting in which care is provided. This type of evaluation provides data on environmental variables, such as the agency's policies and procedures, quantity and characteristics of nursing and other staff, availability of resources needed for care, and financial resources of the institution and their effect on the delivery of care.

4.0 CONCLUSION

The nursing process is central to all nursing actions and, applicable in any setting. It is continuous and can accommodate changes in the client's health status and/or failure to achieve expected outcomes through a feedback mechanism. This mechanism allows the nurse to re-enter the nursing process at the appropriate stage to collect additional data, restructure nursing diagnoses, design a new plan, or change implementation strategies.

5.0SUMMARY

- The nursing process as a systematic approach to nursing, establishes the scientific basis of nursing as a profession.

- The four steps of the nursing process are assessment, planning, implementation, and evaluation.

- The scientific method and the nursing process are almost identical in form, but they are different in purpose. While the scientist is looking for new knowledge, the nurse is usually looking for answer to an immediate problem in a particular setting.
- Critical thinking, problem solving, and the decision-making skills are essential for implementing the nursing plan as well as ability to perform psychomotor skills.

6.0 TUTOR-MARKED ASSIGNMENT

What do you understand by the nursing process? What are its importance?

7.0 REFERENCES/FURTHER READING

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UNIT 3 APPLICATION OF THE NURSING PROCESS

CONTENTS

1.0 INTRODUCTION

This unit is the continuation of the previous one. You will learn how to write hypothetical nursing care plan using the information learnt from the previous unit.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- learn how to write a nursing care plan
- explain how to evaluate nursing care
- understand the skill necessary for the use of the nursing process
- explain the concept of nurse-patient relationship.

3.0MAIN CONTENT

Nursing Care Plan

This is the plan of care that a nurse draws out for the individual patient, after carefully assessing the patient's need and arranging them in order of priority.

What is a Plan?

The nursing plan begins with the nursing diagnostic statement and progresses to the goal and objectives. Once these are identified, unique nursing actions–nursing orders–are selected to help the client achieve the goals and objectives. This is the core of nursing management, the independent prescriptive role of writing nursing orders. The term "nursing order" is used synonymously with nursing plan in this text.

Nursing orders are different from "standard care" orders, such as routine procedures or common orders for all clients. Nursing orders are individually tailored to meet the specific needs of the client; the standard care plans are useful as a point of reference. Nursing care plans are not delegated medical orders or functions. Although nurses are still involved in implementing these functions and orders, the nursing order is separate and is explicitly a nursing action. The nursing order complements the medical order with related activities such as teaching, discussion, demonstration, or methods of illness prevention and health maintenance or promotion.

3.1 Why and Who Develops a Nursing Care Plan?

A well-written plan gives direction, guidance, and meaning to nursing care. It is a central source of information to all who are involved in the care of a given client. It is the primary means of communicating, synchronising, and organising the actions of all nursing staff. The nursing care plan provides for continuity of care through primary nurses, constantly changing nursing staff, shift reports, and nursing rounds.

Current updating of nursing actions with new assessment data assures continuous quality of care. Adequate communication of this information, in both written and verbal forms, is a mark of the professional nurse.

The nurse and client work together to form the plan of care. The client, the family, and significant others bring their uniqueness to the situation. The nurse brings knowledge and expertise of nursing care to the client. Together, sharing this information, the client and nurse optimize the writing of the plan.

The principal facilitators in developing the plan are the primary nurse, the client; the client's family, other nurses involved in direct care, and selected resource people. Complex client concerns require additional assistance. Resource people include the clinical nurse specialist, dietician, physical therapist, occupational therapist, social worker, chaplain, and physician.

3.1 Components of a Nursing Care Plan

The care plan is divided into five parts listed below:

1. Nursing Diagnosis

This is a brief statement of the patient's response to his actual or potential unhealthful situation that nursing can help change. The statement should be a standardised nursing diagnostic category. An actual diagnosis is written in 3 parts: (1) Category (2) Related to contributing factors (3) As manifested by signs and symptoms. While a potential diagnoses can be continually identified depending on the patient's condition, these should be prioritized.

2. Objectives

Objective is a statement of what the nursing action to achieve for the patient. It is patient oriented, measurable, attainable, brief and timebound.

3. Nursing Actions

This is the actual nursing care that a nurse carries out to meet the objectives of a particular need. It is written as briefly as possible. It should be written in order from. It is a continuous process based on evaluation and reassessment of patient's condition. The action can include independent, dependent, and interdependent roles of the nurse.

4. Rationale/Scientific Principles

This is the statement of the reasons or scientific basis for the nursing care that the nurse carries out. It should relate to the objective as well as the actions.

5. Evaluation

This is the final assessment of the objectives the nurse set out to achieve, stating either negative or positive outcomes. If negative, reassess the problem to cause outcome, you can write as the anticipated outcome.

3.2 Guidelines for Writing Plans for Implementation

The following guidelines are suggested for writing plans for implementation.

1. The plan is dated and contains the signature of the responsible nurse. The date is important, since the nursing orders are reviewed and updated periodically. The date the plan is written is used as a point of reference for evaluation and future planning.

2. Implementation strategies and nursing orders are appropriate to their respective objectives. A nursing strategy is defined as an overall plan or tactic that serves as a guide for individual nursing orders. Clearly defined objectives provide a sound basis for selecting nursing strategies.

3. Plans are written in terms of client and nursing behaviours sufficient to achieve goals and objectives. Nursing plans define the types of nurse and client actions. In some plans, such as crutch-walking, the client takes over the action completely; in other plans, the nurse assumes the dominant role.

4. The nursing plans are stated in specific terms, giving direction to the behaviour of the nurse and client. The nursing orders need to be specific. What does the client need to do to achieve the objectives and goal?

5. The plan includes preventive, promotional, and rehabilitative aspects of care. All three aspects of care–prevention, promotion, and rehabilitation–are included in the plans for each client. The client's general state of health, identified health concerns and strengths, and the situation, dictate which aspect is the focus.

6. The nursing plan includes collaborating and coordinating activities. Collaboration and coordination are essential components of nursing leadership that are intrinsic to the nursing

care plan. With whom do you need to collaborate to assist the client in achieving the objective: the physical therapist, nutritionist, community health nurse, or agency that can supply information, materials, finances, consultation, equipment, or appliances to the client?

7. The plans are placed in an appropriate sequential order based on priority. The nurse needs to establish the sequence of events in order to achieve the objective. What is the most important action to take first? When the objectives have been arranged in order of priority, the nursing orders should follow accordingly.

8. The plan incorporates the autonomy and individuality of the client. The plan is individually tailored to the unique characteristics of the client. Autonomy and individuality can be encouraged by giving the client the choice in setting the times for care as well as in selecting the methods to be used.

9. Plans are kept current and revised and include alternate plans when indicated. For a plan to remain current, it must be flexible. The nurse must modify goals and approaches as situations change.

10. Plans for the client's future are included. The two major concepts in the area of future planning are the termination of the nurse-client relationship and discharge. The nurse-client relationship terminates when the client no longer needs professional nursing care.

3.3 Assessment Tools for Planning Care

Assessment is essential before making a plan and is made through:

1. Observation

By observing the patient and his immediate environment, some of his needs can be identified: e.g., dyspnoea, dehydration.

2. Interview

By discussing with the patient or his relatives, other needs can be identified: insomnia, pain, cough, fear, knowledge deficit.

3. Records

The patient's records provide useful data as to what care has been given and the effect of such care, as well as recorded observations on progress or condition of patient as noted by other health care personnel. It also gives the nurse information about the dependent functions of care, e.g., pyrexia, bleeding, condition of drainage and wounds, vomiting, diarrhoea, level of consciousness, orders such as bed rest.

3.4 Tools for Data Collection

Data collection occurs through the use of three tools: interaction, observation, and measurement. Interaction data are considered as any spoken word from the client, health care personnel, or significant others. Observations made through the senses, including written documents, are observation data. Measurement data are those obtained through the use of instruments that quantify information. Definitions and examples of these tools are given in the following discussion.

All these tools have strengths and limitations. They should not be used in isolation, since accurate assessments cannot be made through the use of one tool alone. In some situations the use of two tools will dominate, depending on the age and health status of the client and the given situation. Generally, the nurse should always use at least two of the three tools for data collection.

3.4.1 Interaction

Interaction is defined as a continuous exchange between the nurse and the client. The purpose is to obtain information or develop rapport, or both. Nursing, today is often based on a series of transient interactions with clients rather than sustained relationships.

Interviews, or transitory relationships between two persons for the purpose of gaining information or developing rapport, can be classified as directive-interrogative, rapport-building, or open-ended. Directive-interrogative interviewing involves asking for specific information; the purpose is primarily to get data. The nurse maintains control of the direction of the interview, and the client becomes a passive participant. This type of interview is advantageous when a specific amount of data is needed in a short period of time, but disadvantageous in that the client is passive and may not be able to discuss concerns.

History taking is an example of a directive-interrogative interview. Rapport-building interviews focus on building a relationship, not on getting information. Open, empathic responses are used by the interviewer to facilitate the client's control of the interview. Data

emerge and a relationship develops, but rapport building takes time and specific data may not be obtained. The open-ended interview is a combination of the first two types; the goals are to get information from the client and to build rapport. The client's concerns emerge through the use of a variety of communication techniques.
The interviewer starts with the least amount of authority (open-ended statements and questions) to allow client directiveness and proceeds to increasing authority (more specific focus). All three types of interviews have a place in nurse-client interactions. In general, the nurse should use the least amount of authority necessary to obtain the information needed within the time allotted.

The outcome of interactions is data that reflect what the client said and what the nurse observed. Observations include the client's nonverbal behavior, appearance, and function, and the environment. Statements by the client should be noted as direct quotations. Paraphrasing what someone says tends to increase the probability of interpreting or placing one's own meaning to the data. Table 3-3 provides examples of objective statements of interaction data versus their personal interpretations.

3.4.2 Observation

Observation is a process of noting pieces of information or cues through the use of the senses (sight, touch, hearing, smell, and taste). These senses are used in a variety of ways to observe the client's (1) general characteristics of appearance and physical function, (2) content and process of interactions and relationships, and (3) environment. Each sense is discussed in relation to these three categories.

The sense of sight is used to identify visual cues that clients and data sources project. Examples of data collected through the use of sight are as follows:

1. General characteristics of appearance and physical function: colour, shape, amount, approximate size, gait, balance, and dress; data from written records about general characteristics (such as nurses' notes).

2. Content and process of interactions: nonverbal communication such as body movements, gestures, eye contact, personal space, use of touch.

3. Environment: neighborhood characteristics such as number of houses and cleanliness; characteristics of client's home such as

rooms available, cleanliness, and furniture; data from written sources about client's environment.

The sense of touch is used to determine qualities of an object or person. Through simple touch or the use of palpation* and percussion* the following data can be obtained.

1. General characteristics: texture, moisture, temperature, density, and muscle and skin tone.

2. Content and process of interactions: not applicable.

3. Environment: temperature of air, moisture (humidity), and furniture.

Hearing is primarily used to actively listen to clients' verbal messages or to note interaction data. Other important uses of hearing are:

1. General characteristics: auscultation* of lung, heart, and bowel sounds, and percussion (along with touch) of tissue.

2. Content and process of interactions: amount of interacting with others, tone of voice(s), interruptions in conversations, and specific content of what is said.

3. Environment: house/neighborhood noise levels; usual sounds in home or community.

The senses of smell and taste are used less frequently. The odours of client, home, and environment are detected through smell. The taste of local foods and, in some environments, chemical in the air can be detected through taste.

Maintaining objectivity in observing clients is an important element of data collection. Examples of observation data that are objective versus notations of personal interpretations are given in Table 3-4. Recording specifically what one sees, feels, smells, or tastes is more accurate than recording one's interpretation of it.

3.4.3 Measurement

Measurement is actually a form of observation. The tool is separated to indicate that certain data are conductive to more precise observation. Measurement is used to ascertain extent, dimensions, rate, rhythm, quantity, or size, frequently through the use of additional instruments along with the senses. Some forms of measurement data include laboratory values, vital signs, height, and weight for the individual

client; number of family members, ages, and number of rooms in dwelling for the family client; and population, number of blocks in district, and epidemiological data for the community client. General observation data that can be quantified are also considered measurement data (for example, observation datum: smoked cigarettes during interview; measurement datum: smoked five cigarettes during 30-minute interview). Table 3-5 gives examples of objective, nonjudgmental measurement data in contrast with personal interpretations from measurement data.

3.5 Documenting Interactions, Observations, and Measurements

The recording of interaction, observation, and measurement data is facilitated by the use of a columnar approach. This format allows the nurse to note the sequence and tools needed to collect data. Depending on the client situation, two of the three tools are used more prominently. The size of the data collection columns can vary accordingly. For example, an infant client will provide minimum, if any, verbal data. Some interaction data may be obtained from the parent or staff, so the interaction column would be the smallest.

3.6 Implementation of the Nursing Plan

Implementation is the execution of the nursing plan. The nurse considers three major phases when implementing the nursing order: preparation, implementation itself, and post-implementation.

Preparation consists of the nurse's being aware of the nursing orders; having the knowledge to implement them; being cognisant of the legal and ethical aspects; and knowing the possible side effects and complications, as well as what technical skills and resources are needed. Preparation also includes arranging a suitable environment in which the client and nurse may implement the plan. A quiet environment free of distractions enhances learning.

3.7 Scientific Rationale

Knowledge is the basis for prescribing and implementing nursing orders. A scientific rationale describes and explains the basis for nursing orders. For example, consider the scientific rationale relevant to the following questions: Why do we restrict fluids at certain times for clients who have problems of the circulatory or excretory system? Why should the

nurse assess learning needs before teaching? Why must clients learn to take their pulses before leaving the hospital for home if they will be taking digoxin at home? Why do we encourage clients to cough to loosen bronchial secretions if we know that deep breathing will produce coughing? Why do we avoid arguing with a delusional client?

The rationale in each case is based on theories, models, frameworks, and scientific principles from nursing, the natural and behavioural sciences, and the humanities. The principle, concept, or theory that supports each step of the plan is stated.

The rationale for the steps of the plan is usually not written into the nursing orders, but it must be known by the nurse. In some instances, the rationale is written into the plan to ensure effective communication. For example, if a client is asked to change a complicated dressing alone, it may be necessary to include a written rationale. Otherwise, another care provider may do it for the client, not realizing that the client needs to learn how to change the dressing alone.

The following guidelines are suggested for writing a scientific rationale:

1. The scientific rationale addresses the identified topic and strategy and the individuality of the client and family.

2. The scientific rationale cites appropriate research findings and current literature. Other sources to be used include interviews with experts, textbooks, journal articles, and reference books. Any reliable writings or persons may be considered appropriate. The resource is cited for each supporting scientific rationale.

3.8 Evaluating Care Plan

Evaluation examines such questions as: Was the health care effective? Were the goals and objectives met to the degree specified? Were the changes in the client's behavior in the direction expected? If so, which nursing strategies were effective? If not, what was lacking in the nursing care? By measuring the client's progress toward meeting the objectives, the nurse judges the effectiveness of nursing actions; thus nurses are able to judge the quality of their car and determine ways to improve it. This demonstrates accountability for their actions. Accountability implies responsibility for one's behaviour; it requires the ability to define, explain, and measure the results of nursing actions. Evaluation identifies those effective nursing strategies and may promote nursing research.

3.8.1 Forms of Evaluation

Evaluation may be conceptualized in three forms: structure, process, and outcome. Process and outcome evaluation can both be subdivided into two categories, concurrent (present) and retrospective (past), as shown in Table 11-1. Each form will be discussed separately.

Structure The focus of structure evaluation is on the physical facilities, equipment, and organizational pattern of the agency. Examples of structure evaluation are the nursing audit.

Process evaluation focuses on the activities of the nurse. The nurse's activities are judged by observing her performance, asking clients what the nurse did, or reviewing the nurse's notes in the chart. This forms the evaluation, concentrating on whether procedures are properly performed, asks such questions as:

Concurrent process evaluation examines nursing performance when it takes place. Examples include judging the nurse's ability to teach insulin administration and noting if neurological checks are performed accurately and on time. The Slater Nurse Competencies Rating Scale and the Quality Patient Care Scale are examples of tools for concurrent process evaluation. Also, the chart may be reviewed for evidence of appropriate nursing actions while the client is receiving the nurse's care.

Outcome Evaluation focuses on changes in the client's behavior and health status. The nurse looks for evidence of improved health status resulting from nursing intervention; for example, that the client is free from signs of infection, or that the client accurately states the correct dose of and time to take medication.

Concurrent Outcome Evaluation judges the client's ability to demonstrate behavioural and measurable progress in health status, knowledge, or abilities.

Retrospective outcome evaluation examines the chart after the client has been discharged. The chart is reviewed for evidence of the client's progress resulting from nursing intervention. Examples include documentation that the client performed activities of daily living, demonstrated positive attitudinal change, or planned a daily diabetic menu.

3.8.2 Criteria and Standards

The concepts of criteria and standards are often used interchangeably in evaluation, but they are different. Criteria are measurable qualities, attributes, or characteristics that specify skills, knowledge, or health status. They describe acceptable levels of performance by stating the expected behaviours of the nurse or client.

Standards represent acceptable, expected levels of performance by the nursing staff or other health team members. They are established by authority, custom, or general consent. Professions develop standards to improve the levels of practice.

3.8.3 Guidelines for Evaluation

The guideline describes the steps in evaluation. They presuppose the achievement of the preceding components in the nursing process.

1. Evaluation criteria are given if the objectives lack specificity. Evaluation criteria are indicators of the expected client behaviors. They are written like objectives but clarify the behaviours more specifically.

2. The formative evaluation describes whether and to what extent the client and nurse achieved the stated plans and objectives. During each interaction, the nurse have observes and compares the client's behaviour with the criteria for the objectives. The effectiveness of the plan is determined by changes in the client's behaviour.

3. The summative evaluation describes the client's progress or lack of progress in achieving the goals. The nurse evaluates the client's response in meeting the objectives and judges whether the client's behaviour shows progress toward goal achievement. Is the client's response in the expected direction and safe, desirable, and reasonable, considering the time and situation?

4. The nursing care plan indicates revisions if the goals and objectives have not been adequately met. Modification of the plans, criteria, objectives, or goals is the last step in the evaluation process. During ongoing evaluation, the nurse may judge that the plans or objectives are ineffective in achieving the goal.

3.9 Hypothetical Nursing Care Plan

A Client with Pelvic Inflammatory Disease

DATE	NURSING DIAGNOSIS	NURSING OBJECTIVE	NURSING ACTION	RATIONAL/SCIENTIFIC PRINCIPLE	EVALUATION
Oct 29	1. Pain related to irritation of the pelvic region by inflammatory exudates evidenced by reports of lower abdominal pain x 4/7	Patient will verbalize satisfactory level of pain control within 48 hours.	1. Investigate pain reports noting duration and intensity. 2. Nurse in semi fowler's position. 3. Administer analgesics as ordered e.g. fortwin 30mg in bed splinting painful area and restrict movement.	1. Changes in intensity may reflect developing complications and pain tends to become constant, more intense and diffuse over the entire abdomen as inflammatory process accelerates. 2. Facilitates fluid drainage by gravity reducing irritation and abnormal tension and thereby reducing pain 3. Heat improves blood flow this promotes delivery of nutrients, removal of waste and muscle relaxation. 4. Fortwin inhibits ascending pain pathways in CNS, increase pain threshold and alters pain perception . 5. Reduces muscle tension which may help minimize pain of movement (Doenges Moorhouse and Geissler, P. 371)	Patient acknowledge satisfactory level of pain control

	2. Hyperthermia related to increased metabolic rate evidence by temp of 38^0c.	Patient will demonstrate temperature within normal range in 24- 48 hours.	1. Monitor patient q 4 hours and more often during measures to reduce fever. 2. Place under the 3. Do tepid sponging if temp remains at 38^0c. 4. Give antipyretic drug as ordered e.g. Panadol II PRN. 5. Give Amplicllin 500mg IVq 6 hours as ordered 6. Give Genticin 80 mg IV q 8hrs.	1. Temperature of 38.9 – 41.1^0c suggests acute infection disease process fever is observed to know when and what type of medical intervention is needed. 2. Fan helps to reduce fever through convention, the movement of air, removes heat from the body to air. 3. Tepid sponging help body to lose heat through conduction and evaporation of water from surface of the body Panadol is used to reduce fever by its central action on the hypothalamic heat regulating centre 4. Penicillin is bactericidal against microorganisms by inhibiting all wall synthesis during active multiplication, thus combating the infectious disease process causing fever. 5. Aminiglycosides (Genticin) act directly on ribosomes of susceptible organisms by inhibiting protein synthesis 6. Metronidazole is used in treating gram- negative anaerobic infection.	The temperature did not reduce well with nursing measures and antipyretic drug but dropped to 37^0c after 2 days of antibiotic therapy.

			7. Give Flagyl 500mg IV 8 hours	1) People need someone to whom to talk and share their feelings 2) The thick pus of gonorrhoea can completely clog both fallopian tubes, bind them with strictures & render a woman sterile	
Oct 30	3. Fear related to outcome of disease on reproductive status evidenced by frequent questioning about outcome.	Patient will report that fear is reduced to manageable level within 48 hours	1. Allow her to talk about the problem and express her fears. 2. Confirm that sterility can be a problem of gonorrhea but we do not know yet if this will be true in her, suggest that she should try to avoid future VD by abstaining from sex until she is		

			married		

Students Activity

You are required to write care plans on patients on the wards to which you are assigned the care plan should last minimum of 3 days or the number of days on admission but not more than 7 days. You are not to use a patient with PID (this example) as a care plan. The care plan should be turned in not later than 1 week after completion of the week of care. The grading system for care plans shall be a total of 50 marks divided as follows: Nursing diagnosis, 5mks; Objective, 5 mks; Nursing action, 15mks; rationale/ scientific principal, 15mks; evaluation, 10ks. After completion, the grades will be averaged and one grade per semester put on your final record. They should also be included in the experience book

3.10 Nurse-Client Relationship

The nurse-client relationship is the means for applying the nursing process. This relationship is the vehicle by which the nurse works with the client. Carl Rogers identifies three aspects that facilitate personal growth in a relationship: (1) genuineness, the ability to be aware of one's own feelings, or being real; (2) respecting the separateness of another, accepting the other unconditionally; and (3) a continuing desire to understand or empathize with the other. These aspects are applicable to all human relationships, especially the nurse-client relationship.

Trust, empathy, caring, autonomy, and mutuality are five concepts basic to the development of a nurse-client relationship. These concepts need to be reciprocal during nurse-client interactions, but the nurse is responsible for setting the tone. Therefore, the nurse needs to identify specific actions that communicate trust (consistency, honesty), empathy (touch, sincerity), caring (genuineness, eye contact), autonomy (nonjudgmental, nonthreatening), and mutuality (inclusion of client in decision-making).

Numerous communication techniques that foster the nurse-client relationship have evolved from psychological theory and practice disciplines. These techniques are useful during any nurse-client interaction to facilitate obtaining information and establishing rapport. The communication techniques are enabling devices that should be incorporated naturally into nurse-client interactions. The techniques chosen are based on the nurse's comfort with them. Examples of facilitative verbal and nonverbal communication techniques are found in Table 3-1. In many situations, nonverbal communication reveals the true, often unacceptable message. Nonverbal messages can be unintentional as well as intentional. The nurse's goal in communication

is to exhibit congruent verbal and nonverbal messages; in other words, the verbal and nonverbal messages should be saying the same thing. Definitions of the techniques shown in Table 3-1 are in the glossary. The use of these techniques does not guarantee a meaningful relationship. All aspects of the situation must be taken into account, such as the client's health state, environmental influences, and the nurse's knowledge and use of self.

Effective nurse-client relationships can be attained when nurses are willing to look at their own values, prejudices, strengths, and limitations. Nurses discover how this "self" affects interactions with others. This cannot be done through intellectual development alone; nurses must be open to the discovery of their own motivations and feelings through experience and relationships with others.

3.11 Skills Required in the Nursing Process

In the use of the nursing process the following skills are needed;

3.11.1 Intellectual Skill

Critical Thinking: Once the nurse has assembled a body of facts, she uses critical thinking to sift through the information and start generating ideas about what it means.

Definition of critical thinking by the National Council for Excellence in Critical Instruction (Paul, 1993) parallels the steps of the nursing process. The National Council for Excellence in Critical Instruction defines critical thinking as:

> "The intellectually disciplined process of activity and skill fully conceptualizing, applying, analyzing synthesizing and evaluating information gathered from or generated by observation, experience, reflection, reasoning as a guide to belief and action" (Paul 1993 p. 56).

Evident in this definition are the assessment, planning, implementation and evaluation component of the nursing process.
Critical thinking is important largely because without it, the quality of care the client is receiving may be inappropriate.

Problem Solving: After extracting a series of possible meanings from a collection of facts, the nurse is ready for problem solving. This is the thought process used to define problems based on interpretations made in the critical thinking phase. Both levels of thinking are essential when a nurse is faced with an unstructured situation. Problem-solving

technique gives organization and direction to the various elements of nursing practice. Problem-solving also allows for better assessment and planning because it focuses the nurse's thinking on the individual rather than on the tasks involved in his care. It also helps in the planning and use of written **nursing care plans**.

Decision-Making

This is the third major type of though process, and is used for deciding a particular course of action. The thought process of decision-making is similar to the steps of the nursing process. These are:

1. Recognize and define the problem.
2. Collect data from observation and experimentation.
3. Formulate and implement the solution.
4. Evaluate the solution.

During the assessment phase, the nurse searches for conditions that call for action. What is the most important situation for which a decision is demanded? What alternative actions can be explored? What are the probable consequences of a particular alternative? During the planning and implementation phase, the nurse analyzes each alternative and its consequences. She must decide which course of action is the most effective and efficient for the client.

The evaluation phase of decision-making is an interrelated cycle of activities that allows the nurse to assess the care given. If the care given is inadequate, she can go back to the assessment phase looking for clues.

3.11.2 Interpersonal Skills

It is these skills that distinguish the knowledgeable technician from a professional.

Self-knowledge and Self-image

In order to be capable of reaching others, we must first be in touch with ourselves. Self-knowledge is therefore first on the list of interpersonal skills. The better a nurse understands herself and her own needs, the more insight she will bring to the problems of clients. The term **self-image** refers to the way we see ourselves or believe ourselves to be. Those who are unable to perceive their own defects are often incapable of giving to others except in a very limited way.

Communication

No matter how self-aware a nurse is and how deep her ability to empathize with others, her resources will be useless unless she is capable of communicating. Basically, a nurse is concerned with establishing a rapport that makes her more aware of the client's needs. . Through the use of therapeutic communication, the nurse helps the client to make his own decisions and to come to his own conclusions. Clients often feel that the nurse's time is limited. They therefore hesitate to push a conversation beyond an exchange of pleasantries. For this reason, the nurse must use a variety of techniques to encourage therapeutic communication.

The ability to listen is basic to communication. The nurse must be able to pick up on faint signals. The ability to listen is based on an attitude of acceptance. A client senses acceptance from a nurse who spends time with him and tries to find out how he really feels about his illness. Another set of interpersonal skills that the nurse is asked to develop is the ability to convey interest, compassion, knowledge, and information. This is especially important in the care of patients suffering from terminal illness. She does so by being kind, gentle, gracious, humane, and thoughtful.

In addition to being able to convey an empathetic attitude toward the client, the nurse must also know how to transmit knowledge and information about his condition.

3.11.3 Technical Skills

In giving care, a wide range of technical skill is used. The skill used depends on the patient illness and the knowledge of the nurse. For example, in the case of a client with chronic obstructive pulmonary disease, the nursing plan might include simple measures such as providing two pillows and avoiding tight bed linens across the chest, limiting conversation and helping him get to the bathroom, describing and recording sputum amount, colour, and consistency; and recording fatigue, pulse, and respiratory response.

4.0 CONCLUSION

A well-written nursing care plan gives direction, guidance, and meaning to nursing care. It is the primary means of communicating, synchronising, and organizing the actions of all nursing staff. The nursing care plan provides for continuity of care.

5.0 SUMMARY

- The nursing care plan is the plan of care that a nurse draws out for the individual patient after carefully assessing the patient's need and arranging them in order of priority.

- Assessment tools for planning care are made through observation, interview and records. The patient's records provide useful data as to what care has been given.

- The nurse-client relationship is the means for applying the nursing process. This relationship is the vehicle by which the nurse works with the client. Trust, empathy, caring, autonomy, and mutuality are five concepts basic to the development of a nurse-client relationship.

- In giving care a wide range of technical skill is used. The skill used depend's on the patient illness and the knowledge of the nurse.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the importance of the nursing care plan.

7.0 REFERENCES/FURTHER READING

Barbara Kozier and Glenora, Erb. [no date]. *Fundamentals of Nursing. Concepts and Procedures*. (2nd ed.)

MODULE 2 MEDICAL-SURGICAL CONDITIONS

UNIT 1 FLUID AND ELECTROLYTE DISTRIBUTION

CONTENTS

1.0 INTRODUCTION

All bodily functions rely on the proper distribution of fluids and electrolytes between the intracellular and extracellular compartments. Fluid and electrolyte balance is maintained by the interaction of renal, hormonal, and metabolic mechanisms. Imbalances can occur secondary to other disorders or as complications of therapy. The major objective of fluid and electrolyte distribution is the replacement for prior deficits and continuing losses, and nutrition.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- identify body fluid compartment
- describe the mechanism regulatory fluid and electrolyte balance
- identify he factors affecting fluid and electrolyte balances
- explain route by which water and Electrolyte leave and enter the body
- describe the types of electrolytes in the body
- distinguish between electrolyte balance and imbalance.

3.0 MAIN CONTENT

3.1 Fluids

The fluids system plays an important role in the body. The principal functions of body fluids are:

1. maintains blood volume

2. aids digestion
3. transports material to and from body cells,
4. acts as a medium for cellular metabolism and

5. excretes of waste, and
6. regulation body temperature.

Water is the largest single constituent of the human body and forms about 50-70% of the total body weight (TBW) of the average young to middle age adult. 75-80% of total body weight of an infant is made up of water. By the age of two, the percentage of total body weight that is fluid is the same as that of a young to middle aged adult (60%). The total body fluid drops about 45-60% in the elderly because of changes on the body tissue. In the adult, 60% of body weight consists of water, of which 45% is intracellular fluid (ICF). The remaining 15% is distributed between the intravascular and interstitial compartments and is considered extracellular fluid (ECF).

3.1.1 Body Fluid Compartments

Body fluids are found in years major compartments of the body. These are

a. Intracellular fluid
b. Extracellular fluid

3.1.1.1 The Intracellular Fluid

Compartment is found within the cells of the body. It accounts for approximately 40-50% of the total body weight. The main electrolyte is potassium (K) and this provides the cells with aqueous medium for its chemical functions

3.1.1.2 The Extracellular Fluid

This is found outside the cells. The main electrolyte is sodium (Na). The extracellular fluid is made up of two compartments:

a. **Interstitial Fluid**

This is found in the spaces between the cells and accounts for approximately 15% of total body weight of an adult.

b. **Intravascular Fluid**

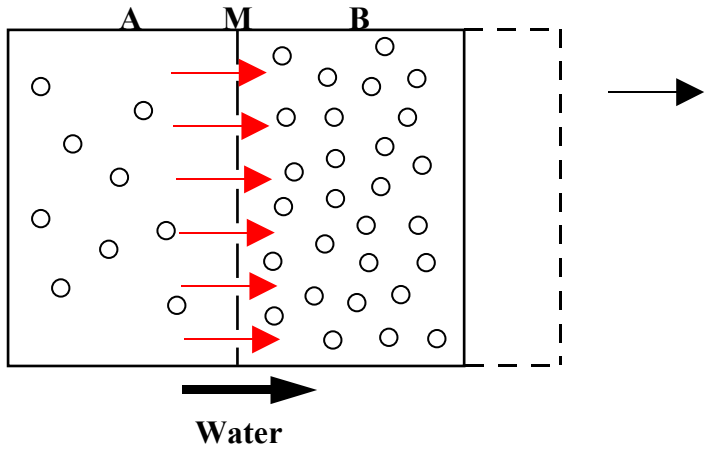
This is found in the blood and lymph vessels and makes up about 5% of the total body weight.

3.2 Distribution and Concentration of Electrolytes in Body Fluid

Distribution and concentration of electrolytes in the body fluids are regulated by osmosis, diffusion, active transport, filtration, and pinocytosis and phagocytes.

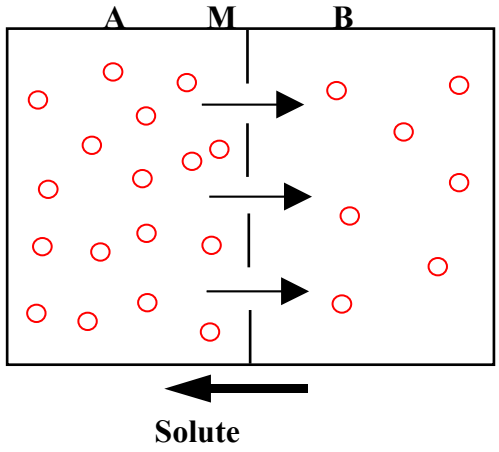
3.2.1 Osmosis

Osmosis is the process by which water passes through a semi-permeable membrane from a high concentration of water to a lower concentration of water. This continues until equilibrium is achieved on both sides of the membrane. Simply stated, in osmosis, water passes from a more dilute solution to a more concentrated one. Water goes where the electrolytes go. If blood cells are suspended in an isotonic solution (a solution having the same osmotic pressure as the cells), the osmotic pressure will remain the same inside and outside the cell. In this case, no movement occurs. If the blood cells are placed in a hypotonic solution (much less concentrated than the cellular contents), water will flow into the cells until they swell and burst. In a hypertonic solution (more concentrated than the cellular contents), water flows out of the cells and they shrink



3.2.2 Diffusion

Diffusion is a process whereby molecules move from higher concentrations of solution to lower concentrations. Oxygen and carbon dioxide exchange in the lungs occurs through diffusion.



3.2.3 Active Transport

Active transport is a mechanism, still not fully understood, whereby ions move from areas of lesser concentration to areas of greater concentration. It involves the release of energy by the action of adenosine triphosphate (ATP), which supplies the necessary "uphill movement," enabling certain substances to pass through the cell membrane. Sodium, potassium, and amino acids are probably carried through all cell membranes by active transport.

3.2.4 Filtration

Filtration is related to hydrostatic pressure produced by the pumping action of the heart. (Hydrostatic pressure is the pressure of water or other liquids.) It involves the transfer of both solute and solvent through a permeable membrane from a region of higher hydrostatic pressure to a region of lower pressure. An example is the passage of water and electrolytes from the capillary beds to the interstitial fluid.

3.2.5 Pinocytosis and Phagocytosis

Pinocytosis is the process by which substances of higher molecular weight, such as protein, enter the body. In this process, the cell membrane folds inward to incorporate the substances. In phagocytosis, foreign particles are engulfed or digested by specialized cells called phagocytes.

3.3 Common Sources of Fluid and Electrolyte Imbalance

1. Vomiting and Gastric Suction

When the quantity of acidic gastric juices is reduced through vomiting or by gastric suction, a number of vital electrolytes is lost. These usually

include hydrogen, chloride, potassium, and sodium. The total amount of fluid in the body is decreased, and the client may develop metabolic alkalosis from the resulting excess of base bicarbonate. The symptoms of metabolic alkalosis include slow, shallow respiration, muscle hypertonicity and tetany, and personality changes. The client may become disoriented, irritable, or uncooperative.

2. Diarrhoea, and Other Sources of Gastrointestinal Fluid Loss

In a 24-hour period, 17,000 ml of fluid can be lost through diarrhoea. With intestinal suction, 3,000 ml of fluid per day can be lost. Prolonged use of laxatives and enemas can result in serious water and electrolyte disturbances. Gastrointestinal fluids can also be lost through fistulas or drainage tubes. Gastrointestinal obstruction also produces fluid loss because the fluids are trapped within the intestine and cannot be used by the body. In addition to fluid volume loss, gastrointestinal disturbances can result in metabolic acidosis (because the intestinal secretions are primarily alkaline). Symptoms of metabolic acidosis include shortness of breath, deep, rapid breathing, weakness, malaise, and stupor progressing to coma.

3. Wound Exudates

This can result in losses of protein and sodium and in a deficit in the extracellular fluid volume.

4. Excessive Perspiration

This can lead to abnormal losses of water, sodium, and chloride. If fluid intake of both water and electrolytes is not continued, the fluid volume and proportion of electrolytes decrease. The client with this condition may even develop sodium excess if insufficient water is ingested during a period of heavy perspiration.

5. "Insensible"

Water loss occurs through the lungs and skin. It totals approximately 600 to 1,000 ml per day in the average adult. If respiratory activity is increased, more water vapour is lost, and if there is damage to the skin, still more loss occurs. Because only water, and not electrolytes, is lost through the skin, water deficit and sodium excess will develop.

6. Hyperventilation

Results in respiratory alkalosis due to excessive elimination of carbon dioxide.

7. Hypoventilation

Which is more dangerous than hyperventilation, causes retention of excessive amounts of carbon dioxide. This condition results in respiration acidosis.

3.4 Factors Influencing Fluid and Electrolyte Balance

Age. The infant requires a large intake of fluid; his body contains 20 per cent more water than that of the adult, and this water acts as a protective mechanism. Thus, imbalance is a major point of vulnerability. This is also true with the elderly client, whose essential physiological systems may not be completely adequate. The infant needs fluid in large amounts to meet his needs for more dilute urine and to satisfy his higher metabolic demands. In the infant, the balance of intra- and extracellular fluids is also different. The infant's balance is 50 per cent intracellular and 50 per cent extracellular, while in the adult, the balance is 75 per cent intracellular and 25 per cent extracellular.

With the elderly client, fluid imbalance can result from the breakdown of one or more of the following systems: respiratory, renal, cardiac, and gastrointestinal. Because the elderly are more subject to these breakdowns, they are more vulnerable to fluid and electrolyte imbalance. While the physiological processes of aging cannot be reversed, dangerous fluid imbalances can be avoided.

3.5 Electrolytes

Electrolytes are chemicals that, when dissolved, dissociate into positively and negatively charged ions (cations and anions). Total cation always equals total anions. They are important constituents of intracellular and extracellular fluids, serving vital functions in maintaining fluid and acid – base balance, neuromuscular excitability, blood clotting, and protein and cellular metabolism. The composition and concentration of electrolytes in each fluid compartment vary. Measurement of electrolytes is usually expressed in mill equivalents per liter (mEq/L).

The electrolytes in the body fluid are involved in chemical reaction such as:

i. Regulating the permeability of cell membranes thus, controlling the transfer of various materials across the membrane.

ii. Maintenance of the bodies acid-base balance.

iii. Promotion of neuron muscular irritability by transmission of electrical energy within the body e.g. without calcium muscle contraction cannot occur.

iv. Maintenance of fluids osmolarity (the osmotic pull of all particles per kg of H_2O).

3.6 Mechanisms Regulating Fluid and Electrolyte Balance

Proteins and electrolytes are the main forces holding H_2O within the various compartments of the fluid system in the body. In the intravascular compartments the force is by the serum album where as in the interstitial fluid by (Na^+) ions and in the intracellular by potassium. These substances exact an osmotic pressure which holds the H_2O in their respective compartments. For example a patient who has lost a great deal of serum albumin through malnutrition tends to become odematus, since fluid is drawn from the blood plasma into the intracellular space because the main force holding the H_2O in the blood vessels has been lost.

1. Kidneys

This is the most important regulatory mechanism. This function is regulated by the action of two hormones – Anti Diuretic Hormone (ADH) which controls H_2O reabsorption and Aldesterone which promotes the retention of Na and the excretion of K. Under the influence of these hormones the kidney assists in regulation of.

a. Total value of extra cellular fluid.
b. Electrolyte concentrate.
c. Acid-base balance.
d. Blood pressure is erythropoesis.

2. Gastrointestinal Tract

This is done through the selective reabsorption of $H_2O$and solute taking place principally in the small intestine. The gastrointestinal tract absorbs about 7-9 liters of glandular and gastrointestinal secretions per day. About 100mls of H_2O are excreted from the bowel daily, the rest are reabsorbed. Both fluids and electrolytes may be lost in considerable quantities in conditions as vomiting and diarrhoea.

3. Thirst

This is stimulated by a decrease in extracellular fluid volume. Thirst indicates a basic physiological need for H_2O. The thirst mechanism is stimulated by:

a. Increase osmotic pressure.
b. Decrease ECF.
c. Dry mucous membrane in the mouth.

4. Lungs

H_2O is lost during expiration and inspiration, although amount of H_2O lost is small. Whenever respiration increases in rate and depth, the amount of H_2O lost via this routed is increased. This is seen in strenuous muscular exercise, fever or any condition in which respiration is increased or when the air that is breathed is very dry.

5. Skin

H_2O is lost through perspiration

6. Hormonal Control

Three hormones play a particularly vital role in maintaining fluid and electrolyte balances:

1. Antidiureretic hormone (ADH)

a. Is produced in the hypothalamus and stored and released from the posterior pituitary gland.
b. Acts on the renal tubules to retain water and to decrease urinary output.

2. Aldosterone

a. Is secreted by the adrenal cortex.
b. Acts on the renal tubules to reabsorb sodium and to excrete potassium.
c. Increase circulatory volume by reabsorbing water along with sodium.

3. Parathormone

a. Produced by the parathyroid glands
b. Promotes absorption of calcium from the intestine
c. Promotes release of calcium from bone
d. Increases the excretion of phosphate ions by kidneys.

3.7 Factors Affecting Fluid and Electrolyte Balance

1. Insufficient intake of fluid.
2. Disturbance of the gastrointestinal tract such as diarrhoea and vomiting, gastric suction and wash out.
3. Disturbances of kidney function e.g. cardio vascular dysfunction or imbalance in antidiurectic hormone.
4. Excessive perspiration and evaporation.
5. Lost of body fluid as occurs will Hemorrhage, burns and body trauma including surgical trauma.

3.8 Mechanism in Which H_2O and Electrolyte Enter and Leaves the Body

Water enters the body through

a.	Oral liquids	=	1,500ml
b.	Water in fluids	=	700ml
c.	Water from oxidation	=	200ml
			2,400ml

Water leaves the body by several routes

a.	Skin diffusion		350ml
b.	Skin by perspiration		100ml
c.	Lungs		350ml
d.	Feaces		200ml
e.	Kidneys		1400ml
		=	2,400ml

As long as all organs are functioning normally, the body is able to maintain balance in its fluid contents. i.e. the intake of fluid must balance the output.

Calculation of Maintenance Fluid in Children

Child's Age/Weight	KG Body Weight Formular Over 24hrs Period.
0 – 72hrs old	60 – 100mls
0 – 10kg	100ml / kg (may ↑ up to 150ml / kg if renal and cardiac function is adequate.
11 – 20kg	100ml for the 1st 10kg + 50ml for each kg over 10kg.
21 – 30kg	1500ml for the 1st 20kg + 25ml / kg for each kg over 20kg
6 months	130ml / kg

3.9 Problems Related to Fluid Balance: Oedema

Definition: A condition in which excessive fluid is retained in the tissue (interstitial space) this may be localized or generalized. It may result from disturbances in the kidney or heart or increased permeability of cell membrane. The source of the edematus fluid is from the blood plasma. Normally, the interstitial compartment is dry, compact and expandable with very little fluid present except that needed to fill the spaces between the tissue substances. The dry state is significant in bringing about movement of nutrient from the plasma to the intracellular fluid and removing waste in the same way.

Any ↑ in the distance between the blood capillaries and the cells (such as edema) interferes with the cells nutrition. In edema the low encotic pressure in the intravascular space cannot pull fluid back into the capillaries.

3.9.1 Physiology of Oedema

Accumulation of excess tissue fluid is known as oedema or dropsy. This may result from excess tissue fluid formation or a failure of absorption. There are a variety of causes of oedema, but basically it is caused by an increase in the blood pressure in the capillaries which increases fluid production, and or a decrease in effective osmotic pressure of plasma proteins which decreases fluid reabsorption.

When there is wide arteriolar dilatation, there is a reduction in pressure drop across the arterioles and a rise in capillary pressure. Similarly an obstruction to the veins produces increased pressure in the veins distal to the obstruction and eventual rise in the pressure at the venous end of the

capillaries. These pressure gradients enhance extravasations of fluid into the tissues causing oedema. This type of oedema is seen in the legs of pregnant women due to pressure by the baby on veins in the pelvis, when a plaster cast or bandage on a limb is too tight and obstructs the venous return, and in patients with heart failure.

Reduction in the effective osmotic pressure of the blood is associated with deficiency of plasma proteins seen in insufficient intake of protein (malnutrition) excessive protein loss in the urine (kidney disease) and increased permeability of the capillaries to protein as in burns injuries. The loss of protein into the tissue space causes a reduction in the osmotic effect which draws fluid back into the blood. Generally hypoxia damages capillaries with resultant increased passage of protein into the tissue spaces. This phenomenon is an additional cause of oedema in heart failure.

Disorders of sodium chloride excretion may result in sodium retention and subsequently water retention causing generalized oedema.

Capillary damage due to insect bite or injury may lead to a localized oedema. Trauma to the capillary and the release of histamine and related substances are responsible for the damage of the capillary.

3.9.2 The Causes of Oedema can thus be Summarised as Follows

1. Increased arteriolar dilatation
2. Obstruction to venous drainage
3. Protein malnutrition
4. Kidney disease e.g. nephritis
5. Burns
6. Generalized hypoxia
7. Sodium retention
8. Local trauma

3.9.3 Types of Edema

a. Pitting Edema

Edema that after firm finger pressure on the stun leaves a small depression called the pit. This is caused by movement of the edematous fluid in the adjacent tissue.

b. Dependent Edema

Refers to edema that collects in lower patient or most dependent regions of the body–fat, ankles, sacral regions.

Additional site of Edema includes:

c. Cerebral Edema

Excessive accumulation of fluid in brain tissues.

d. Pulmonary Edema

Fluid in interstitial spaces of the lungs.

e. Ascites

Accumulation of fluid in the abdominal cavity but specifically in the peritoneal cavity.

3.9.4 Signs and Symptoms

a. Weight gain
b. Tissue swelling
c. Puffy eyelids
d. Decreased fluid output compared to intake
e. Amber-dark coloured urine
f. Decreased Hct, heamoglobin and RBC count
g. Weakness and anorexia
h. Mental confusion
i. Slow/absent responses
j. Apathy

3.9.5 Nursing Care

a. Good skin care – pressure area care, use of comfort devices to prevent pressure source.
b. Restriction of fluid intake
c. Accurate measure of intake and output
d. Daily weight
e. If edema of the feet, elevate foot of bed
f. If pulmonary edema, nurse in cardiac position
g. If sacral-edema, turn patient q2
h. Low soft diet.

3.10 Dehydration

3.10.1 Definition

This is a condition in which the body or tissue are deprived of H2O. In dehydration, there is loss of 10% or more of the body H_2O. The effect of dehydration depends upon the rate and volume of fluid deficit. If patient are young, elderly or if their general condition is poor, the effect will be more acute. Wide variation occurs in electrolyte changes depending on volume and composition of the fluid lost, rate of renal function, underlined disease process and amount of intake, the proportion of electrolyte as compared to water loss.

3.10.2 Causes

a. Insufficient intake of fluid.
b. Excessive loss of fluid as in sweating.
c. Vomiting and diarrhea.

3.10.3 Signs and Symptoms

1. Sunken eyes, Weight loss
2. Poor skin tugor
3. Excessive thirst
4. Decrease in urine output
5. Decreased sweating
6. Increased Hematocrit (Hct)
7. Conc. Urine
8. Weakness and malaise

3.10.4 Nursing Care

1. Increased fluid intake about three liters per day
2. Good skin care and mouth care
3. Proper record of intake and output
4. Adequate rest
5. Monitor temperature

3.11 Anorexia, Nausea and Vomiting

These indicate varying degree of distress of the upper gastrointerstinal tract. Anorexia may precede nausea; nausea in return, may reproceed vomiting.

3.11.1 Definitions

Anorexia: This is the loss of appetite, lack of desire for food.

Nausea: This is a feeling of the urge to vomit in which each thought of food is with an uncomfortable sensation in the stomach.

Vomiting: This is forceful ejection of stomach contents.

3.11.2 Physiology of Vomiting

The primary vomiting centre is located in the medullar oblongata. The physiology involves a sequence of actions

Initially, there is relaxation of the upper portion of the stomach, including the cardiac sphincter. This is followed by strong contractile waves in the lower portion of the stomach which closes the pyloric sphincter. Subsequently, the diaphragm and abdominal muscles contract, leading to increase in intra-abdominal pressure and the stomach is squeezed between two sets of muscles. The content in the relaxed upper portion of the stomach are then forced upward through the oesophagus out through the mouth. Normally, the glottis is closed, respiratory ceases during vomiting to prevent vomitus from being aspirated.

3.11.3 Physical Changes Accompaning Anorexia

1. Hypo functioning of the stomach.
2. Lessened gastric tone.
3. Decrease hydrochloric secretion.
4. Stomach is pale in colour.

3.11.4 Clinical Manifestation of Nausea

They are similar to in anorexia expect they are more pronounced:

a. There is other signs relaxation of the walls of the stomach.
b. Gastric secretions and muscular contractions ceases in nausea.
c. Uncomfortable sensation in the gastric region.
d. Frequent perspiration and increased salivation.
e. There may be hypotension and tachycardia.

f. Some people feel faint, dizzy or complain of headache.
g. Wrenching – unproductive attempt at vomiting which may occur several times before vomiting takes place.

3.11.5 Factors Causing Anorexia, Nausea and Vomiting

Drugs

Many drugs have anorexia, nausea and vomiting as side affects e.g. Digitalis, anesthetics, antibiotics etc. Bacteria toxins that are circulating in the blood may sometimes stimulate deformity centre resolution in vomiting.

Motion Sickness

A disturbance in the motion or any rapid change in the direction of the body stimulates receptors in the labyrinth (ear). Impulses are then transmitted to the vomiting centre in the medulla.

Strong Emotions

Unpleasant, stressful, situation may give rise to nausea. In this case, a stimuli originating from the cerebral cortex activates the vomiting centre directly.

Internal Factors

Parts of the body like the stomach, uterus, kidneys, semi lunar canals, duodenum, pharynx and heart contain vomiting receptors. These body parts can be stimulated in many different ways like irritation, stretching, pressure, thus vomiting centre is stimulated.

3.11.6 Observation of Anorexia, Nausea and Vomiting:

a. Subjective Observation

– Listen to patient's complaint
– Note reaction to food
– Observe for listlessness (apathy)

b. Objective Observation

– Observe for outward signs like palour
– Excessive perspiration
– Assess the vomiting in terms of the nature of vomiting:

(i) Projectile or regurgitated
(ii) Preceded by feeling of nausea
(iii) Its frequency

(iv) Its occurrence in relation to food intake
(v) Assess vomiting in terms of the characteristics of the vomitus i.e. colour, consistency (watery, liquid or solid), the presence of undigested food, blood or other foreign substance, odour etc.

3.11.7 Nursing Intervention for Anorexia, Nausea and Vomiting

Nursing action is directed toward three goals

1. Prevention of symptoms
2. Maintenance of comfort and hygiene
3. Maintenance of hydration and nutritional status.

Prevention of Symptoms

a. Clean and maintain a pleasant environment.
b. Keep emesis basin out of sight but if patient feels more secured with it thereby it can be kept within easy reach.
c. Minimize unpleasant odours.

Room should be ventilated: Use of deodorant may be necessary symptoms.

d. Oral hygiene may be due before meals.
e. Provide for patients emotional and physical comfort:

– Prevent / eliminate of pain
– Appropriate positioning
– Good oral hygiene
– Reduction of fever

f. Psychological support to help patient deal with anxiety.

g. Use of anti-emetic drugs to prevent vomiting.

Maintenance of Comfort and Hygiene

a. Holding emesis basin over patients chin to catch vomits.
b. Position for vomiting.
c. Support patient in a sitting or sideline position.

d. In post-operative vomiting, the patient will find it less painful if the nurse supports its incision with her hands when vomiting.
e. Nurse should stay with patient.

f. While patient is vomiting, nurse should provide him with tissue and help him to wipe its mouth.
g. After vomiting, wash hands and face and give mouth care.

Maintenance of Hydration and Nutritional Status

a. Encourage regular fluid intake.
b. If having difficulty retaining food, give small amount of food at frequent intervals.
c. Clear liquids are permitted after vomiting has subsided.
d. For anorexic or nauseated patient, small portion of meal attractively served are usually more appealing.
e. Determine food preference by asking patient what he likes to eat.
f. If unable to tolerate foods or fluid / oral, parenteral fluid may be prescribed or patient may be fed via tube which is inserted into the stomach Fluid And Electrolyte Disturbances

4.0 CONCLUSION

A large percentage of body weight is composed of water containing dissolved particles of organic and inorganic substance and filtration.

5.0 SUMMARY

- Water is contained in two compartments: intracellar and extracellular.
- The mechanism by which water and solute move in the body are osmosis.
- Three hormones (antidiuretic aldesterone and parathormb play vital role in maintaining fluid and electrolyte balance.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the importance and functions of water to the body.

7.0 REFERENCES/FURTHER READING

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UNIT 2 FLUID AND ELECTROLYTE IMBALANCES

CONTENTS

1.0 INTRODUCTION

Almost all medical-surgical conditions threaten fluid and electrolyte balance. There may be deficits or excesses of water or of any electrolyte. The assessment and maintenance of a patient's fluid and electrolyte balance is a major nursing responsibility. This unit describes some basic information about water and electrolytes in the body and the causes and effects of common fluid and electrolyte imbalances. Nursing process approach is used in discussing the condition.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- distinguish between electrolyte balance and imbalance
- explain all the clinical manifestation of Fluid electrolyte imbalance
- apply nursing process in the assessment and management of conditions due to Fluid electrolyte imbalance.

3.0 MAIN CONTENT

3.1 Extracelullar Volume Deficit: Hypervolemia

Hypervolemia is a condition in which the ECF compartment becomes expanded, and there is a surplus of circulating fluid with normal or near normal proportions of electrolytes.

3.1.1 Causes

1. Inability of the kidneys to excrete excess water and electrolytes as seen in chronic renal disease, chronic liver disease congestive heart failure, or administration of oral or parenteral fluids at a rate beyond renal capacity for excretion.

2 Administration of intravenous fluids at a rate beyond renal capacity for excretion especially in patients with impaired kidney function, in infants or elderly people.

3 Fluid retention following administration of large doses of corticosteroids resulting from the increased level of aldosterone.

3.1.2 Clinical Manifestations

This is due to expanded extracellular volume

1. If excess fluids are in the vascular space there will be elevated BP, bounding pulse, distended neck veins, weight gain, dyspnea, crackles (rales), and pretibial and sacral edema. If overload becomes sufficiently severe to exceed the pumping capacity of the left ventricle, pulmonary edema will result.

2. Laboratory findings are variable. Serum osmolality usually remains unchanged. Serum sodium values are not often affected, although they may be low. Hematocrit may be decreased.

3.1.3 Medical Management

The treatment is according to severity but the goal is to obtain a definitive diagnosis of the underlying cause to determine appropriate treatment.

1. Restrict fluids and sodium intake.
2. Administer diuretics e.g. Lasix to eliminate excess fluids.
3. Replace potassium losses secondary to diuretic therapy.
4. Administer dialysis for patients with renal failure or life-threatening hypervolemia.

3.1.4 Nursing Diagnoses

Fluid volume excess, edema related to surplus of circulating fluid.

Nursing Objective

Patient's vital sign, physical findings, and laboratory values are within acceptable limits.

Interventions

1. Assess vital sign and monitor input and output; measure weight daily. Watch out for an irregular pulse, which can be indicative of dangerous hypokalemia.
2. Observe for and report edema, which may not be clinically evident until 5 – 10 pounds of fluid have been retained. Check sacral areas in patients on bed rest. Look for edema in the ankles and pretibial areas of ambulatory patients.

3. Maintain fluid and sodium restrictions as prescribed.

4. Administer diuretics as prescribed.

5. Monitor lab values; be especially alert to decreased potassium in patients on diuretics.

6. Monitor for clinical indicators of potassium depletion during diuretic therapy. These include muscle weakness, cramping, nausea, anorexia, and cardiac dysrhythmias.

7. Replace potassium losses by administering potassium supplements as prescribed.

8. Teach patient about foods high in potassium, including oranges, tomatoes, and bananas.

Nursing Diagnoses

Impaired Gas Exchange related to tissue hypoxia secondary to pulmonary edema.

Nursing Objective

Patient does not exhibit signs of respiratory dysfunction.

Interventions

1. Monitor character, rate, and depth of respirations; auscultate lung fields for adventitious breath sounds.
2. Keep patient in semi-Fowler's position to facilitate respirations.
3. Teach patient deep-breathing exercises to enhance gas exchange.

3.2 Extracellular Volume Deficit-Hypovolemia

Hypovolemia is a condition in which depletion of ECF occurs as a result of water and sodium loss in varying proportions from the body,

depending on underlying pathology there .One third of the lost is from vascular space and two thirds from the interstitial space. There is no water shift between intra and extracellular fluid compartment because there is no change in osmolarity.

3.2.1 Causes

1. GI losses such as vomiting, diarrhoea, fistulous drainage, ileostomy, gastric suction.
2. Urinary losses from diuretic administration, renal or adrenal disease, diabetes insipidus.
3. Sequestration of fluid that is (plasma-to-interstitial fluid shift). This is with burns, peritonitis, ileums, ascites, and acute pancreatitis.
4. Profuse diaphoresis, hyperventilation, fever.
5. Decreased intake of water and electrolytes.
6. Blood loss

3.2.2 Clinical Manifestation

1. Postural hypotension, weak pulse with tachycardia, flattened neck veins, increased respirations, poor skin turgor, longitudinal furrows in the tongue, absence of moisture in the groin and maxillae, decreased tearing and salivation, anorexia, nausea, vomiting, weakness, apathy, weight loss, subnormal temperature, and decreased urine output. Shock and coma can ensue if volume depletion is severe.

2. Laboratory Findings: BUN is elevated to serum creatinine, and an elevated hematocrit and protein count, all reflective of hemoconcentration. Urinary sodium is decreased, and urine specific gravity is elevated.

3.2.3 Medical management

The goal is to restore ECF volume and correct the underlying cause.

1. Administer oral or intravenous fluids to replace water and electrolyte losses while definitive diagnosis is being made. Isotonic fluid such as Lactate Ringer solution and 0.9% saline are given. Blood transfusion may be given in severe shock.

3.2.4 Nursing care

Nursing Diagnosis

Fluid Volume Deficit related to abnormal loss and/or decreased intake.

Nursing Objective

Patient's vital sign, physical findings, and lab values are within acceptable limits.

Interventions

1. Monitor vital sign, laboratory values, and input and output for evidence of dehydration; measure weight daily. Check specific gravity of urine.

2. As appropriate, encourage oral intake or administer prescribed replacement solutions. Observe for indications of fluid overload during rapid IV replacement.

3. Provide oral hygiene at frequent intervals.

4. Obtain accurate measurements of "third space" (interstitial) fluid accumulation areas such as the abdomen and limbs. Measure abdomen or limb(s) at the same place with each assessment. To ensure accuracy, mark the measurement site with indelible ink, and use the same tape measure for all assessments.

5. Position patient in supine with foot slightly elevated to allow blood flow to the brain and the heart.

6. Teach patients on diuretic therapy, leg exercises and to rise up slowly from bed.

3.3 Electrolyte (Osmolality) Disturbances

This disturbance affects both intracellular and extracellular compartments. When osmolality in one compartment is altered water shifts to balance the osmolality. Therefore both compartments become equally increased or decreased.

Sodium

Sodium is the major action of extracellular fluid and is primarily responsible for osmotic pressure in that compartment. Normal serum sodium concentration is approximately 137 – 14 me/L. Body water and electrolyte regulation by the kidneys is based in part on sodium concentration in the ECF. When ECF sodium concentration rises, the kidneys attempt to maintain normal sodium concentration by retaining water. When ECF water increases, sodium is retained. An elevated serum sodium level (hypernatremia) usually reflects a relative ECF water deficit rather than an increase in total body sodium. Hyponatremia exists when the serum sodium concentration in a given amount of plasma water falls below normal. Symptoms might not occur until the serum sodium level is <120–125 mEq/L. Sodium is also important in cellular functioning normal acid–base balance. Aldosterone, which is secreted by the adrenal cortex, is essential in sodium regulation through its effect on renal tubular reabsorption of sodium.

3.3.1 Hypernatremia: Increased Serum Osmolality

3.3.2 Causes

1. Decreased intake of water due to inability to respond to thirst, such as in an unconscious state; less efficient functioning of the thirst centre in the base of the brain, as is commonly seen with the elderly.

2. Increased output of water from severe hypotonic fluid losses through the GI and respiratory tracts.

3. Increased urinary water loss through osmotic diuresis, and diabetes insipidus.

4. Increased intake of sodium from excessive administration of concentrated electrolyte mixtures.

3.3.1 Clinical Manifestation

(1) Intense thirst
(2) flushed skin; dry
(3) Sticky mucous membranes
(4) Rough, reddened, dry tongue
(5) Elevated temperature
(6) Lost of skin tugor

(7) Agitative behaviour such as restlessness, excitement, convulsions; decreased reflexes; oliguria or anuria.

Laboratory findings: Serum sodium >147 mEq/L, increased serum osmolality, urine specific gravity >1.030 (except in diabetes insipidus).

3.3.2 Medical Management

The goal is to restore normal sodium concentration.

1. Replace water: Plain water given by mouth may be sufficient in the early stages of sodium excess or if serum sodium <160 mEq/L; IV infusion of hypotonic solution of water and electrolytes (5%Dextrose water intravenously) in advanced stages or if serum sodium is >160 mEq/L. **Note:** Rapid reduction of serum sodium (serum osmolality) may lead to cerebral edema, seizures, or death.

2. Administer diuretics by mouth with plain water.

3. Draw serum sodium levels q6h.

3.3.3 Nursing Care

Nursing Diagnosis

Fluid Volume Deficit related to abnormal (hypotonic) loss or decreased intake.

Nursing Objective

Patient's vital sign, physical findings, and lab values are within acceptable limits.

Interventions

1. Monitor vital sign and input and output, and assess skin turgor and mucous membranes for evidence of dehydration. Check urine specific gravity and monitor serum sodium levels.

2. As appropriate, encourage oral fluids or administer prescribed fluid replacement.

3. Administer diuretics, if prescribed.

4. Assess patient's sensorium; institute seizure precautions and notify doctor if significant findings are noted.

3.4 Hyponatremia

1. Loss of sodium-containing fluids from vomiting, diarrhoea, profuse diaphoresis, salt-losing nephropathy, adrenal insufficiency.

2. Excessive diuretic use together with reduced sodium intake.

3. Plasma-to-interstitial fluid shift in massive burns and trauma.

4. Impaired renal excretion of water as seen in renal failure, nephrotic syndrome, CHF, and hepatic cirrhosis.

5. Increased intake of water, which dilutes serum sodium.

6. Excessive administration of electrolyte-free IV solutions, fresh-water drowning, or compulsive polydipsia.

7. Secretion of inappropriate antidiuretic hormone (SIADH).

8. Loss from skin such as diaphoresis, large open lesion and burns

3.4.1 Clinical Manifestation

1. Include:

(1) Anorexia, nausea, vomiting
(2) Cold and clammy skin
(3) Postural hypotension
(4) Apprehension
(5) Seizures
(6) Headache
(7) Abdominal cramps.

2. Laboratory findings:

(1) Serum sodium below normal
(2) Urine specific gravity <1.010.

3.4.2 Medical Management

The goal is to restore normal serum sodium levels as quickly as possible without volume overload and to establish a definitive diagnosis to determine appropriate therapy.

1. Replace salt and water orally in cases of mild deficit.
2. Provide parenteral replacement with 3–5% sodium chloride in water if the deficit is severe.

3. Restrict water if the hyponatremia is dilutional.

3.4.3 Nursing Care

Nursing Diagnosis

Fluid volume deficit or excess related to abnormal fluid loss, increased intake, or interstitial spacing of fluids.

Nursing Objective

Patient's physical findings and lab values are within acceptable limits.

Interventions

1. Monitor input and output and weigh patient daily.
2. Monitor serial sodium levels.
3. Maintain fluid restrictions, or administer oral or parenteral fluids as prescribed.
4. Provide safety measures as indicated for patients with altered LOC.

3.5 Potassium

Potassium is the major cation of intracellular fluid, and it plays a leading role in cellular metabolic activities. It is essential for neuromuscular function and is instrumental in maintaining normal cellular water content. Potassium is not stored in the body, nor do the kidneys conserve it. Most of the daily potassium intake is excreted in the urine, with only small amounts lost through perspiration and faeces. Potassium excess does not usually develop in the presence of normal renal function. Although only 2% of body potassium is extracellular, serum potassium concentration generally reflects total body potassium and is affected by the pH of ECF. In acidosis, extracellular hydrogen is exchanged for intracellular potassium. An opposite reaction occurs in alkalotic states. The body is intolerant of fluctuations from normal serum potassium concentration, which is 3.5–5.5 mEq/L; excess or deficit can cause a medical crisis.

3.5.1 Hyperkalemia (Potassium is >5.0mEq)

Causes

1. Decreased potassium excretion as seen in renal failure; adrenal insufficiency (Addison's disease).

2. Increased tissue breakdown, as in crush injuries, burns, major surgery, rhabdomyolysis, severe hemolysis, or GI bleeding;

3. Excessive administration of potassium-containing IV solutions or potassium supplements; potassium-sparing diuretics or

4. High doses of penicillin in patients with renal failure;

5. Massive transfusions of stored blood.

6. Redistribution of intracellular potassium resulting from metabolic acidosis.

3.5.2 Clinical Manifestation

8. Neuromuscular: Irritability, weakness, paresthesia, muscular or respiratory paralysis.

9. Nausea, diarrhoea, intestinal.

10. Weak heart muscle: Bradycardia, ventricular fibrillation.

11. Laboratory findings: Repeated serum potassium values >5.6 mEq/L.

12. EKG: Tall, peaked T-waves, development of wide, bizarre QRS complexes culminating in ventricular fibrillation or asystole.

3.5.3 Medical Management

The goal is the rapid restoration of normal serum potassium levels.

1. Administer IV calcium gluconate or calcium chloride, 5–10 mL of a 10% solution, to quickly antagonize the toxic neuromuscular and cardiac effects of hyperkalemia, particularly if hypocalcaemia is present.

2. Redistribute ECF potassium: IV injection of one ampule of sodium bicarbonate, which causes rapid movement of potassium into the cells; IV administration of hypertonic solutions of glucose and regular insulin, which causes intracellular potassium shift. These are temporary measures for the immediate reduction of serum potassium until potassium removal can be effected by other means.

3. Perform dialysis to remove potassium from the blood.

4. Treat the underlying disease.

3.5.4 Nursing Care

Nursing Diagnosis

Ineffective breathing patterns related to restricted chest movement secondary to impairment/paralysis of respiratory muscles.

Nursing Objective

Patient's respiratory rate and depth are within acceptable limits

Interventions

1. Assess character, rate, and depth of respirations.

2. Reposition patient q2h to enhance aeration. Elevate head of bed to facilitate respirations; ensure that patient deep breathes and coughs at frequent intervals.

3. Suction airway if patient is unable to expectorate secretions.

Risk to Alterations in Cardiac Output

Decreased: Risk of dysrhythmias and cardiac arrest secondary to hyperkalemia.

Desired Outcome

Patient's VS and lab and physical findings are within acceptable limits.

1. Monitor EKG, cardiac rate and rhythm, and serial serum potassium values. Notify MD if potassium levels exceed 6.0 – 6.6 mEq/L.

2. Administer IV calcium gluconate or calcium chloride as prescribed.

3. Administer prescribed IV or oral fluids and/or ion-exchange resins.

Knowledge Deficit

Foods relatively high in potassium and diuretics that is potassium-sparing.

Desired Outcome

Patient can verbalize knowledge of foods that are relatively high in potassium and diuretics that are potassium-sparing.

1. Teach patient the importance of limiting dietary potassium intake.
2. As appropriate, teach patient about diuretics that spare potassium.

3.6 Hypokalemia

Causes

1. GI losses: Diarrhoea, vomiting, NG suctioning, intestinal or biliary fistulas.

2. Urinary losses as occurs in renal tubular disorders, osmotic diuresis, administration of potent diuretics, corticosteroid therapy.

3. Inadequate intake as seen in starvation, inadequate replacement during diuretic therapy, prolonged administration of potassium-free parenteral fluids.

3.6.1 Clinical Manifestation

1i. Fatigue
ii. Muscle weakness,
iii. Anorexia
iv. Nausea
v. Vomiting
vi. Decreased bowel sounds, paralytic ileus.

2. Heart arrythimas.
3. Laboratory findings: Repeated serum potassium <3.5 mEq/L.
4. On EKG: There is prolonged P–R interval, flattened or inverted T waves, S–T segment depression, and prominent U wave.

3.6.2 Medical Management

The goal is to replenish potassium without inducing hyperkalemia.

1. Administer oral potassium through dietary intake of potassium-rich foods or give oral potassium supplements in liquid, tablet, or powder form.

2. Administer IV potassium chloride if hypokalemia is severe.

3.6.3 Nursing Diagnoses

Knowledge Deficit

Foods high in potassium and diuretics that spare potassium.

Nursing Objective

Patient can verbalize knowledge of foods that are high in potassium and diuretics that spare potassium.

Interventions

1. Teach patient the importance of eating foods in potassium.
2. Give diuretics that spare potassium.

Risk for Alterations in Cardiac Output

Decreased: Risk of dysrhythmias secondary to hypokalemia.

Desired Outcome

Patient's vital sign and laboratory and physical findings are within acceptable limits.

1. Monitor vital sign. Assess cardiac rate and rhythm, noting character and intensity of pulse and heart tones.

2. Monitor serum potassium levels. Especially if below, notify MD if K + is below 3.5 mEq/L.

3. Administer oral potassium supplements with a lot of 4 ounces of water or fruit juice to minimize gastric irritation.

4. Where necessary, administer prescribed parenteral potassium supplements.

3.7 Calcium

Calcium serum level is controlled by hormonal activity of the parathyroid glands and is inversely related to phosphate levels. Calcium is necessary for the formation of bones and teeth, blood clotting, maintenance of the normal transmission of nerve impulses, and muscle contraction. Sufficient vitamin D and protein are required for normal calcium utilization. Approximately half the circulating calcium is bound to albumin; the rest is ionized (free).

Hypercalcemia refers to excess calcium. Hypocalceamia refers to calcium deficiency.

3.7.1 Hypercalcemia

Causes

1. Excessive administration of vitamin D
2. Prolonged immobility
3. Multiple fractures
4. Osteoporosis
5. Osteomalacia
6. Ingestion of excessive amounts of dietary calcium and/or calcium-containing antacids.

3.7.2 Clinical Manifestation

1. Anorexia
2. Nausea
3. Vomiting
4. Pathologic fractures
5. Deep bone pain
6. Flank pain (related to kidney stone formation).
7. Relaxed skeletal muscles
8. Personality changes
9. Lethargy
10. Stupor
11. Coma
12. Laboratory findings: Repeated serum calcium levels >5.8 mEq/L
13. EKG: Shortening of Q–T interval
14. Radiographic findings: Generalized osteoporosis, urinary calculi, bone cavitation

3.7.3 Medical Management

The goal is to restore normal serum calcium levels.

1. Promote renal calcium excretion: Rapidly infuse saline solution to induce calcium diuresis (sodium inhibits tubular reabsorption of calcium) and diuretics to prevent volume excess; replace urinary water, sodium, and potassium losses.

2. Restrict calcium intake.

3. Administer steroids to inhibit intestinal absorption of calcium and reduce inflammation and associated calcium-mobilizing stress response.

4. Administer calcitonin subcutaneously or intramuscularly to reduce serum calcium levels temporarily when hypocalcaemia is caused by increased parathyroid hormone (PTH).

5. Monitor serial serum calcium values.

3.7.4 Nursing Diagnoses

Alteration in Pattern of Urinary Elimination

Dysuria, urgency, or frequency related to presence of renal calculi.

Nursing Objective

Patient relates the return of a normal voiding pattern.

Interventions

1. Encourage early mobility to prevent further mobilization of calcium from the bones.

2. If patient is on bed rest, assist with ROM exercises.

3. Turn patient q2h, and encourage gastrocnemius, gluteal, and quadriceps muscle-setting exercises.

4. Administer prescribed fluids and medications, and encourage oral fluid intake to dilute urinary calcium, which can result in kidney stones.

5. Monitor I&O and serum calcium levels.

6. Strain all urine to check for renal stones.

7. Teach patient to avoid foods and medications high in calcium (e.g., cheese, milk, spinach, eggs, peanuts, oysters, and calcium-containing antacids).

3.8 Hypocalcemia

Causes

Loss of calcium-rich secretions through diarrhoea or wound exudates.

3.8.1 Clinical manifestation

1. Muscle cramps, paresthesia, numbness and tingling of the fingers, tetany.

2. Cardiovascular: Hypotension, bleeding if hypocalcemia is severe.

3. Laboratory findings: Repeated serum calcium values <4.5 mEq/ L or 8.5 mg/dL (provided that albumin level is within normal range).

4. EKG: Prolonged Q–T interval.

3.8.2 Medical Management

The goal is to restore serum calcium level to normal with minimal hypercalciuria.

1. Administer IV calcium: 100–200 mg calcium (10–20 mL 10% calcium gluconate) over 10–15 minutes in acute symptomatic hypocalcemia, followed by IV administration of 600–800 mg calcium gluconate in 1000 mL D_5W (5% dextrose in water), which is titrated until the need can be met orally.

2. Administer oral calcium supplements in less acute conditions.

3. Administer Vitamin D to enhance calcium absorption from the GI tract.

4. Monitor serial serum calcium.

3.8.3 Nursing Diagnoses

Potential for injury related to increased risk of seizure activity secondary to hypocalcemia.

Nursing Objective

Patient's physical findings are within acceptable limits.

Interventions

1. Administer prescribed calcium, Vitamin D, and magnesium supplements. Teach patient about foods containing calcium.

2. Observe patient for (1) numbness and tingling around the mouth, an early indicator or hypocalcemia, (2) signs and symptoms of tetany: muscle twitching, facial spasms, and painful tonic muscles spasms.

3. Monitor serum calcium values.

4. Assess for carpopedal spasm when blood supply to hand is decreased.

5. Assess spasm of lip and cheek when the facial nerve is tapped.

6. If significant findings are noted notify doctor.

4.0 CONCLUSION

Almost all medico surgical condition threatened fluid and electrolyte balance. There may be deficit or excesses of water or any electrolyte.

5.0 SUMMARY

- Sodium, pottasium, calcium and magnesium are major electrolyte in the body.

- The Buffer systems in the body are haemoglobin, protein carbonic acid con and bicarbonate con.

- The normal PH of the body is slightly alkaline – 7.30 – 7.45.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the functions of fluids and electrolytes to the body system.

7.0 REFERENCES/FURTHER READING

Brunner & Suddarth (2004). Medical Surgical Nursing. (10th ed) Lippincott Wilkins.

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UNIT 3 ACID BASE IMBALANCE

CONTENTS

1.0 INTRODUCTION

The human body maintains a relatively constant internal environment, of which the balance between acids and bases is one vital aspect. Optimally, cellular processes occur within a narrow range of pH values (concentration of free hydrogen ions). When an imbalance occurs, compensatory mechanisms engage to bring the pH into normal range. Arterial blood gas (ABG) analysis is a clinical tool that can reveal a variety of acid–base disturbances. Arterial blood is slightly alkaline solution with a normal pH range of 7.35 – 7.45. A decrease in the pH below approximate 6.8 or above 7.8 is incompatible with life. A variety of homeostatic mechanism interact to maintain the pH with normal limit

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain the role of the kidney lungs and chemical buffers in maintaining acid-base balance
- compare metabolic acidosis and alkalosis with regard to causes, clinical manifestations, diagnosis, and management
- compare respiratory acidosis and alkalosis with regard to causes, clinical manifestations, diagnosis, and management
- interpret arterial blood gas measurements
- demonstrate a safe and effective procedure of venipuncture
- describe the measures used for preventing complications of intravenous therapy.

3.0 MAIN CONTENT

3.1 Acids

There are two categories of acid found in the body: nonfixed (volatile) and fixed (nonvolatile).

1. Nonfixed Acids

These are acids that can change easily between a liquid and gas state. Carbonic acid (carbon dioxide dissolved in water) is the most prevalent nonfixed acid and is primarily controlled and excreted by the respiratory system.

2. Fixed Acids

These are produced by metabolic processes within the body and buffered and excreted by the kidneys. The three predominant categories include the following:

i. Sulfuric, phosphoric, and other acids that are produced from dietary intake.

ii. Lactic acid, produced by RBCs, WBCs, skeletal muscles, and the brain, and during periods of anaerobic metabolism (e.g., vigorous exercise, cardiac/respiratory arrest).

iii. Ketoacids, produced as byproducts of fatty acid oxidation. Fatty acids are an alternate energy source for cell metabolism in glucose-deficient states such as starvation and insulin-deficient states such as diabetes mellitus.

3.1.1 Bases

These are substances that are capable of accepting free hydrogen ions. Bicarbonate is the body's predominate base.

3.2 Maintenance of Acid–Base Balance

There are three ways the body maintains acid–base balance: the buffer system response, respiratory response, and renal response:

Buffer System Response

A buffer is a combination of two or more compounds that can combine either with acids or bases to maintain pH. One common combination is carbonic acid and sodium bicarbonate. Others are the plasma proteins, hemoglobin, phosphate, and ammonium complexes. A buffer may be regarded as a chemical sponge.

Respiratory System Response

This involves the change in rate and depth of ventilation. Increased respirations will cause CO_2 levels to decrease, and decreased respirations will increase CO_2 levels.

Renal Response

Kidney excretes varying amounts of acid or base thus controlling the body's PH. Controlling base bicarbonate does this. Excess hydrogen is excreted in urine. The kidney also excretes more or less bicarbonate to achieve balance. This occurs over a 2–3-day period and is the slowest of the three responses.

3.3 Acid –Base Imbalance

Body fluids are maintained within a PH range of 7.35 to 7.45. Imbalance in the PH of the body leads to acidosis or alkalosis. There are two categories of acid–base imbalance. These are respiratory and metabolic acidosis.

a. **Respiratory acidosis:** This is caused by clinical situations that interfere with pulmonary gas exchange, causing retention of CO2 and increase in the blood carbonic acid. Two major conditions that can cause respiratory acidosis are central nervous system depression and obstructive pulmonary disease.

b. **Respiratory alkalosis:** This is the result of lack of carbonic acid due to hyperventilation as in fever and anxiety.

c. **Metabolic acidosis:** This occurs because of high acid content in extracellular fluid and low base bicarbonate. This is characterized by deep and rapid breathing as the lungs exhale more CO_2 and the kidneys excrete hydrogen and urine becomes acidic. This is seen in diarrhoea, vomiting, diabetes mellitus etc.

d. **Metabolic alkalosis:** It occurs when the level of base bicarbonate is high. This may be caused by ingestion of large amounts of sodium bicarbonate or by the loss of chloride through vomiting or gastric suction.

3.4 Components of Arterial Blood Gases

Normal Values for Arterial Blood Gases

pH—7.40	range 7.38–7.42
$Paco_2$—40 mm Hg	range 36–44
HCO_3—24 mEq/L	range 22–26
Pao_2—90 mm Hg	range 80–100 (room air)

1. **pH:** The concentration of hydrogen and hydroxyl ions in equivalents per liter, or in the commonly known scale of pH. An increase in hydrogen ions will cause a more acidic environment, and a decrease will cause a more alkaline environment. pH is

inversely proportional to the number of hydrogen ions. As they increase in number, the pH decreases (acidosis occurs); as they decrease in number, pH increases (alkalosis occurs).

2. **$Paco_2$:** The partial pressure of dissolved CO_2 in arterial blood. Along with water, CO_2 is an end-product of cell metabolism; therefore, $Paco_2$ can be considered an index of the effectiveness of ventilation in relation to the metabolic rate. Carbon dioxide is highly soluble and can rapidly diffuse into plasma to form carbonic acid, which breaks down to form hydrogen and bicarbonate ions. The formation of hydrogen and bicarbonate ions plays an important role in diffusing O_2 and CO_2 in the lungs and in maintaining electrical neutrality within the RBCs.

3. **HCO_3:** The measurement of bicarbonate ion concentration in the blood. The bicarbonate system is the major and most immediate buffer response. Bicarbonate is a base, and is capable of accepting hydrogen ions. Increased amounts of bicarbonate or other bases can cause an alkaline environment. The kidneys regulate bicarbonate excretion and reabsorption.

4. **Pao_2:** The partial pressure of dissolved oxygen in arterial blood. Oxygen is dissolved and carried in the plasma and combined with hemoglobin in the RBCs. Hemoglobin plays a key role in the transport of CO_2 and O_2 from the lungs and tissue. Generally, hemoglobin has a strong affinity for oxygen, but this affinity can be altered by hydrogen ion concentration, CO_2 concentration, and body temperature.

3.5 Respiratory Acidosis

3.5.1 Causes

Reduced ventilation states found with respiratory arrest, head/brain trauma, pneumonia, hypoventilation caused by sedation or anesthesia, atelectasis, Guillain-Barre syndrome, chronic obstructive pulmonary disease (COPD).

3.5.2 Signs and Symptoms

Early signs include weakness, headache, fatigue, anxiety, and tremors. Progressive signs include dehydration and confusion, leading ultimately to coma if untreated.

3.5.3 Medical Management

a. Find the cause to determine appropriate treatment.
b. Administer bicarbonate.
c. Begin antibiotic therapy for patients with pneumonia.
d. Administer naloxone hydrochloride for patients who are oversedated.
e. Replace potassium chloride (because acidosis causes potassium ions to leave and hydrogen ions to enter the cells).

3.5.4 Nursing Diagnoses and Interventions

Potential alteration in respiratory function related to prolonged inactivity and/or omission of deep breathing,

Ineffective Breathing Pattern related to decreased respiratory depth secondary to anesthesia, immobility, and guarding with painful surgical incision.

(These are only a few examples of related nursing diagnoses.)

3.6 Metabolic Acidosis

3.6.1 Causes

Build up of fixed acids, as in cardiac arrest, renal failure, keto-acidosis, or ingestion of acidic substances; loss of base, as in diarrhoea.

3.6.2 Signs and Symptoms

Kussmaul's respirations, dehydration, lethargy, malaise, fatigue, nausea/ vomiting, headache, SOB, vasodilatation, tremors, coma.

3.6.3 Medical Management

i. Find the cause to determine appropriate treatment.
ii. If ketoacidosis is the cause, administer glucose, insulin, or IV potassium chloride.
iii. Replace fluid losses.
iv. Administer bicarbonate.
v. If renal failure is the cause, prescribe diet low in protein and high in carbohydrates.
vi. Replace phosphates.

3.6.4 Nursing Diagnoses

Fluid Volume Deficit related to abnormal losses.

Nursing Objective

Patient's vital sign, physical findings, and lab values are within acceptable limits.

Nursing Intervention

1. Monitor input and output and vital sign; evaluate laboratory results for abnormal values of glucose and potassium; monitor EKG for evidence of cardiac dysrhythmias.

2. Assess for signs of dehydration and decreased sensorium.

3. Test urine pH and specific gravity.

4. Encourage intake of fluids and/or administer fluids such as IV lactate and $NaHCO_3$ as prescribed.

5. Institute seizure precautions if patient exhibits signs of decreased sensorium.

3.7 Respiratory Alkalosis

3.7.1 Causes

Hyperventilation states, as in mechanical overventilation, pain, anxiety, brain injury, fever, pulmonary edema, acute asthma.

3.7.2 Signs and Symptoms

Dizziness, lethargy, weakness, tingling, spasms, tetany, anxiety.

3.7.3 Medical Management

a. Find the cause to determine appropriate treatment.

b. Decrease ventilations, for example, with sedation or rebreathing apparatus.

c. Replace sodium and/or chloride.
d. Replace potassium chloride.

3.7.4 Nursing Diagnoses

Ineffective-breathing patterns related to hyperventilation.

Nursing objective

Patient's respiratory rate and depth are within acceptable limits.

Nursing intervention

1. Monitor vital signs...
2. Place patient in semi-fowler's position to enhance ventilation.
3. Allay patient's anxieties.
4. Sedate patient as prescribed.

3.8 Metabolic Alkalosis

3.8.1 Causes

This is caused by the build up of bicarbonate or base by ingestion of bicarbonate in the form of antacids; loss of chloride or hydrogen ions as with long-term NG suctioning, diuretic therapy, and/or vomiting; and corticosteroid treatment.

3.8.2 Signs and Symptoms

Dizziness, lethargy, weakness, dyshythmias, tetany, hypoventilation, convulsions, irritability, disorientation.

3.8.3 Medical Management

a. Find the cause to determine appropriate treatment.
b. Replace fluids; administer intravenous fluids.
c. Replace potassium, sodium, and/or chloride, if needed.
d. Administer acetazolamide to increase excretion of HCO_3.

3.8.4 Nursing Diagnoses

Fluid volume deficit related to abnormal losses.

Nursing Objective

Patient's vital sign, physical findings, and lab values are within acceptable limits.

1. Monitor input and output; monitor for indicators of hypokalemia, such as dysrhyhmias and tetany.

2. Ensure minimal bicarbonate administration or ingestion.

3. Administer potassium chloride, sodium chloride, and fluids as prescribed.

4. Use saline rather than water to irrigate NG tube.

5. Institute seizure precautions if indicated.

3.9 Parental Fluid Therapy

Intravenous fluid administration is performed in the hospital, out patient diagnostic and surgical settings, clinics, and home to replace fluids, administer medications, and provide nutrients when no other route is available.

3.9.1 Purpose

Generally, intravenous fluids are administered to achieve one or more of the following goals.

- To provide water, electrolytes, and nutrients to meet daily requirements.

- To replace water and correct electrolyte deficits.

- To administer medications and blood products.

3.9.2 Types of IV Solutions

Solutions are often categorized as isotonic, hypotonic, or hypertonic, according to whether their total osmolality is the same as, less than, or greater than that of blood.

Isotonic Fluids

Fluids that are classified as isotonic have a total osmolality close to that of the ECF and do not cause red blood cells to shrink or swell. The composition of these fluids may or may not approximate that of the ECF.

D_5W

A solution of D_5W has a serum osmolality of 252 mOsm/L. Once administered, the glucose is rapidly metabolized, and this initially isotonic solution then disperses as a hypotonic fluid, one-third extracellular and two-thirds intracellular. During fluid resuscitation, this solution should not be used because it can cause hyperglycemia. Therefore, D_5W is used mainly to supply water and to correct an increase serum osmolality.

Normal Saline Solution

Normal saline (0.9% sodium chloride) solution has a total osmolality of 308 mOsm/L. Because the osmolality is entirely contributed by electrolytes, the solution is often used to correct an excellular volume deficit. Although referred to as "normal," it contains only sodium and chloride and does not actually simulate the ECF. It is used with administration of blood transfusions and to replace large sodium losses, as in burn injuries. It is not used for heart failure, pulmonary edema, renal impairment, or sodium retention. Normal saline does not supply calories.

Several other solutions contain ions in addition to sodium and chloride and are somewhat similar to the ECF in composition. Lacnated Ringer's solution contains potassium and calcium in addition to sodium chloride. It is used to correct dehydration and sodium depletion and replace GI losses. Lactated Ringer's solution contains bicarbonate precursors as well.

Hypotonic Fluids

One purpose of hypotonic solutions is to replace cellular fluid, because it is hypotonic as compared with plasma. Another is to provide free water for excretion of body wastes. At times, hypotonic sodium solutions are used to treat hypernatremia and other hyper-osmolar conditions. Excessive infusions of hypotonic solutions can lead to intravascular fluid depletion, decreased blood pressure, cellular edema, and cell damage. These solutions exert less osmotic pressure than the ECF.

Hypertonic Fluids

Higher concentrations of dextrose, such as 50% dextrose in water, are administered to help meet caloric requirements. These solutions are strongly hypertonic and must be administered into central veins so that they can be diluted by rapid blood flow.

3.9.3 Other IV Substances

When the patient's GI tract is unable to tolerate food, nutritional requirements are often met using the IV route. Parental solutions may include high concentrations of glucose, protein, or fat to meet nutritional requirements. The parenteral route may also be used to administer colloids, plasma expanders, and blood products. Examples of blood products include whole blood, packed red blood cells, albumin, and cryoprecipitate. The IV route also delivers many medications, either by infusion or directly into the vein. Because IV medications enter the circulation rapidly, administration by this route is potentially very hazardous. All medications can produce adverse reactions; however, medications given by the IV route can cause these reactions within 15 minutes after administration because the medications are delivered directly into the bloodstream. Administration rates and recommended dilutions for individual medications are available in specialized texts pertaining to IV medications and in manufacturers' package inserts; these should be consulted to ensure safe IV administration of medications.

3.9.4 Nursing Management

Choosing an IV Site

Many sites can be used for IV therapy. Because they are relatively safe and easy to enter, arm veins are most commonly used (Fig. 1). The metacarpal, cephalic, basilic, and median veins as well as their branches are recommended sites because of their size and ease of assess. Ideally, both arms and hands are carefully inspected before choosing a specific venipuncture site that does not interfere with mobility. For this reason, the antecubital fossa is avoided, except as a last resort. The following are factors to consider when selecting a site for venipuncture:

1. Condition of the vein
2. Type of fluid or medication to be infused
3. Duration of therapy
4. Patient's age and size
5. Whether the patient is right- or left-handed
6. Patient's medical history and current health status
7. Skill of the person performing the venipuncture.

After applying a tourniquet, the nurse palpates and inspects the vein. The vein should feel firm, elastic, engorged, and round not hard, flat, or bumpy. Because arteries lie close to veins in the antecubital fossa, the vessel should be palpated for arterial pulsation (even with a tourniquet

on), and cannulation of pulsating vessels should be avoided. General guidelines for selecting a cannula include:

1. **Length:** ¾ to 1.25 inches long

2. **Diameter:** narrow diameter of the cannula to occupy minimal space within the vein

3. **Gauge:** 20 to 22 gauge for most Intravenous fluids; a larger gauge caustic or viscous solutions; 14 to 18 gauge for blood administration and for trauma patients and those undergoing surgery

Hand veins are easiest to cannulate. The tips should not rest in a flexion area (e.g., the antecubital fossa) as this could inhibit the IV flow.

3.9.5 Venipuncture Devices

Equipment used to gain access to the vasculatute includes cannulas, needleless IV delivery systems, and peripherally inserted central catheter or midline catheter access lines.

Cannulas. Most peripheral access devices are cannulas. They have an obturator inside a tube that is later removed. “Catherer” and “Cannula” are terms that are used interchangeably. The main types of cannula devices available are those referred to as winged infusion sets (butterfly) with a steel needle or as an over-the-needle catheter with wings indwelling plastic cannulas inserted through a steel needle. Scalp vein or butterfly needles are short steel needles with plastic wing handles. These are easy to insert, but they are small and nonpliable.

Preparing the IV Site

Before preparing the skin, the nurse should ask the patient if he or she is allergic to latex or iodine, products commonly used in preparing for IV therapy. Excessive hair at the selected site may be removed by clipping to increase the visibility of the veins and to facilitate insertion of the cannula and adherence of dressings to the IV insertion site. Because infection can be a major complication of IV therapy, the IV device, the fluid, the container, and the tubing must be sterile. The insertion site is scrubbed with a sterile pad soaked in 10% povidone-iodine (Betadine) or chlorhexidine gluconate solution for 2 to 3 minutes, working from the center of the area to the periphery and allowing the area to air day. The site should not be wiped with 70% alcohol because the alcohol negates the effect of the disinfecting solution. (Alcohol pledgets are used for 30 seconds instead, only if the patient is allergic to iodine.) The nurse must

perform hand hygiene and put on gloves. Nonsterile disposable gloves must be worn during the venipuncture procedure because of the likelihood of coming into contact with the patient's blood.

3.9.6 Factors Affecting Flow

The flow of an IV infusion is governed by the same principles that govern fluid move in general.

1. Flow is directly proportional to the height of the liquid column. Raising the height of the infusion container may improve a sluggish flow.

2. Flow is directly proportional to the diameter of the tubing. The clamp on Ivtubing regulates the flow by changing the tubing diameter. In addition, the flow is faster through large-gauge rather than small-gauge cannulas.

3. Flow is inversely proportional to the length of the tubing. Adding extension tubing to an IV line will decrease the flow.

4. Flow is inversely proportional to the viscosity of a fluid. Viscous IV solutions, such as blood, require a larger cannula than do water or saline solutions.

3.9.7 Guidelines for Starting an Intravenous

Nursing	**Rationale**
Preparation	
1. Verify prescription for IV therapy, check solution label, and identify patient.	1. Serious errors can be avoided by careful checking.
2. Explain procedure to patient.	2. Knowledge increases patient comfort and cooperation.
3. Carry out hand hygiene and put on disposable nonlates gloves.	3. Asepsis is essential to prevent infection. It Prevents exposure of nurse to patient's blood and of patient and nurse to latex.
4. Apply a tourniquet 4–6 inches above the site and identify a suitable vein.	4. This will distend the veins and allow them to be visualized.
5. Choose site. Use distal veins of hands and arms first.	5. Careful site selection will increase likelihood of successful venipuncture and preservation of vein. Using distal sites first preserves sites proximal to the

6. Choose IV cannula or catheter.	previously cannulated site for subsequent venipunctures. Veins of feet and lower extremity should be avoided due to risk of thrombophiebitis. (In consultation with the physician, the suphenous vein of the ankle or dorsum of the foot may occasionally be used.) 6. Length and gauge of cannula should be appropriate for both site and purpose of infusion. The shortest gauge and length needed to deliver prescribed therapy should be used.
7. Connect infusion bag and tubing and run solution through tubing to displace air; cover end of tubing.	7. Prevent delay; equipment must be ready to connect immediately after successful venipuncture to prevent clotting.
8. Raise bed to comfortable working height and position for patient; adjust lighting. Position patient's arm below heart level to encourage capillary filling. Place protective pad on bed under patient's arm.	8. Proper positioning will increase likelihood of success and provide comfort for patient.
Procedure	
1. Depending on agency policy and procedure, lidocaine 1% (without epinephrine) 0.1–0.2 ml may be injected locally to the IV site or a transdermal analgesic cream (EMLA) may be applied to the site 60 minutes before IV placement or blood withdrawal. Intradermal injection of bacteriostatic 0.9% sodium chloride may have local anesthetic effect.	1. Reduces pain locally from procedure and decreases anxiety about pain.
2. Question the patient carefully about sensitivity to latex; use blood-pressure cuff rather than latex tourniquet if there is possibility of sensitivity.	2. Reduces risk of allergic reaction.
3. Apply a new tourniquet for each patient or a blood pressure cuff 15 to 20 cm (6–8 in) above injection site. Palpate for a pulse distal to the	3. The tourniquet distends the vein and makes it easier to enter; it should never be tight enough to occlude arterial flow. If a radial pulse cannot be palpated distal to

tourniquet. Ask patient to open and close fist several times or position patient's arm in a dependent position to distend a vein.	the tourniquet, it is too tight. A new tourniquet should be used for each patient to prevent the transmission of microorganisms. A blood pressure cuff may be used for elderly patients to avoid rupture of the veins. A clenched fist encourages the vein to become round and turgid. Positioning the arm below the level of the patient's heart promotes capillary filling. Warm packs can promote vasodilatation as well.
4. Ascertain if the patient is allergic to iodine. Prepare site by scrubbing with chlorhexidine gluconate or povidone-iodine swabs for 2 – 3 min in circular motion, moving outward for injection site. Allow to dry. a. If the site selected is excessively hairy, clip hair. (Check agency's policy and procedure about this practice.) b. 70% isoprophyl alcohol is an alternative solution that may be used.	4. Strict asepsis and careful site preparation are essential to prevent infection.
5. With hand not holding the venous access device, steady patient's arm and use finger or thumb to pull skin taut over vessel.	5. Applying traction to the vein helps to stabilize it.
6. Holding needle bevel up and at 5°–25° angle, depending on the depth of the vein, pierce skin to reach but not penetrate vein.	6. Bevel-up position usually produces fewer traumas to skin and vein. A superficial vein needs a smaller cannula angle and a vein deeper in subcutaneous tissue requires a greater cannula angle.
7. Decrease angle of needle further until nearly paralled with skin, then enter vein either directly above or from the side in one quick motion.	7. Two-stage procedure decreases chance of thrusting needle through posterior wall of vein as skin is entered. No attempt should be made to reinsert the stylet because of risk of severing or puncturing the catheter.
8. It backflow of blood is visible, straighten angle and advance needle. Additional steps for catheter inserted over needle:	8. Backflow may not occur if vein is small; this position decreases

e. Advance needle 0.6 cm (¼ – ½ in) after successful venipuncture. f. Hold needle hub, and slide catheter over the needle into the vein. Never reinsert needle into a plastic catheter or pull the catheter back into the needle. g. Remove needle while pressing lightly on the skin over the catheter tip; hold catheter hub in place.	chance of puncturing posterior wall of vein. a. Advancing the needle slightly makes certain the plastic catheter has entered the vein. b. Reinsertion of the needle or pulling the catheter back can sever the catheter, causing catheter embolism. c. Slight pressure prevents bleeding before tubing is attached.
9. Release tourniquet attaches infusion tubing; open clamp enough to allow drip.	9. Infusion must be attached promptly to prevent clotting of blood in cannula. After two unsuccessful attempts at venipuncture, assistance by a more experienced health care provider is recommended to avoid unnecessary trauma to the patient and the possibility of limiting future sites for vascular access.
10. Slip a sterile 2-in x 2-in gauze pad under the catheter hub.	10. The gauze acts as a sterile field.
11. Anchor needle firmly in place with tape.	11. A stable needle is less likely to become dislodged or to irritate the vein.
12. Cover the insertion site with a transparent dressing, bandage, or sterile gauze; tape in place with nonallergenic tape but do not encircle extremity.	12. Tape encircling extremity can act as a tourniquet.
13. Tape a small loop of IV tubing onto dressing.	13. The loop decreases the chance of inadvertent cannula removal if the tubing is pulled.
14. Cover the insertion site with a dressing according to hospital policy and procedure. A gauze or transparent dressing may be used.	14. Transparent dressings allow assessment of the insertion site for phlebitis, infiltration, and infection without removing the dressing.
15. Label dressing with type and length of cannula, date, time, and initials.	15. Labelling facilitates assessment and safe discontinuation.
16. A padded, appropriate-length arm board may be applied to an area of	16. Secures cannula placement and allows correct flow rate (neurovascular checks assess

flexion (neurovascular checks should be performed frequently).	nerve, muscle, and vascular function to be sure function is not affected by immobilization).
17. Circulate infusion rate and regulate flow of infusion. For hourly IV rate use the following formular: gtt/mL of infusion set/60 (min in hr) total hourly vol=gtt/min.	17. Infusion must be regulated carefully to prevent over infusion or under infusion. Calculation of the IV rate is essential for the safe delivery of fluids. Safe administration requires knowledge of the volume of fluid to be infused, total infusion time, and the calibration of the administration set (found on the IV tubing package; 10, 12, 15, or 60 drops to deliver 1 mL of fluid).
18. Document site, cannula size and type, the number of attempts at insertion, time, solution, IV rates, and patient response to procedure.	18. Documentation is essential to promote continuity of care.

3.9.8 Complications

IV therapy predisposes the patient to numerous hazards, including both local and systemic complications. Systemic complications occur less frequently but are usually more serious than local complications. They include circulatory overload, are embolism, febrile reaction, and infection.

Fluid Overload

Overloading the circulatory system with excessive intravenous fluids causes increased blood pressure and central venous pressure. Signs and symptoms of fluid overload include moist crackles on auscultation of the lungs, edema, weight gain, dyspnea, and respirations that are shallow and have an increased rate. Possible causes include rapid infusion of an IV solution or hepatic, cardiac, or renal disease. The risk for fluid overload and subsequent pulmonary edema is especially increased in elderly patients with cardiac disease; this is referred to as circulatory overload. The treatment for circulatory overload is decreasing the IV rate, monitoring vital signs frequently, assessing breath sounds, and placing the patient in a high Fowler's position. The physician is contacted immediately. This complication can be avoided by using an infusion pump for infusions and by carefully monitoring all infusions. Complications of circulatory overload include heart failure and pulmonary edema.

Air Embolism

The risk of air embolism is rare but ever-present. It is most often associated with cannulation of central veins. Manifestations of air embolism include dyspnea andcyanosis; hypotension; weak, rapid pulse; loss of consciousness; and chest, shoulder, and low back pain. Treatment calls for immediately clamping the cannula, placing the patient on the left side in the Trendelenburg position, assessing vital signs and breath sounds, and administering oxygen. Air embolism can be prevented by using a Luer-Lok adapter on all lines, filling all tubing completely with solution, and using an air detection alarm on an IV pump. Complications of air embolism include shock and death. The amount of air necessary to induce death in humans is not known; however, the rate of entry is probably as important as the actual volume of air.

Septicemia and Other Infection

Pyrogenic substances in either the infusion solution or the IV administration set can induce a febrile reaction and septicemia. Signs and symptoms include an abrupt temperature elevation shortly after the infusion is started, backache, headache, increased pulse and respiratory rate, nausea and vomiting, diarrhoea, chills and shaking, and general malaise. In severe septicemia, vascular collapse and septic shock may occur. Cause of septicemia includes contamination of the IV product or a break in aseptic technique, especially in immunocompromised patients. Treatment is symptomatic and includes culturing of the IV cannula, tubing, or solution if suspect and establishing a new IV site for medication or fluid administration.

Infiltration and Extravasation

Infiltration is the unintentional administration of a nonvesicant solution or medication into surrounding tissue. This can occur when the IV cannula dislodges or perforates the wall of the vein. Infiltration is characterized edema around the insertion site, leakage of Intravenous fluid from insertion site, discomfort and coolness in the area of infiltration, and a significant decrease in the flow rate. When the solution is particularly irritating, sloughing of tissue may result. Closely monitoring of the insertion site is necessary to detect infiltration before it becomes severe.

Phlebitis

Phlebitis is defined as inflammation of a vein related to a chemical or mechanical irritation, or both. It is characterized by a reddened, warm area around the insertion site or along the vein, and swelling.
Treatment consists of discontinuing the IV and restarting it in another site, and applying a warm, moist compress to the affected site. Phlebitis can be prevented by using aseptic technique during insertion, using the appropriate-size cannula or needle for the vein, considering the composition of fluids and medications when selecting a site, observing the site hourly for any complications, anchoring the cannula or needle well, and changing the IV site according to agency policy and procedures.

Hematoma

Hematoma results when blood leaks into tissues surrounding the IV insertion site. Leakage can result from perforation of the opposite vein wall during venipuncture, the needle slipping out of the vein, and insufficient pressure applied to the site after removing the needle or cannula. The signs of a hematoma include ecchymosis, immediate swelling at the site, and leakage of blood at the site.

Treatment includes removing the needle or cannula and applying pressure with a sterile dressing; applying ice for 24 hours to the site to avoid extension of the hematoma and then a warm compress to increase absorption of blood; assessing the sites; and restarting the line in the other extremity if indicated. A hematoma can be prevented by carefully inserting the needle and using diligent care when a patient has a bleeding disorder, takes anticoagulant medication, or has advanced liver disease.

4.0 CONCLUSION

The balance between acids and bases is one vital mechanism that the body uses to maintain internal homeostasis. When an imbalance occurs, compensatory mechanisms engage to bring the pH into normal range. Arterial blood gas (ABG) analysis is a clinical tool that can reveal a variety of acid–base disturbances.

5.0 SUMMARY

- Intravenous fluids are administered to provide water, electrolytes, and nutrients to meet daily requirements and to administer medications and blood products.
- **IV Solutions** are often categorized as isotonic, hypotonic, or hypertonic, according to whether their total amorality is the same as, less than, or greater than that of blood.

- There are three ways the body maintains acid–base balance: the buffer system response, respiratory response, and renal response

6.0 TUTOR-MARKED ASSIGNMENT

7.0 REFERENCES/FURTHER READING

Barbara C, Long and Wilma J. Phipps (1985). *Essentials of Medical-Surgical Nursing. A Nursing Process Approach*. St. Loius: The C. V. Mosby Company.

UNIT 4 INFLAMMATION

CONTENTS

1.0 INTRODUCTION

Natural protection of the body against invasion by organisms and damage by injury is ensured by the process of inflammation and the immune system. Inflammation can therefore be protective in certain circumstances and harmful in others. This unit exposes you to inflammation processes in the body

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain the concept of inflammation
- describe inflammation response.

3.0 MAIN CONTENT

Definitions

Inflammation has been defined in several ways. But the basic underlying principle of these definitions is that inflammation occurs following the presence of any foreign irritating matter in the body in an attempt to remove or resist this foreign material.

According to Jones D. A. et al, inflammation is a protective mechanism exhibited by the tissues in response to an insult that may be of various origins. Inflammation is a tissue reaction to injury or irritants.

3.1 Causes of inflammation

Various agents are responsible for inflammation.

These include

1. **Chemical: -** Strong acids and alkalis, irritating gases, poisons, drugs.

2. **Biological:** - Micro organisms.

3. **Immunological: -** Antigen – antibody and auto – immune reactions.

4. **Mechanical:** - Trauma, pressure.

5. **Thermal:** - Extreme heat or cold.

3.2 Inflammatory Response

This is an active and aggressive response to tissue injury and infection. It is a process or reaction to relieve the area of injury and to prepare it for repair. And it is one of the most common responses of the body to injury. Injury can be caused by bacteria invasion, mechanical, chemical.

Body structures that defend the body against injury are:

1) Intact skin and mucous membranes.

2. Bone structures such as skulls, ribs and pelvis.

3. Secretions of some glands help to remove irritants e.g. hydrochloride acid removes any ingested germs.

4. Reflexes such as blinking, sneezing, coughing, vomiting, prevent contact with injurious agents or remove then after they have gained entrance to body structures.

Certain cells in the blood destroy harmful elements by digestion or by altering their chemical structure for example the lymphatic system.

When the body is subjected to adverse conditions, it may respond in several ways. These include:

a. Hyperplasia

This is extra growth of normal tissue resulting in hypertrophy. The physiology is unknown. It usually occurs in time of need. For example if one kidney is removed and the other enlarges. At other times hyperplasia may result where there is no apparent need and this often results in illness or toxicity to the body. Example of these include hypertrophy of the thyroid gland, prostate gland, tumor formation

b. Activities of the Autonomic Nervous System

This system provides body protection because of the adjustments it makes automatically in response to ever-changing environment. Sweating regulated – speed and slowing of heartbeat etc.

c. Fever

Fever is one of the body's responses to a microorganism. It is a reliable indication of a path physiological process in the body, usually inflammation or infection. Although it can have ill effects such as cellular damage or fluid or electrolytes imbalance, it also has a useful purpose in some infections. It can destroy a large numbers of organisms or make some less virulent. It can also help to identify hidden infections. The increase of metabolism may support an increase of antibody formation.

d. Pain

Although pain is a disagreeable sensation, its purpose is mainly protective. The destruction that can occur in the absence of pain demonstrates its value.

3.3 Pathophysiology

Injury to the tissue involves local and systemic responses. Local response consists of vascular response and cellular response. Shortly

after the injury, there is brief constriction of blood vessels which may last for five minutes. This is replaced by dilatation of the vessels occurring within thirty minutes of the injury. The dilatation of the blood vessels accounts for increased blood supply – (hyperemia) and increased permeability of the venules and capillaries.

Exudation (escape) of some cells and fluid (plasma) into the tissues occurs. Hypereamia causes redness and heat as seen and felt on the affected part. Swelling and firmness are brought about by the accumulation of fluid and cells in the interstitial spaces. Pain occurs due to the pressure of the exudate on nerve endings. Pain and swelling account for the loss of function of the area. This vascular response is basically mediated by the presence of histamine released by injured or irritated cells.

There is decrease in the intravascular volume, following the escape of plasma and some blood cells into the tissue. Consequently, blood flow, through the dilated vessels, decreases. Leucocytes marginate (adhere to the walls of the blood vessels) and move through the capillary walls to the inflammatory site (diapedesis). Chemical products within the tissue (products of inflammation, bacterial toxins) attract these leucocytes (chemotaxis) to the site where they engulf and destroy or inactivate the foreign substances through a process called phagocytosis.

Inflammation of bacterial origin often results in abscess formation due to the walling of the inflammed area. An abscess is a cavity formed as phagocytosis takes place and damaged tissue is consumed. Pus formation (suppuration) occurs after phagocytes have engulfed and digested bacteria and necrotic tissue. The phagocytic cells eventually die. Pus consists of dead phagocytic cells, partially digested and undigested bacteria and necrotic tissue. Enzymes liberated by the dead cells digest the dead debris and accounts for the liquid consistency of pus. The presence of undigested bacteria makes the exudates highly infectious. The pus may be absorbed to the surrounding tissues if the abscesses remain encapsulated and content autolyzed. It may persist in an encapsulated abscess.

The systemic responses occur, especially in inflammatory conditions caused by invasive micro organisms. Leucocytosis and an increase in erythrocyte sedimentation rate are main features. When soluble products of tissue reaction diffuse into the blood stream (toxaemia) general body irritation and non-specific responses are manifested. These responses include general malaise, loss of appetite, headache, lethargy, weakness, and fever. These symptoms are also referred to as constitutional symptoms.

3.4 Clinical Manifestations

A. Local

1. Redness seen on the affected area
2. Heat felt on the affected area
3. Swelling
4. Pain
5. Loss of function in the affected area
6. Pus formation

B. Systemic

1. Leucocytosis
2. Increased erythrocyte sedimentation rate (ESR)
3. General Malaise
4. Loss of appetite
5. Headache
6. Fever
7. Lethargy
8. Weakness

3.5 Characteristics of the Exudates

The fluid that forms:

1. Serous Exudates

On a mild inflammation, serum is similar to the normal insterstial fluid e.g. burns, it is a clear fluid.

2. Fibrinous or serosanguinous

Found on a more severe form inflammation contains large amount of fibrin and can be found with patient in burns.

3. Purulent Exudates

This is the exudates that contains a lot of pus, found in an infection that is caused by pyogenic bacteria (pus forming bacteria) can be whitish, the serous sanguinous is pinkish in colour; purulent can be whitish, yellowish, pinkish, greenish, depending on the kind of organism.

3.6 Termination of Inflammatory Response

1. Resolution

Products of inflammation are digested and absorbed into the circulation.

2. Spontaneous Rupture and Drainage

E.g. boils – it nurtures on its own, when the exudates gathers at one point, it ruptures on is own. Drain surface through a sinus or tract.

3. Surgical Drainage (1 + D) Incision and Drainage

Cut and drain surgically / Done Surgically under aseptic technique, facilitates healing by aiding in removal of materials that can be etherioise absorbed and digested before healing can take place.

4. Ulcers or Erosion

Sometimes you can have ulcers extend through covering members, erosion involves only the covering membrane, erosion is more superficial where as ulcers are deeper.

5. Organism Causing Infection

Staphylococcus onus and staphylococcus algus Alpha and beta nemolytic streptococcal, clostridium tetani, Escherichia coli (E. coli), Acrobacter organism.

3.7 Management

Usually, resolution follows inflammation and repair of the damaged tissue takes place. This process may be achieved naturally if the individual's body defence system is adequate to bring about resolution without any assistance. In case of a more severe injury when resolution is not easily accomplished death of some cells occurs. The area is healed by replacement of the destroyed tissue with living cells. This process requires a considerable strengthening of the body defence mechanisms and weakening the attack.

Nursing Intervention

1. Strengthening the Defences

Rest is essential in overcoming the inflammatory reactions. It assists the body to mobilize adequate defence mechanisms and decreases the

energy being expended by the patient. Local rest can be achieved with the use of splints, slings, and sand bags. Further trauma is prevented and pain lessened.

Affected parts should be elevated as it encourages venous and lymphatic drainage, reduces swelling, increases fresh blood flow to the area. Fresh blood carries more elements to combat the offending agent and facilitates repair.

Application of heat or cold could be carried out. Heat causes relaxation of muscles, facilitates increased blood flow. Cold constricts blood vessels; reduces volume of exudates and the degree of swelling. It lessens pain by reducing nerve endings sensitivity and also prevents the growth of bacteria when they are the cause agents.

Nutritional status of the patient should be promoted and maintained by the nurse. There is need for increased calorie intake to meet the increased energy demand and tissue catabolism. Vitamin C is essential for the formation of collagen fibers that support the development of fibrous tissue. Increased protein intake is needed to provide essential amino acids important for new tissue growth.

Prescribed medications, which may include analgesics, antibiotics, antitoxin or anti-inflammatory agents, should be administered.

In the presence of an open lesion surgical wound dressing should be carried out to promote healing. Aseptic measures should be considered. Assessment of the patient should be carried out by the nurse.

2. Weakening the Attack

The use of antibiotics is the most desirable method of weakening the attack of the micro-organisms. This, however, should not be used in trivial infections when the defences of the body are likely to prove adequate on their own. Ideally, antibiotics are only employed after sensitivity tests have been carried out and results indicate the type of antibiotics to be used. The antibiotics are used either systemically or locally introducing them into wounds in the form of powders.

When pus has formed, antibiotics will only sterilize it (the pus) and healing will not occur until removal of the pus has been done. Incision of the abscess is therefore indicated. This (the incision line) must be sufficient to permit free drainage.

3. Replacement of fluids

- Increase metabolic rate and the loss of fluid need replacement.
- Give nourishing fluids: fruit juice, pepper soup, bournvita, pineapple, lucozade e.t.c.
- Provision of nourishment (bland diet – diet that is not containing roughages).
- Make sure the food is balanced.
- If the patient is draining profusely from the inflammation side, lost protein has to be replaced.
- Nutrients to increase caloric intake.
- Emotional support should be provided.
- Provision of comfort measure.
- Reassure the patient

3.8 Nursing Care of Patient with Inflammation

1. Goal is to prevent further injury.

2. Understand the nature of the warning of the inflammation.

3. Premature or improper opening of an abscess will interfere with mechanism of the body for limiting the spread of micro-organism and lead to their wide spread determination.

4. Ambulation of boils and tissues should be avoided until they have a well defined area of pus in the centre, and then they should be opened under surgical conditions.

5. Medical and surgical asepsis should be maintained.

6. Pus should not come in contact with surrounding skin or person caring for abscess.

7. Pus contains living bacteria as well as enzymes which can digest both dead and living tissues therefore, when changing dressings, you should protect self by using instruments or glares.

8. Good hand washing technique.

9. Careful disposal of dressing.

10. Protection of one part of the body by use of cradle and support e.t.c.

11. Conservation of energy through rest.

12. Production of leukocytes, increase blood flow, removal of debris and tissue repair all require energy expense.

13. Promotion of adequate circulation to the affected area to be able to covert invasion of the pathogenic organism and promote healing.

14. Heat is the form of dry or most heat so that blood flow to that area will be increased.

15. Medical wet heat fermentation, siting bath, use of hot H_2O bottle – to apply heat and increase blood supply to affected area.

16. Elevation of the extremity involved to promote venous returns, and help to reduce pain, improve circulation.

17. Use of bandage to promote comfort, promote venous return, and support the area to relieve pain.

18. Assistance in overcoming causative agent – removal of foreign body.

19. Give specific antibiotics before giving antibiotics; be sure of the causative organism.

20. Removal of debris through incision and drainage Debridment (removal of dead tissue.) Debridment done for osteomylibis (inflammation of the bones) is:

3.9 Allergy

Definitions

Allergy is an abnormality or disease condition in which the immunological defence system responds by forming antibodies to agents, which are not usually antigenic. It differs from beneficial immunological reactions in that there is harm to body tissue. It can occur at any age and often differs in the same individual over the years.

3.9.1 Common Causes

a) Inhalants – dust, feathers, animal danders, pollen

b) Ingestants – egg, seafood, nuts, chocolate

c) Contactants - wool, dye, nylon, cosmetics

d) Drugs – penicillin, ASA, quinine, chloroquine, dragents such as Telepoques

3.9.2 Types of Allergic Reactions

a) Immediate

(1) Occurs within seconds or minutes
(2) Antibodies are found in the blood stream
(3) Localized lesion or systemic reaction (anaphylactic shock)

b) Delayed

(1) Takes several hours or days to develop
(2) No antibodies in plasma but probably in lymphatic system

3.9.3 Pathophysiology

Most of the pathological effects of mild and severe allergic reactions can be traced to the effects of suddenly released histamine on the blood vessels, bronchial muscles, and exocrine gland cells.

a) On the Vascular System

Initial skin flush with wheal or edema at the site. Itching at these urticarial sites caused by action of histamine on sensory nerve endings in the skin. Histamine acts as vasodilator, this account for the flushing and for vascular headache. Histamine increases capillary permeability which causes the swelling. It also causes laryngeal edema and nasal congestion. Because blood trapped in dilated terminal arterioles, protein containing fluid is forced into the extravascular spaces. This loss of plasma proteins together with the reduced resistance of the arterioles results in fall in blood pressure, decreased cardiac output which can result in loss blood flow to brain and loss of consciousness and loss of respiratory control.

b) On smooth Muscle

Smooth muscles, other than those of small arterioles, are contracted. This is pronounced in bronchioles which reduces vital capacity. Breathing becomes difficult as in asthma.

c) Exocrine Glands

G.I. tract, respiratory system, lacrimals etc. are stimulated by histamine. Increased HCL causes epigastric distress, nausea, vomiting, and

diarrhoea. This will result in increase in bronchial secretions in asthma, and increased lacrimation in hay fever.

3.9.4 Diagnosis

a. Establishing a cause and effect relationship may not be clear cut if patient is allergic to several things.

b. Careful and detailed history is very important.

c. Skin tests.

(1) Begin by scratch on skin.
(1) If scratch is negative, small amount of antigen is injected intradermally.
(2) Wait for 20 minutes and observe for any reaction.
(3) Positive test is indicated by a wheal surrounded by erythema.
(5) Observing for reactions after skin tests (within 20 minutes).
(6) Careful observations in effort to determine causes.
(7) Epinephrine 1:1000 is kept ready in case of severe reaction.

3.9.5 Treatment

a. Since there is no real cure, the best that can be done is avoidance of allergen or minimizing contact with allergen.

b. Desensitization

With this, a very small dosage of allergen is injected into skin in gradually increasing dosages until patient develops tolerance. Histamine is prevented from being released with this method. However, precautions must be taken as with skin tests.

c. Drug therapy

Antihistamines provide symptomatic relief by inhibiting action of histamine especially to relieve symptoms of short duration such as drug sensitivity or hay fever. An adrenergic agent such as Epinephrine is used primarily to relax bronchiolar smooth muscle spasm by counteracting effects of histamine. Corticosteroids can be given for brief periods if symptoms are very severe.

3.10 Human Immunodeficiency Virus (HIV) Infection

The human immunodeficiency virus (HIV) causes damage to the immune system. It is associated with a spectrum of disease, ultimately

presenting as required immune deficiency syndrome (AIDS). HIV is primarily a sexually transmitted disease and carries with it connotations of 'sin' and 'evil'. The myths and misconceptions about HIV and AIDS are widespread amongst the general public and healthcare professionals.

3.10.1 Pathophysiology

The genetic information of most organisms is composed of **DNA**, and complementary molecules of **RNA** are made as templates for protein production. HIV is a retrovirus: its genetic information is RNA but it has an enzyme called reverse transcriptase, which can synthesize DNA by using RNA as the pattern. The virus can infect cells that carry a protein called **CD4** on their surface. Their primary target is the T4 or T helper cells of the immune system. Once HIV has invaded a cell, the reverse transcriptase converts its RNA to DNA, which is then integrated into the DNA of the host cell. HIV particles then assemble in the cytoplasm of the cell and escape by budding through the cell membrane, killing the cell in the process. As increasing numbers of T4 cells are invaded and destroyed, the body's immune system is weakened, making the individual prone to a variety of opportunistic infections, malignant diseases and neuropsychiatry complications.

3.10.2 Transmission

HIV is transmitted by sexual intercourse, inoculation of infected body fluids through skin or on to mucous membranes, transplantation of tissues and transfusion of contaminated blood. It may also be transmitted from mother to baby, either through the placenta or during delivery. Transmission of HIV has occurred through blood, semen, vaginal fluids and occasionally breast milk. Although HIV has been isolated in tears, urine and saliva, the concentration is extremely low and there is no documented evidence that the virus can be transmitted by these secretions. HIV cannot be transmitted through casual contact such as hugging, holding hands, crying, shared toilet seats, etc.

Table 3 Common Opportunisitc Infections in Persons with AIDS

Cause	Usual Site	Symptoms	Common Diagnostic Tests	Therapy
Protozoa				
1. Pneumocystis carinii	Lungs	Dry, non-productive cough, shortness of breath, fever, night sweats	Chest radiography, bronchoscopy	Trimethoprin Pentatamidine Co-trimoxazine
2. Toxoplasma gondii	Brain	Headache, seizures, neurological deficits, behaviour changes, may lead	CT scan (head) MRI scanning	Sulfadiazine Pyrimethamine

		to dementia		
3. Cryptosporidium	GI tract	Profuse, watery diarrhoea, dehydration, debility	Stool cultures	Spiramycin Antidiarrhoea Antiperistaltic
Fungi				
4. Candida albicans	Mouth (thrush) Oesophagus	Dysphagia Dysphagia (oral candida may not be present)	Visible lesions scraped and cultured Endoscopy with biopsy and culture of tissue	Nystatin Clotrimazole Ketoconazole Fluconazole
1. Crytococcus neoformans	Brain Lungs	Headache, fever, confusion, behaviour changes Non-specific cough or fever, dyspnoea	Lumbar --puncture, bone marrow aspiration Chest radiography, sputum for culture, bronchoscopy with culture	Amphotericine Flucytosine
Viruses				
6. Cytomegalovirus	Eyes Lungs GI tract Spinal cord	Retinitis, loss of vision Cough, dyspnoea, fever Abdominal pain, ulcer, GL bleeding Paraparesis, quadraparesis	Serology testing Bronchoscopy with biopsy and culture Endoscopy, colonoscopy Analysis of spinal fluid	DHPG Foscamet Ganciclovir
7. Herpes simplex virus	Skin Spinal cord	Painful cold sore clusters at mouth and perianal area Paraparesis, quadraparesis	Histology and culture Analysis of spinal fluid	Aciclovir
Bacteria				
8. Mycobacterium avium intracellulare	Disseminated, many organs affected: liver, spleen, lungs, lymph nodes, bone marrow, GI tract	Fever, profuse sweating, productive cough, lymphadenopathy, diarrhoea, weight loss	Blood cultures, bone marrow aspiration, stool for acid-fast bacilli, endoscopy, colonoscopy with culture of biopsy tissue	Isoniazid Rifampicin Ethambutol Streptomycin Amikacin Biofazimine

3.10.3 High-Risk Behaviours

The patterns of HIV infection and transmission vary in different parts of the world. In Africa, transmission occurs mostly through heterosexual activity, whilst in the USA and Europe infection has occurred mostly amongst homosexual and bisexual men and injecting drug users.

It is important to recognize that it is risk behaviours that place an individual at risk of infection rather than association with a particular group. The major route of transmission is by heterosexual and homosexual intercourse, with specific sexual practices carrying varying degrees of risk.

HIV can also be transmitted by infected blood or blood products. The use of drugs or alcohol does not specifically put a person at risk, but sharing needles to inject drugs with someone who is infected is risky because small amounts of infected blood are transmitted in the injecting equipment. Individuals, who suffer from clotting factor concentrates manufactured from the pooled plasma of thousands of donors, are also at risk of HIV infection. Routines screening for HIV antibodies and heat treatment that inactivates HIV have greatly reduced the risk of transmission by this route.

A small number of healthcare workers have acquired HIV following percutaneous or mucous membrane exposure to blood or body fluids. Surveillance of healthcare workers exposed to infected blood has shown that the risk of acquiring HIV is less than 1%, with the greatest risk associated with percutaneous exposure about 0.3%, or one case per 300 needlestick injuries. An infected health worker may transmit a bloodborne virus to a patient as result of accidental injury during a procedure such as surgery or dental practice that resulted in blood entering the patient's open tissue. Health workers who are infected with HIV may therefore be advised to avoid performing invasive procedures.

3.10.4 Progression of HIV Infection

The rate at which symptoms develop in people with **HIV** infection is unpredictable and varies a great deal between individuals. Some people may develop an acute illness 2 – 6 weeks after infection. Symptoms include fever, myalgia, arthralgia, headache, diarrhoea, sore throat, lymphadenopathy and a maculopapular rash. After about three months, it is possible to detect antibodies to the virus in the blood; this is known as seroconversion.

In some cases, seroconversion may take six months or longer. The presence of infection is detected, using a test called the enzyme-linked immunosorbert assay (ELISA) and confirmed with the more specific Western blot test. Both of these tests detect antibodies to HIV in the serum.

Being tested for HIV can have far-reaching implications and place the individual under considerable stress. Issues include how the result may affect their sexual behaviour, potential problems with housing, insurance

or employment, and people in whom they might confide if the test is positive. Inadequately prepared individuals may become extremely distressed, acutely anxious, severely depressed or suicidal. It is therefore crucial that the person receives professional counseling, both before and after the test.

The counselor should act as a confidential listener, questioner and source of information and support. **The pre-test counseling session** is an opportunity to:

- provide information about HIV infection
- explore the risks and benefits of being tested
- discuss the meanings of the test (Box 8.7)
- Help the individual to develop a plan to maximize the benefits and minimize risks.

It also gives the counselor an opportunity to assess the individual's support system and provides some preventive education related to safer sexual practices and drug use.

The counselor can also put the individual in touch with support groups set up by people with HIV. These groups may run advice centres or alternative therapy clinics as well as providing opportunities to discuss issues with others in the same situation.

HIV Disease

Current data suggest that the majority of individuals infected with **HIV** will eventually become severely immunosuppressed develop AIDS. The main diseases associated with AIDS are unusual infections caused by microorganisms that are not pathogenic in people with a competent immune system (opportunistic infections) and various cancers. A case definition of AIDS has been developed by the Centres for Disease Control in the USA and is recognized internationally it is estimated that 40% of HIV-infected individuals will have developed AIDS eight years after seroconversion, 99% after 15 years. They will remain infectious throughout the course of the disease, although they are probably more infectious during the latter stages (Heptonstal et al 1993a). The progressive impairment of the immune response is caused by the gradual depletion of the CD4+ T-lymphocytes, which coordinate a number of important immune functions. There is a strong association between the number of CD4+ T-lymphocytes and the development of serious opportunistic illness. CD4 counts are therapeutic management. In the UK, zidovudine is licensed for use in patients with a neutrophil count of less than 0.5×10^9/litre.

Usually, the first clinical signs of infection are fever, night sweats, skin rashes, diarrhoea, unexplained weigh loss or respiratory symptoms. The type and extent of symptoms with which the individual presents will depend on the degree of immunodeficiency. A debilitating syndrome of weight loss, diarrhoea, fever and night sweats may be caused directly by HIV by secondary infection. The most common opportunisatic infection in individuals with AIDS is Pneumocystis carried pneumonia. The most common neoplasm is Kaposi sarcoma, which is most likely to develop in homosexual or bisexual men. Table 8.3 and 8.4 outline the common opportunistic infections and neoplasms associated with AIDS.

Issues around Testing for HIV

There are many things that need to be considered when planning to have an HIV test:

- It may be stressful not to know your HIV status.
- Knowing whether the individuals are HIV positive can help to make decisions about the direction of their lives.
- Early treatment of HIV can delay onset of AIDS.
- You can protect yourself and your partner by using safer sex and/ or drug use.
- It may enable the individual to have sex with his/her partner without using condoms.
- It may be stressful to know that the individual could become ill at any time.
- It can be difficult to tell friends, family, and partners if the individual are HIV positive.
- The individual may have difficulties obtaining a mortgage or insurance.
- There may be strains on your relationship with your partner if you is HIV positive.
- The individual may need to assess the risks associated with having a baby.

Facts About the HIV Antibody Test

The AIDS virus (usually called HIV) may cause serious disease resulting from the body's inability to fight infection. The antibody to the AIDS virus is a protein the body produces in response to an infection by the AIDS virus.

A positive test indicates that the antibody to the AIDS virus has been found in your blood. The test is not always accurate. A small percentage of persons tested may be told they have the antibody when in fact they do not. A small percentage of persons with negative test results have in fact been infected with the AIDS virus. The blood will be tested more than once to minimize the risk of making such an error.

A positive antibody test result means that:

- The blood sample has been tested more than once and the tests indicate that antibodies to the AIDS virus are present.
- The individual has been infected with HIV, the virus that causes AIDS, and his body has produced antibodies to it.
- You should assume that you are infectious and capable of passing the virus to others.

A Positive to AIDS

- You have AIDS or an AIDS-related condition.
- You will get AIDS or AIDS-related complex (ARC).
- You are immune to AIDS.

A negative antibody test result means that no antibodies to the AIDS virus have been found at this time.

There are three possible explanations for this:

1. You have not been in contact with the virus.
2. You have come in contact with the virus, but have not become affected. Repeated exposure to the virus through high-risk behaviour greatly increases the likelihood of your becoming infected.

3. You have been infected with the virus but have not produced antibodies yet. It may take several weeks to months to produce antibodies. A small number of persons who become infected never produce antibodies.

A negative antibody test does not mean that:

- You are immune to the virus
- You have not yet been infected with the virus (you may have been infected and have not yet produced antibodies)
- You should stop worrying about being infected by the AIDS virus if you participate in high-risk behaviours.

Modified from Gauthier and Turner (1989)

HIV Disease in Women and Children

HIV infection may appear differently in women, with many of the symptoms focused on gynaccological problems such as persistent and virulent yeast infections, irregular menstrual periods, pelvic inflammatory disease and cervical cancer. Women often do not have what they require to make informed decisions about safer sex, intimacy, childcare and reproductive rights.

Children who are born to mothers who are HIV infected are likely to carry passively acquired maternal antibodies of HIV, making an accurate diagnosis of infection difficult until the child is approximately 15 months old. Maternal antibody in the infant is usually lost at between six and nine months, but may persist until 15 months. Symptoms of HIV infection usually appear when the child is between six months and two years of age.

A child with HIV infection will live approximately two years from the time of diagnosis. Problems associated with infection are characterized by failure to thrive and delays in development. The child is particularly prone to recurrent bacterial infections, recurrent oral thrush and chronic diarrhoea, chronic parotid swelling, and pulmonary lymphoid interstitial pneumonitis, thought to be linked to the Epstein-Barr virus, is found frequently in children with AIDS. The major cause of morbidity in these children is lung disease.

4.0 CONCLUSION

Natural protection of the body against invasion by organisms and damage by injury is ensured by the process of inflammation and the immune system.

5.0 SUMMARY

1. Inflammation occurs following the presence of any foreign irritating matter in the body in an attempt to remove or resist this foreign material.

2. An allergen is a substance that gives rise to hypersensitivity or allergy.

3. The patterns of HIV infection and transmission vary in different parts of the world. In Africa, transmission occurs mostly through heterosexual activity, whilst in the USA and Europe infection has occurred mostly amongst homosexual and bisexual men and injecting drug users.

4. It is the risk behaviours that place an individual at risk of infection rather than association with a particular group.

6.0 TUTOR-MARKED ASSIGNMENT

Explain the roles of the kidney and lung in the body mechanism.

7.0 REFERENCES/FURTHER READING

Barbara, C. Long and Wilma, J. Phipps (1985). *Essentials of Medical-Surgical Nursing. A Nursing Process Approach*. St. Loius: The C. V. Mosby Company.

UNIT 5 SHOCK

CONTENTS

1.0 INTRODUCTION

The organs and tissues of the body are supposed to be adequately supplied with blood to enhance their effective functioning, apart from oxygen and nutrients derived by these structures from blood circulation. Certain pathophysiological conditions may bring about hypotension and subsequent reduction in blood supply to most vital structures in the body. This state is accompanied by serious reduction in the delivery of oxygen and other essential substances to a level below that needed for normal and effective cellular activities.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- define shock
- identify various types of conditions that can lead to shock
- identify the clinical manifestation of a patient with shock
- distinguish between the various types of shock
- utilize nursing process to manage a patient with shock
- discuss the role of the nurse in psychosocial support of both the patient experiencing shock and the family.

3.0 MAIN CONTENT

Key Concept

1. Anaphylactic Shock

This results from a severe allergic reaction producing an overwheming systemic vasodilation and relative hypovolemia:

2. Cardiogenic Shock

This is due to impairment or failure of the myocardium.

3. Circulatory Shock

This results from displacement of blood volume creating a relative hypovolemia and inadequate delivery of oxygen to the cells. It is also called distributive shock.

4. Neurogenic Shock

Refers to a shock state resulting from loss of sympathetic tone causing relative hypovolemia.

5. Septic Shock

Results from overwhelming infection, causing relative hypovolemia.

6. Anoxia

Refers to lack of oxygen in the body.

7. Anoxemia

Refers to lack of oxygen in the blood.

8. Anuria

This is the absence of urinary secretion.

9. Thrombosis

Refers to possible emboli, due to blood stasis.

3.1 Definition

Shock is an abnormal physiological state in which there is wide spread, serious reduction of tissue perfusion that if prolonged, will lead to generalized impairment of cellular function. Shock has also been described as a clinical state of peripheral circulatory failure characterized by a fall in blood pressure. Cellular destruction and deterioration in tissue and organ functions are possible outcomes.

3.2 Causes of Shock

1. Loss of body fluid
2. Blood loss
3. Inadequate fluid intake
4. Congestive cardiac failure
5. Myocardial infarction
6. Pulmonary embolism
7. Cardiac arrhymias
8. Spinal anaesthesia
9. Infections with the release of endotoxins
10. Antigen – antibody reaction with release of histamine.

3.3 Pathophysiology of Shock

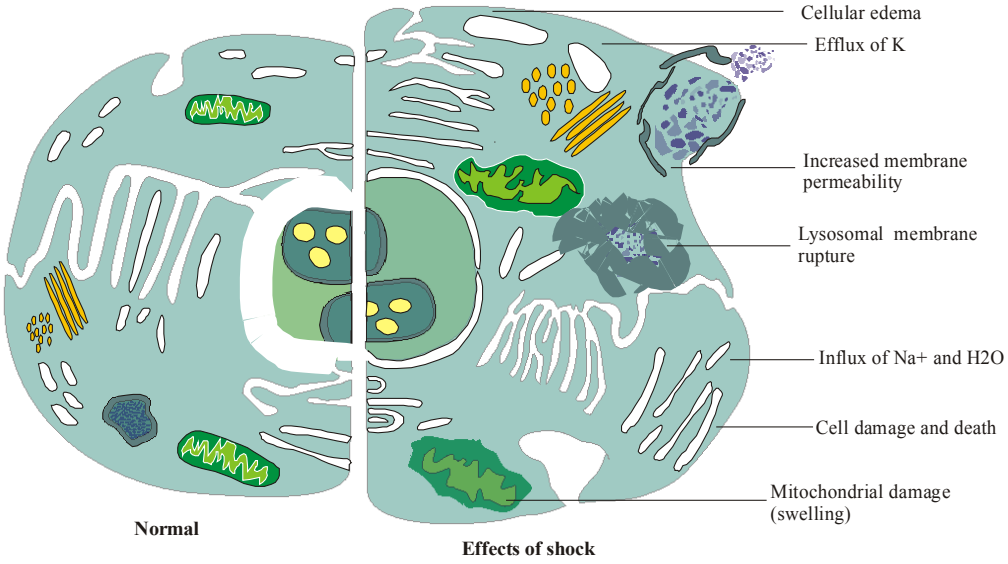
The cardiac output and the peripheral vascular resistance normally maintain arterial blood pressure. When there is reduction in cardiac output and a subsequent decrease in arterial pressure sufficient to produce a wide spread reduction in tissue perfusion, the body attempts to compensate for the changes that follows in the body. The ultimate importance of this compensatory mechanism is to restore adequate circulation to the vital structure of the body. The response of these systems varies from individual to individual. Vasoconstriction and increase in the heart rate with increase in both peripheral resistance and cardiac output causes additional blood circulation to the vital organs. Haemodilution occurs due to secretion of antidiuretic hormone, and subsequent retention of fluid and sodium helps to improve blood volume. Improved cardiac output and myocardial contractility occur due to increased production of carbon-dioxide occasioned by limited tissue

oxygenation. The increased carbon dioxide causes the coronary arteries to dilate resulting in increased myocardial perfusion.

When the compensatory mechanism cannot effectively sustain the body's physiologic functioning, shock progresses and multiple physiological changes ensue. A progressive shock produces multiple systemic changes as a result of decreased cardiac output, hypovolemia, and limited cardiac perfusion. These changes produce alteration in oxygenation, fluid and electrolytes metabolism and the body's defence against bacterial invasion. In the early stages, cerebral hypoxia produces restlessness, apprehension, and anxiety, and may be replaced by apathy and confusion and verbal response becoming inappropriate as cerebral hypoxia increases. In the irreversible stage, unconsciousness manifests with no response to painful stimuli.

The skin is pale, cold and clammy reflecting poor perfusion of the superficial tissue and sympathetic activity to the sweat glands respectively. There is cyanosis, showing a reduction in cardiac output and decreased oxygen saturation. Initially the pulse is rapid and thread, but later becomes slower, irregular and imperceptible.

In response to hypoxia, respirations increase in rate and depth. In severe cases, there is depression of the respiratory centre resulting in shallow and irregular respiration. Severe respiratory dysfunction accounts for complications such as atelectasis, pulmonary emboli, interstitial congestion and oedema, which develops about three to six days after the event that initiated the shock. The complication is referred to as 'shock lung' or adult respiratory distress syndrome (ARDS). Subnormal temperature is characteristic of shock. This is due to reduction in cellular metabolism and heat production caused by hypoxia. However, exception is noticed in septic shock. Oliguria ensues due to decreased renal perfusion. Urinary output might be less than 30mls per hour, resulting in the retention of urea, nitrogen and creatinine. Decreased bowel sounds indicating reduced peristalsis develops due to sympathetic innervation and vaso constriction. Reduction in tissue perfusion and the resulting hypoxia accounts for the anaerobic metabolism which causes accumulation of metabolic acids. This eventually leads to acidosis. Myocardial failure and cardiac arrhythmia may develop if acidosis is prolonged.



Cellular effects of shock. The cell swells and the cell membrane becomes more permeable, and fluids and electrolytes seep from and into the cell. Mitochondria and lysosomes are damaged, and the cell dies.

Source: Jones, D.A. et al, (1978) *Medical–Surgical Nursing, A Conceptual Approach*. Megraw-Hill, P. 959.

3.4 Common Types of Shock

1. **Hypovolaemic Shock (Decrease in Blood Volume).** This is due to a decrease in blood volume which may be caused by haemorrhage, dehydration due to vomiting and diarrhoea, loss of plasma in burns, inadequate fluid intake, and excessive use of diuretics. When intravascular volume drops, there is decrease in tissue perfusion, decreased venous return, and low cardiac output and blood flow through the tissue becomes inadequate.

2. **Carcinogenic Shock (Decreased Cardiac Output).** This indicates a severe impairment in the efficiency of the heart as a pump. There is decreased ability of the heart to pump out blood into circulation. This results in decrease in stroke volume and cardiac output. Cardiogenic shock may be occasioned by congestive cardiac failure, pulmonary embolism, myocardial infaction, pneumothorax cardiac arrhythmias, or pericardial tamponade.

3. **Neurogenic Shock.** This develops as a response to autonomic nervous system activity resulting in reflex vasodilatation and loss of arteriolar tone with subsequent pooling of blood in the dilated vasculature. This result is deceased venous return to the heart. This type of shock is usually due to spinal anaesthesia,

barbiturate injection, hyperrinsulinism, spinal cord injury, severe pain, accidental injury or extreme fright. Septic or bacteraemic shock, toxic shock, anaphylactic shock occurs essentially following the same phenomena as in neurogenic shock. It is characterized by dry, warm skin rather than the cool, moist skin seen in hypovolemic shock. Another characteristic is bradycardia, rather than the tachycardia that characterizes other forms of shock.

4. Circulatory Shock

Circulatory or distributive shock occurs when blood volume is abnormally displaced in the vasculature—for example, when blood volume pools in peripheral blood vessels. The displacement of blood volume causes a relative hypovolemia because not enough blood returns to the heart, which leads to subsequent inadequate tissue perfusion. The ability of the blood vessels to constrict helps return the blood to the heart. Thus, the vascular tone is determined both by central regulatory mechanisms, as in tissue demands for oxygen and nutrients. Therefore, circulatory shock can be caused either by a loss of sympathetic tone or by release of biochemical mediators from cells. Pooling of blood in the periphery results in decreased venous return. Decreased venous return results in decreased stroke volume and decreased cardiac output. Decreased cardiac output, in turn, causes decreased blood pressure and ultimately decreased tissue perfusion.

5. Septic Shock

Septic shock is the most common type of circulatory shock and is caused by widespread infection. The source of infection is an important determinant of the clinical outcome. The greatest risk of sepsis occurs in patients with bacteremia (bloodstream) and pneumonia other infections that may progress to septic shock include intra-abdominal infections, wound infections, bacteremia associated with intravascular catheters.

6. Anaphylactic Shock

Anaphylactic shock occurs in patients already exposed to an antigen who have developed antibodies to it. An antigen—antibody reaction-provokes mast cells to release potent vasoactive substances, such as histamine or bradykinin, that cause widespread vasodilation and capillary permeability. Therefore, patients with known allergies need to understand the consequences of subsequent exposure to the antigen and should wear medical identification that lists their sensitivities. This could prevent inadvertent administration of a medication that would lead to anaphylactic shock.

3.5 Clinical Manifestations

1. Restlessness
2. Apathy and confusion
3. Unconsciousness
4. Rapid thready pulse followed by weak pulse
5. Decreased blood pressure
6. Increased respiratory rate, shallow respirations
7. Subnormal temperature
8. Cold and clammy skin
9. Decreased urinary output (oliguria)
10. Cyanosis
11. Decreased bowel sounds or absence of bowel sounds

3.6 Management of Shock

3.6.1 First Aid Management of Shock

In the presence of major external haemorrhage,

- Stop the bleeding.
- Apply firm pressure over the wound or artery involved.
- Apply a firm pressure bandage.
- Immobilize the extremity to control the bleeding.
- Elevate the part.

If hemorrhage is internal

- Blood transfusion and surgery may be indicated.
- Tourniquet is the last resort.

Other actions include

- Keep the patient laid flat or place him on shock position (head lower than its feet) to improve blood supply to the brain.
- Give analgesics to reduce pain.
- Take patient to hospital as fast as you can.
- Keep crowd away from patient.
- Give reassurance.
- Keep patient warm.

3.6.2 Medical and Nursing Management of Shock

Management in all types and phase of shock should include the following:

- Fluid replacement to restore intravascular volume
- Vasoactive medications to restore vasomotor tone and improve cardiac function
- Nutritional support to address the metabolic requirements that are often dramatically increased in shock.

Assessment

The management of shock should be rapid to prevent the condition from becoming irreversible. A good and careful assessment of the patient's general/physical health status is paramount. Blood pressure, respiration, pulse, urinary output, skin colour should be noted. The blood pressure and pulse rate should be monitored every 15 minutes. This reflects the cardiac functioning and cardiac output. An indwelling catheter is passed to facilitate the measurement of the urinary output hourly. In the adults, the urinary output is expected to range between 30 and 60ml/hour. A decrease in this value indicates poor renal perfusion. Oliguria may lead to anuria. The hourly urinary output is useful in assessing patients' cardiovascular status. Except in septic shock in which the body temperature may be elevated in the early stages, patients with other types of shock usually record a subnormal temperature and remain same as shock progresses. The body temperature should be monitored continuously and recorded every one to two hours.

The rate and volume of respirations should be monitored and recorded 15 to 30 minutes. This is particularly important as hyperventilation occurs in the early stages of shock while respiration may become slow, irregular and shallow as a result of ischaemia of the respiratory centre. Secretions in the respiratory tract should be removed promptly through suctioning. The skin should be observed for lessening of pallor, warmth and quick refilling of the capillaries and veins, following compressions which are signs of improvement. Conversely, signs of subcutaneous bleeding may indicate disseminated intravascular coagulation in severe shock, and especially that associated with sepsis. The level of consciousness should be determined at regular intervals, using Glasgow coma scale. This reflects blood and oxygen supply to the brain.

Treatment

Usually, treatment is directed towards improving tissue perfusion and oxygenation as well as treating the specific cause accordingly. The

contractile ability of the heart is strengthened to increase cardiac output in cardiogenic shock. Adrenalin is useful as a cardiac stimulant.

Fluid Replacement

Fluid replacement is administered in all types of shock. The type of fluids administered and the speed of delivery vary, but fluids are given to improve cardiac and tissue oxygenation. Fluid replacement is paramount in all types of shock, especially in hypovolaemic shock. The fluids administered may include **crystalloids** (electrolyte solutions that move freely between intravascular spaces), **colloids** (large-molecule intravenous solutions), or blood components.

Initially a crystalloid solution e.g. Ringers lactate solution or Normal saline is used. Colloid solutions of whole blood or fresh plasma may be used in conjunction with the crystalloid solutions. The aim is to expand intravascular volume. If the cause is due to haemorrhage, efforts should be made to arrest bleeding by giving whole blood or fresh plasma so that blood pressure is raised and tissue perfusion restored.

Close monitoring of the patient during fluid replacement is necessary to identify side effects and complications. The most common and serious side effects of fluid replacement are cardiovascular overload and pulmonary edema. Patients receiving fluid replacement must be monitored frequently for adequate urinary output, changes in mental status, skin perfusion, and changes in vital signs. Lung sounds are auscultated frequently to detect signs of fluid accumulation. Adventitious lung sounds, such as crackles, may indicate pulmonary edema.

Vasoactive Medication Therapy

Vasoactive medications are administered in all forms of shock to improve the patient's hemodynamic stability when fluid therapy alone is inadequate. Specific vasoactive medications are prescribed to correct the particular hemodynamic alteration that is impeding cardiac output. These medications help to increase the strength of myocardial contractility, regulate the heart rate, reduce myocardial resistance, and initiate vasoconstriction.

Nutritional Support

Nutritional support is an important aspect of care for the patient with shock. Increased metabolic rates during shock increase energy requirements and therefore caloric requirements. The patient in shock requires more than 3,000 calories daily. The release of catecholamines

early in the shock continuum causes glycogen stores to be depleted in about eight to ten hours. Nutritional energy requirements are then met by breaking down lean body mass. In this catabolic process, skeletal muscle mass is broken down, even when the patient has large stores of fat or adipose tissue. Loss of skeletal muscle can greatly prolong the recovery time for the patient in shock. Parenteral or enteral nutritional support should be initiated as soon as possible, with some form of enteral nutrition always being administered.

A stress ulcer occurs frequently in acutely ill patients because of the compromised blood supply to the gastrointestinal tract. Therefore, antacids, histamine-2 blockers (e.g., famotidine [Pepcid], ranitidine [Zantac]), and antipeptic agents (e.g., sucralfate [Carafate]) are prescribed to prevent ulcer formation by inhibiting gastric acid secretion or increasing gastric pH.

Nursing Care

Possible nursing diagnosis includes:

1. Altered nutrition, less than body requirements
2. Impaired mobility
3. Fluid volume deficit
4. Altered comfort
5. Altered urinary output
6. Ineffective breathing pattern

Altered Nutrition

The patient should not be given anything orally because of paralytic ileus, instead a nasogastric tube is inserted to drain the stomach contents and prevent abdominal distension. The nutritional status is maintained primarily by intravenous infusions. Oral feeding is commenced only in the presence of bowel sounds.

Impaired Mobility

Complications such as thrombosis, circulatory stasis, decubitus, ulcer, flexion contractures and atelectasis may develop due to immobility. The patient's position should be changed every one to two hours (where permitted). Skin should be inspected for redness and pressure areas treated accordingly. This promote circulation, relieves pressure and drainage of pulmonary secretions. Patient is positioned in good body alignment to prevent contractures and foot drop. Passive exercise, especially of the lower limbs, is also useful. A bed cradle will be useful in lifting the weight of the bed clothes thus preventing pressure.

Fluid Volume Deficit

Frequent observation of the patient's reaction and flow of the infusion used should be carried out by the nurse. Intake and output record should be maintained. Oral fluids should be avoided because of poor gastro-intestinal absorption.

(Altered Comfort) or Self-Care Deficit (bath, and oral care and grooming). Physical care such as bathing and oral hygiene are necessary as they promote relaxation and ensure prevention of sores, ulcers and infection respectively. An analgesic is administered intravenously to relieve pain. The patient should be observed for the respiratory depressive effect of analgesic used. Light linen should be used to keep patient comfortably warm, but overheating and chilling should be avoided.

Altered Urinary Output

Impaired urinary elimination occurs due to inadequate renal perfusion. To maintain adequate urinary output, an indwelling catheter is passed using aseptic technique. This is to facilitate the measurement of hourly urinary output. Hourly urinary output less than 30mls (in adult) should be reported to the appropriate personnel.

Ineffective Breathing Pattern

A patient airway should be established immediately and oxygen given through nasal cannulae or mask. When the patient is able, he should be encouraged to carry out deep breathing and coughing exercises at frequent intervals. Change in positions hourly is beneficial as it decreases the possibility of consolidation developing thereby promoting effective gas exchange.

In order of priority in shock management, restoration of tissue perfusion by way of I.V. fluid administration takes precedence over other measures. This is followed by adequate tissue oxygenation, i.e. ensuring a patent airway and adequate gaseous exchange.

3.7 Complications of Shock

1. Metabolic acidosis
2. Cardiac failure
3. Cardiac arrhythmias
4. 'Shock lung'
5. Uraemia
6. Cerebral damage
7. Susceptibility to infection

3.7 .1 Haemorrhage

Definition

This is an escape of blood from the blood vessels and this may be internal or external.

3.7.2 Causes of Haemorrhage

It may occur due to one of the three causes:

1. Direct injury to the blood vessel wall as a result of a wound or surgical intervention.

2. Disease of the blood vessel wall. This may be caused by infection or malignancy.
3. Disease of the blood itself e.g. haemophillia. Haemophilia is a condition characterised by delay in the coagulation time of blood, it is due to lack of a specific blood clotting factor in the blood which is necessary for satisfactory clotting. This factor is known as anti-haemophillic factor.

3.7.3 Classification

Haemorrhage may be classified in different ways

1. According to its situation
2. According to its source
3. According to the time it occurred.

3.7.3.1 Situational of Haemorrhage

External Haemorrhage

In this instance, the blood escapes from the blood vessel into the surface of the body and can be seen.

Internal or Unseen Haemorrhage

In this type of haemorrhage, blood escapes from the blood vessels into a cavity or organ of the body or into the tissues. The simplest example of this type of haemorrhage is a bruise or heamatoma. It is possible for an internal to eventually become visible. If blood escapes from the alimentary tract, the person may eventually vomit all the blood or if there is bleeding from the respiratory tract the person may eventually cough off the blood.

3.7.3.2 Sources of Haemorrhage

Haemorrhage may be classified according to the type of blood vessel involved:

Arterial Bleeding

If an artery is severed, the blood will be:

a. Bright red in colour due to the presence of oxygen in the blood.
b. Spurting from the wound, each spurt coincides with the heart beat.
c. Escaping from that part of the wound nearest to the heart.
d. Escaping from the wound under great pressure.

Venous Bleeding

If a vein is severed, the blood will be:

a. Dark red in colour, this is due to the small amount of oxygen present in the blood.
b. Flowing from the wound in a steady stream and will not be under great pressure.
c. Escaping from the part of the wound farthest away from the heart.

Capillary Bleeding

This occurs in superficial wounds, e.g. in a graze or a scrape and the blood will be:

a. Oozing from the wound.
b. Neither bright red nor dark-red in colour.
c. Welling up from all ever the wound.

3.7.3.3 Time of Haemorrhage

This may occur at the time of injury or it may occur later.

1. Primary Haemorrhage

This occurs at the time of injury or operation or when the blood vessel has been damaged by disease.

2. Reactionary

It is important to note that up to 24hrs after an injury or operation, bleeding may commence again, this bleeding is due to reaction of the body. If there had been a haemorrhage, nature employs strategies to prevent serious loss of blood. These strategies include:

(a) The blood pressure is reduced resulting in diminished flow of blood to that part.
(b) A blood clot forms, these clots of blood vessels further limiting loss of blood.
(c) The blood vessel wall turns in to hold the clot in position and prevents further loss.

3 Secondary Haemorrhage

This type of haemorrhage seldom occurs but if it does, it takes place within seven to ten days. It is slow to develop after the injury or operation and is often due to infection. It is extremely dangerous and shows the important of keeping wound absolutely clean.

3.7.4 Types of Haemorrhage

1. Ante Partum Haemorrhage

This starts before labour and is associated with placenta previa and abruptio placenta.

2. Cerebral Haemorrhage

This is collection of blood in a cavity within the cranium, which may be extradural, subarytenoid or cerebral.

3. Post-Partum Haemorrhage (Primary)

This refers to bleeding that occurs between 12 and 24hrs of delivery which measures 500ml or more.

4. Secondary Post-Partum

This refers to excessive bleeding after 24hrs of delivery

3.7.5 Signs and Symptoms of Haemorrhage

The Skin

It becomes pale and white and feels cold and clammy to touch. This is due to the constriction of the superficial blood vessels. Physiological adjustments are made to improve the blood supply to deeper more vital organs such as brain, kidneys, heart and liver, because of this restricted blood supply also the temperature becomes subnormal i.e. 35°C or 95°F.

The Pulse

This is rapid and weak. How rapid and weak, depends on the severity of the haemorrhage.

Respiration

This is unique and unmistakable and is described as "air hunger" (deep sign of respiratory). The patient is signing and grasping for air.

Facial Expression

The patient, if conscious, will look anxious, afraid and will be restless.

Effect on the Brain

Brain tissue may suffer hypoxia, due to the brain not receiving enough blood supply, the patient may show or complain of the following signs and symptom.

a. Dimmed or blurred vision
b. Buzzing and ringing in the ears
c. Dilated pupils
d. Mental confussion

Thirst

The patient commonly complains of thirst. This is the reaction of the body to lost of fluid. During bleeding, fluid is withdrawn from tissues into the blood stream resulting in dehydration...

3.7.6 First Aid Management

It is important for any first aid worker to recognize signs and symptom of haemorrhage.

3.7.6.1 Internal Haemorrhage

1) Lie patient flat either on the bed, floor or couch.
2) Reassure the patient since he/she will be anxious.
3) Lower the head of the bed. This will help flow of blood by gravity to the head thus prevent fainting or unconsciousness.
4) Undo tight clothing rounded neck, chest and waist. This will allow the patient to breath more easily and prevent suffocation.
5) Contact a doctor as soon as possible for further treatment or pain management.
6) If signs and symptoms are severe, then get the patient to the hospital with minimum amount of movement and handling.
7) Keep crowd away from patient.
8) Keep patient warm.

3.7.6.2 External Haemorrhage

The general care will be the same as the internal haemorrhage with the following special emphasis.

2. Stop the bleeding.

3. Any open wound must be covered immediately with a clean dressing. This prevents infection.

4. Immobilise extremities to the bleeding if the part that is bleeding involved is a limb, it should be raised as high as possible and maintain in that position. This limits the amount of blood flowing to that part; thus reduces the amount of bleeding.

5. Apply firm pressure, this may be directly on the wound, using a pad and placing it over the wound and bandaging it firmly into position. A pad can be made from any available material.

6. Digital pressure can be applied to the nearest artery known to supply the part.

7. Only at a last resort is a tourniquet applied:

(1) It must be tight enough.

(2) There must be a piece of material between the tourniquet and the skin.

(3) It must not be left on longer than 15 minutes.

(4) An indication of the presence of a tourniquet must be made obvious. This might be done by putting the letter T and the time of application in the patient's forehead.

3.7.6.3 Dangers Associated With the Application of Tourniquet

1. Damage nerves and muscles.

2. If it is not tight enough, it may only limit venous blood flow and may not stop arterial blood flow.

3. Damage the skin.

4. Death of the affected part if the tourniquet is kept on for longer than 20 minutes.

3.7.7 Pressure Points in the Body

These are points in the body when an artery passes superficially over a bone.

1. Temporal Artery

This artery supplies the side of head. The thumb or tip of fingers may be used to apply pressure here, by placing it over the zygomatic process of the temporal bone. It is about one inch in front of the external auditory meatus. The pressure here will stop bleeding on the superficial side of the scalp.

2. Facial Artery

This artery supplies the side of the face passing at the side of the jaw in front of the angle. The artery can be pressed against the mandible thus, limiting the flow of blood to the face.

3. Brachial Artery

This artery supplies the arm, and passes down the inner aspect of the humerus just beside the inner border of the Bicep muscles. It is easier done if the nurse stands behind the patient.

4. Radial Artery

This is the artery most commonly used for recording the pulse. Digital pressure can be applied by pressing the fingers very firmly on the artery as it passes across the radius.

5. Femoral Artery

This is the main artery of the leg; it passes down the front of the groin. To compress it, the patient should be lying down with the knee flexed, grasp the patient's thigh with both hands placing both thumbs one on top of the other in the centre fold of the groin.

4.0 Conclusion

Any condition that prevents cells from receiving an adequate blood supply, /or interfere with this metabolism produces.

5.0 Summary

- Shock may be classified as hypovolemic, cardiogence or vasegenic.
- Liver, heart, kidney and brain are major organism that can easily be damaged by shock.

6.0 TUTOR-MARKED ASSIGNMENT

Define shock and discuss in detail the various types of conditions that can lead to shock.

7.0 REFERENCES/FURTHER READING

Brunner & Suddarth. *Medical Surgical Nursing*. (10th ed) Lippincott Wilkins, 2004.

UNIT 6 NEOPLASM

CONTENTS

1.0 INTRODUCTION

Normal cells proliferate to replace worn out tissue. The process is increased after illness or injury and then slows to normal again. Sometimes, certain body cells begin to multiply more rapidly than normal which has no relationship to growth and maintenance of body tissue. This new growth is called neoplasm. Neoplasm is a disease that is universal in scope. It affects human wherever they live and regardless of race – colour – level of education and affluence. However, there is some variation with regard to sex, age and geographical location. The unit

highlight, some neoplasm conditions with special emphasis on the nurse role in cancer prevention.

2.0 OBJECTIVES

Ay the end of this unit, you should be able to:

- compare the structure and function of the normal cell and the cancer cell
- differentiate between benign and malignant tumors
- identify agents and factors that have been found to be carcinogenic
- describe the special nursing needs of patients receiving chemotherapy
- use the nursing process as a framework for care of patients with cancer.

3.0 MAIN CONTENT

3.1 Terms Relating to Proliferative Patterns of Cell Growth

Perplasia, an increase in the number of cells of a tissue, is a common proliferative process during periods rapid body growth and during epithelial and bone marrow regeneration. It is a normal cellular response when a physiologic demand exists and an abnormal response when growth exceeds the physiologic demand.

Metaplasia occurs when one type of mature cell is converted to another type by means of an outside stimulus that affects the parent stem cell. The changes may be reversible or may progress to dysplasia.

Dysplasia is bizarre cell growth resulting in cells that differ in size, shape, or arrangement from other of the same type of tissue. It can precede irreversible neoplastc change.

Anaplasia is a lower degree of differentiation of dysplastic cells. (Differentiation refers to the extent to which the cells differ from their cells of origin and to their degree of maturity.) Anaplastic cells are poorer differentiated; irregularly shaped, or disorganized with respect to growth and arrangement. They lack no cellular characteristics and are nearly always malignant.

Neoplasia, described as uncontrolled cell growth that follows no physiologic demand, can be either benign or malignant. Benign and malignant neoplastic growths are classified and named by tissue of origin. The degree of anaplasia (lack of differential of cells) ultimately determines the malignant potential.

Cancer cells grow larger and divide more rapidly than normal cells, and serve no useful purpose. They are metastasized by way of the circulation through the blood or lymphatics, by accidental transplantation from one site to another during surgery, and by local extension.

3.1.1 Pathophysiology

Cancer is a disease process that begins when an abnormal cell is transformed by the genetic mutation of the cellular DNA. This abnormal cell forms a clone and begins to proliferate abnormally, ignoring growth-regulating signals in the environment surrounding the cell. The cells acquire invasive characteristics, and changes occur in surrounding tissues. The cells inflitrate these tissues and gain access to lymph and blood vessels, which carry the cells to other areas of the body. This phenomenon is called metastasis (cancer spread to other parts of the body).
Cancer is not a single disease with a single cause; rather, it is a group of distinct diseases with different causes, manifestations, treatments, and prognoses.

3.1.2 Normal Immune Response

Normally, an intact immune system has the ability to combat cancer cells in several ways. Usually, the immune system recognizes as foreign certain antigens on the cell membranes of many cancer cells. These antigens are known as tumor-associated antigens (also called tumor cell antigens) and are capable of stimulating both cellular and humoral immune responses.

Along with the macrophages, T lymphocytes, the soldiers of the cellular immune response, are responsible for recognizing tumor-associated antigens. When T lymphocytes recognize tumor antigens, other T lymphocytes that are toxic to the tumor cells are stimulated. These lymphocytes proliferate and are released into the circulation. In addition to possessing cytotoxic (cell-killing) properties, T lymphocytes can stimulate other components of the immune system to rid the body of malignant cells.

Certain lymphokines, which are substances produced by lyphocytes, are capable of killing or damaging various types of malignant cells. Other lymphokines can mobilize other cells, such as macrophages, that disrupt cancer cells. Interferon (IFN), a substance produced by the body in response to viral infection, also possesses some antitumor properties. Antibodies produced by B lymphocytes, associated with the humoral immune response, also defend the body against malignant cells. These

antibodies act either alone or in combination with the complement system or the cellular immune system.
Natural killer (NK) cells are a major component of the body's defense against cancer. NK cells are a subpopulation of lymphocytes that act by directly destroying cancer cells or by producing lymphokines and enzymes that assist in cell destruction.

3.1.3 Classification of Tumors or Neoplasms

Neoplasm can be classified into benign and malignant forms.

Characteristics of Benign and Malignant Neoplasms

Characteristics	Benign	Malignant
Cell characteristics	Well-differentiated cells that resemble normal cells of the tissue from which the tumor originated.	Cells are undifferentiated and often bear little resemblance to the normal cells of he tissue from which they arose.
Mode of growth	Tumor grows by expansion and does not infiltrate the surrounding tissues; usually encapsulated.	Grows at the periphery and sends out processes that infiltrate and destroy the surrounding tissues.
Rate of growth	Rate of growth is usually slow.	Rate of growth is variable and depends on level of differentiation; the more anaplastic the tumor, the faster its growth.
Metastasis	Does not spread by metastasis.	Gains access to the blood and lymphatic channels and metastasizes to other areas of the body.
General effects	Is usually a localized phenomenon that does not cause generalized effect unless its location interferes with vital function.	Often causes generalized effects, such as anemia, weakness, and weight loss.
Tissue destruction	Does not usually cause tissue damage unless its	Often causes extensive tissue damage as the

	location interferes with blood flow.	tumor outgrows its blood supply or encroaches on blood flow to the area; may also produce substances that cause cell damage
Ability to cause death	Does not usually cause death unless its location interferes with vital functions.	Usually causes death unless growth can be controlled.

3.1.4 Routes of Spread of Malignant Neoplasms

a. direct extension to adjacent tissues
b. extension through lymphatic system or blood stream
c. diffusion within a body cavity.

3.1.5 Etiology of Malignant Neoplasms

Certain categories of agents or factors implicated in carcinogenesis include viruses and bacteria, physical agents, chemical agents, genetic or familial factors, dietary factors, and hormonal agents.

Viruses and Bacteria

Viruses as a cause of human cancers are hard to determine because viruses are difficult to isolate. However, infectious causes are considered or suspected, when specific cancers appear in clusters. Viruses are thought to incorporate themselves in the genetic structures of cells, thus altering future generations of that cell population—perhaps leading to a cancer.

Herpes simplex virus type II, cytomegalovirus, and human papillomavirus types 16, 18, 31 and 33 are associated with dysplasia and cancer of the cervix. The hepatitis B virus is implicated in cancer of the liver; the human T-cell lymphotropic virus may be a cause of some lymphocytic leukemias and lymphomas; and the human immunodeficiency virus (HIV) is associated with Kaposi's sarcoma.

Physical Agents

Physical factors associated with carcinogenesis include exposure to sunlight or radiation, chronic irritation or inflammation, and tobacco use.

Excessive exposure to the ultraviolet rays of the sun, especially in fair-skinned, blue- or green-eyed people, increases the risk for skin cancers. Factors such as clothing styles (sleeveless shirts or shorts), use of sunscreens, occupation, recreational habits, and environmental variabels, including humidity, altitude, and latitude, all play a role in the amount of exposure to ultraviolet light.

Chemical Agents

About 75% of all cancers are thought to be related to the environment. Smoking is strongly associated with cancers of the lung, head and neck, esophagus, pancreas, cervix, and bladder. Tobacco may also act synergistically with other substances, such as alcohol, asbestos, uranium, and viruses, to promote cancer development.

Chewing tobacco is associated with cancers of the oral cavity and primarily occurs in men younger than 40 years of age.

Genetic and Familial Factors

Almost every cancer type has been shown to run in families. This may be due to genetics, shared environments, cultural or lifestyle factors, or chance alone. Genetic factors play a role in cancer cell development. Abnormal chromosomes, too few chromosomes, or translocated chromosomes. Specific cancers with underlying genetic abnormalities include Burkitt's lymphoma, chronic myelogenous leukemia, meningiomas, acute leukemias, retinoblastomas, Wilms' tumor, and skin cancers, including malignant melanoma.

In cancers with a familial predisposition, individuals may develop multiple cancers; commonly, two or more first-degree relatives share the same cancer type.

Dietary Factors

Dietary factors are thought to be related to 35% of all environmental cancers. Dietary substances associated with an increased cancer risk include fats, alcohol, salt-cured or smoked meats, and foods containing nitrates and nitrites, and a high caloric dietary intake. Food substances that appear to reduce cancer risk include high-fiber foods, cruciferous vegetables (cabbage, broccoli, cauliflower, Brussels sprouts, kohlrabi), carotenoids (carrots, tomatoes, spinach, apricots, peaches, dark-green

and deep-yellow vegetables), and possibly vitamins E and C, zinc, and selenium.

Obesity is associated with endometrial cancer and possibly postmenopausal breast cancers. Obesity may also increase the risk for cancers of the colon, kidney, and gallbladder.

Hormonal Agents

Tumors growth may be promoted by disturbances in hormonal balance either by the body's own (endogenous) hormone production or by administration of exogenous hormones. Cancers of the breast, prostate, and uterus are thought to depend on endogenous hormonal levels for growth. Diethylstilbestrol (DES) has long been recognized as a cause of vaginal carcinomas. Oral contraceptives and prolonged estrogen replacement therapy are associated with increased incidence of hepatocellular, endometrial, and breast cancers, whereas they appear to decrease the risk for ovarian and endometrial cancers.

3.1.6 Clinical Manifestation of Malignant Neoplasms (7 danger signals)

1. **Early symptoms** are often slight and therefore easily overlooked. It is important to recognize early signs as when there is pain or drastic change. Pain is usually a late stage.

   Change in bowel or bladder.
   A sore that does not heal
   Unusual bleeding or discharge.
   Thickening or lump in breast or elsewhere
   Indigestion or difficulty in swallowing.
   Obvious change in wart or not
   Nagging cough or hoarseness.

2. **Systemic Symptoms** – vague symptoms such as fatigue, weight loss, loss of appetite, and anemia which may be seen in many other conditions.

3. **Specific Symptoms** – are related to the site of the body where they are located and will be studied later.

3.1.7 Diagnosis of Malignant Neoplasms

1. Regular physical examination, even in absence of symptoms should be done if possible, for women over 35 and man over 45. The exam should include: careful medical history; head to toe physical exam with careful examination of breasts, genitals, and rectum in women and rectum tests and prostate in men. Half of all cancer occurs in sites accessible to palpation or visualization.

2. Laboratory and X-ray, according to the findings of the physical examination:

a. Endoscopy
b. Cytology
c. Diagnostic x-rays (i.e. barium enema) chest
d. Radio-isotope scanning
e. Ultrasound – high frequency sound waver to detect internal abnormal reaction of body organ or structure (leakage
f. Haematological examination – serum alkaline and acid phorphatic metatastic bone ca of liver
g. Radiographic CAT SCAN (corepa

3. Biopsy – A microscopic exam of tissue is usually needed for conclusive diagnosis. This may be done through any of the methods of biopsy, including exploratory surgery.

3.1.8 Imaging Tests Used to Detect Cancer

Test	Description	Diagnostic uses
Magnetic resonance imaging (MRI)	Use of magnetic fields and radiofrequency signals to create sectioned images of various body structures.	Neurologic, pelvic, abdominal, thoracic cancers.
Computed tomography (CT scan)	Use of narrow beam x-ray to scan successive layers of tissue for a cross-sectional view.	Neurologic, pelvic, skeletal, abdominal, thoracic cancers.
Fluoroscopy	Use of x-rays that identify contrasts in body tissue densities; may involve the use of contrast agents.	Skeletal, lung, gastrointestinal cancers.
Ultrasonography (ultrasound)	High-frequency sound waves echoing off body tissues are converted electronically into images; used to assess tissues deep within deep within the body.	Abdominal and pelvic cancers.
Endoscopy	Direct visualization of a body cavity or passageway by insertion of an endoscope into a body cavity or opening; allows tissue biopsy, fluid aspiration and excision of small tumors; both diagnostic and therapeutic.	Bronchial, gastrointestinal cancers.

3.1.9 Detection and Prevention of Cancer

Nurses and physicians have traditionally been involved with tertiary prevention, the care and rehabilitation of the patient after cancer diagnosis and treatment. In recent years, researchers have placed greater emphasis on primary and secondary prevention of cancer. Primary prevention is concerned with reducing the risks of cancer in healthy people. Secondary prevention involves detection and screening to achieve early diagnosis and prompt intervention to halt the cancer process.

Primary Prevention

By acquiring the knowledge and skills necessary to educate the community about cancer risk, nurses in all settings play a key role in cancer prevention. Assisting patients to avoid known carcinogens is one way to reduce the risk for cancer. Another way involves adopting dietary and various lifestyle changes that epidemiologic and laboratory studies show influence the risk for cancer. Nurses can use their teaching and counseling skills to encourage patients to participate in cancer prevention programmes and to promote healthful lifestyles.

Secondary Prevention

Individuals who have inherited specific genetic mutations have an increased susceptibility to cancer. Women in whom the BRCA-1 and BRCA-2 genes have been identified have an increased risk for breast and ovarian cancer. To provide individualized education and recommendations for continued surveillance and care in high-risk populations, nurses need to be familiar with ongoing developments in the field of genetics and cancers.

Numerous factors, such as races, cultural influences, access to care, physician-patient relationship, level of education, income and age, influence the knowledge, attitude, and beliefs people have about cancer. These factors also influence the type of health-promoting behaviours they practice. Nurses can use this type of information in planning education, prevention, and screening programmes.

Public awareness about health-promoting behaviours can be increased in a variety of ways. Health education and health maintenance programmes are sponsored by community organizations such as churches, senior citizen groups, and parent–teacher associations. Secondary prevention programmes may promote breast and testicular self-examination and Papanicolaou (Pap) tests.

3.1.10 Treatment of Malignant Neoplasms

Introduction

The choice of treatment will depend on the histology of the tumor, the site, and the extent of growth.

Forms of Therapy

3.1.10.1 Surgery

Wide excision of tumor and surrounding tissue such as lymph node. Specific types of surgery performed will be discussed with the specific types of cancer. Surgical removal of the entire cancer remains the ideal and most frequently used treatment method. The specific surgical approach, however, may vary for several reasons. Diagnostic surgery is the definitive method of identifying the cellular characteristics that influence all treatment decisions. Surgery may be the primary method of treatment, or it may be prophylactic, palliative, or reconstructive.

Diagnostic Surgery

Diagnostic surgery, such as a biopsy, is usually performed to obtain a tissue sample for analysis of cells suspected to be malignant. In most instances, the biopsy is taken from the actual tumor.

Surgery as Primary Treatment

When surgery is the primary approach in treating cancer, the goal is to remove the entire tumor or as much as is feasible (a procedure sometimes called debunking) and any involved surrounding tissue, including regional lymph nodes.

Prophylactic Surgery

Prophylactic surgery involves removing no vital tissues or organs that are likely to develop cancer. The following factors are considered when electing prophylactic surgery:

- Family history and genetic predisposition.
- Presence or absence of symptoms.
- Potential risks and benefits.
- Ability to detect cancer at an early stage.
- Patient's acceptance of the postperative outcome.

Colectomy, mastectomy, and oophorectomy are examples of prophylactic operations.

Palliative Surgery

When cure is not possible, the goals of treatment are to make the patient as comfortable as possible and to promote a satisfying and productive life for as long as possible. Palliative surgery is performed in an attempt to relieve complications of cancer, such as ulcerations, obstructions, hemorrhage, pain and malignant effusions (Table 16-5).

Reconstructive Surgery

Reconstructive surgery may follow curative or radical surgery and is carried out in an attempt to improve function or obtain a more desirable cosmetic effect. It may be performed in one operation or in stages.

3.1.10.2 Radiation

1. **Definition** Use of radioactive rays to destroy cancer tissue without unduly harming surrounding tissues.

2. **Action** Works on the basis that rapidly dividing cells (tumor cells) are more sensitive to radiation than those that divide slowly.

3. **Uses** For cure, palliative, or control of spread, or for relief of pain.

4. **Types**

a. External beam therapy – x-ray or cobalt
b. Radioisotopes

(1) Implanted in applicators as seeds such as radium
(2) Orally such as radioactive iodine
(3) Interstitial or intracavitary injection as radioactive gold
(4) Orally or intravenously, as radioactive phosphorus

5. **Criteria for use**

a. Tumor must be radiosensitive rather than radio resistant.
Cell that are radiosensitive are those that are:

(1) Rapidly dividing

(2) Poorly differentiated, embryonic, and immature
(3) Characterized by increased metabolic activity.

a. Tumors must be located in areas where they can be treated with fairly large doses of radiation without causing serious injury to neighboring tissues.

b. Tumors most sensitive to radiotherapy include medulloblastoma (tumor of cerebellum); lymphomas; metastatic breast cancer; tumors of skin, lip, mouth, tongue; uterine, cervix, urinary bladder, larynx, tonsils, nasopharynx, and sinuses.

6. Dangers

a. Damage to the normal cells. The larger the area and the more intense the dose at one time, the greater the chance of more normal cells being destroyed.

b. Radiation sickness: Nausea and vomiting; malaise; purpura; petechiae, diarrhoea, and inflammation of mouth and nose.

c. Skin reactions: Erythema, desquamation and abnormal pigmentation may develop in the area exposed to the therapy.

d. Bone marrow depression.

e. Increased susceptibility: to cancer in irradiated areas – usually 20 or more years before development.

f. Birth defects: due to genetic mutation. If pregnant woman's gonads are exposed from two to six weeks gestation, the patient's baby may be born with congenial defects.

3.1.10.3 Chemotherapy

Definition: Drugs used to slow the progress of the disease and relieve distressing symptoms. The principle of chemotherapy is the selective injury by systemic agents to one type of cell and not another. Most are toxic to normal tissues as well as cancer tissue.

Administration: Oral; IV; IM; Perfusion

3.1.10.4 Hormonal Agents

Estrogens used in treatment of cancer of prostate and breast in postmenopausal women.

Effects

Relief from discomfort and prolonging of life in 60-80% cases of prostate cancer.

Side Effects

Nausea and vomiting; fluid retention; enlargement of breasts, uterine bleeding and general feminization of the male.

Androgens used in the treatment of breast cancer

a. **Therapeutic effects**

Relief of bone pain, regression of soft tissue mass; decalcification of bone lesions; increase in sense of well-being; increased appetite and weight gain.

b. **Side effects**

Lowering of voice; hirsutism; edema; increased sexual desire; some dangerous rise of calcium in blood.

Adrenal (ACTH; Cortisone)

a. Action

Depresses the bone marrow especially WBC. Mechanism not fully understood.

b. Uses

Dramatic short remission in patients with acute leukemia and advantageous in advanced cases of chronic lymphatic leukemia and multiple myelma.

c. Side Effects

Fluid retention, hypertension and coma, hypergeyamia moon face, hirsutism and increased susceptibility to infection.

3.1.10.5 Alkylating Agents

(1) Action: powerful cytotoxic agents active against rapidly dividing cells, particularly blood cells.

(2) Examples: Nitrogen mustard; Myleran; Leukeran. Cytoxian.

(3) Use: malignant lymphoid tissue (Hodgkins and lymphosarcoma); advanced breast and ovarian cancer; myelogenous leukemia.

3.1.10.6 Antimetabolites

(1) Action

The compounds used are all similar to important constituents of cell metabolism. They act by replacing the substances they mimic thus driving out essential metabolites.

(2) Examples

Methotrexate inhibits Folic Acid. 5-flurouracil inhibits thymidiliac components of DNA.

(3) Uses

Acute leukemias of adult and children; lymphomas; Hodgkins; solid tumors; choriocarcinoma

3.1.10.7 Mitotic Poisons

(1) Action

Their exact mode of action is unknown but they form crystalline structures which bind to proteins of low molecular weight and inhibit both DNA and RNA synthesis.

(2) Examples

Vineristine (Oncovin) and Vinblastine (Velban)

(3) Uses

Leukemia; Hodgkins

3.1.10.8 Antibiotics

1. Action

Potent immunosuppresive agents thought to act by binding to DNA on the site where RNA ordinarily functions.

2. Examples

Aotinomycin D. Adriamycin; Bleomycin

3. Uses

Melanoma, Wilm's tumor; lymphomas, leukemias

4. Side Effects

Potentiates the action of radiotherapy and very severe skin reations may occur in patients on both treatments.

Side effects of antineoplastic drugs

1. G.I. Effects

Nausea and vomiting; diarrhoea; anorexia; oral ulceration.

2. Hematological Effects

Bone marrow depression. If platelet depression or RBC: bleeding & easy bruising; anemia which will be treated with transfusion of RBC or platelets. If WBC decreased, there is decreased resistance to infection and treated with reversed isolation.

3. General

Fatigue; alopecia

4. Supportive therapy

This may include special diets, blood transfusions, analgesics, electrolytes, vitamins, and Intravenous fluid

3.1.11 Nursing Process: The Patient with Cancer

3.1.11.1 Assessment

Regardless of the type of cancer treatment or prognosis, many patients with cancer are susceptible to the following problems and complications. An important role of the nurse on the oncology team is to assess the patient for these problems and complications.

Infection

In all stages of cancer, the nurse assesses factors that can promote infection.

Bleeding

The nurse assesses cancer patients for factors that may contribute to bleeding. Gross hemorrhage, as well as blood in the stools, urine, sputum, or vomitus (melena, hematuria, hemoptysis, and hematemesis), oozing at injection sites, bruising (ecchymosis), petechiae, and changes in mental status, are monitored and reported.

Skin Problems

The integrity of skin and tissue is at risk in cancer patients because of the effects of chemotherapy, radiation therapy, surgery, and invasive procedures carried out for diagnosis and therapy.

Hair Loss

Alopecia (hair loss) is another form of tissue disruption common to cancer patients who receive radiation therapy or chemotherapy. In addition to noting hair loss, the nurse also assesses the psychological impact of this side effect on the patient and the family.

Nutritional Concerns

Assessing the patient's nutritional status is an important nursing role. Impaired nutritional status may contribute to disease progression.

Pain

Pain and discomfort in cancer may be related to the underlying disease, pressure exerted by the tumor, diagnostic procedures, or the cancer treatment itself.

In addition to assessing the source and site of pain, the nurse also assesses those factors that increase the patient's perception of pain, such as fear and apprehension, fatigue, anger, and social isolation.

Fatigue

Fatigue is the most commonly reported side effect in patients who receive chemotherapy and radiation therapy. The nurse assesses for feelings weariness, weakness, and lack of energy, inability to carry out necessary and valued daily functions, lack of motivation, and inability to concentrate.

Psychosocial Status

Nursing assessment also focuses on the patient's psychological and mental status as the patient. The patient's mood and emotional reaction to the results of diagnostic testing and prognosis are assessed, along with evidence that the patient is progressing through the stages of grief and can talk about the diagnosis and prognosis with the family.

Body Image

Disfiguring surgery, hair loss, cachexia, skin changes, altered communication patterns, and sexual dysfunction are some of the devastating results of cancer and its treatment that threaten the patient's self esteem and body image. The nurse identifies these potential threats and assesses the patient's ability to cope with these changes.

3.1.11.2 Nursing diagnoses

Based on the assessment data, nursing diagnoses of the patient with cancer may include the following:

- Impaired oral mucous membrane.
- Impaired tissue integrity.
- Impaired tissue integrity: alopecia.
- Impaired tissue integrity: malignant skin lesions.
- Imbalanced nutrition, less than body requirements.
- Anorexia.
- Malabsorption.
- Cachexia.
- Chronic pain.
- Fatigue.
- Disturbed body image.
- Anticipatory grieving.

3.1.11.3 Planning

The major goals for the patient may include management of stomatitis, maintenance of tissue integrity, maintenance of nutrition, relief of pain, relief of fatigue, improved body image, effective progression through the grieving process, and absence of complication.

3.1.11.4 Nursing Intervention

Emotional Care

a. Cancer poses real threats to the individual. We must recognize this. The fear of death, prolonged suffering, body mutilation, fear of the cost of treatment.

b. Understand that the emotional aspects are often affected by the patient's and family's attitudes and reactions, location and impairment of body functions, stage of disease and prognosis.

c. Communication:

1. Do not avoid his questions
2. Listen to him and then decide how to answer
3. Be clear about what the doctor has told the patient.
4. Often a question as to whether to tell the patient.

d. **Maintain dignity:**

1. Respect the person
2. Do not expose patient, especially with disfiguring problems
3. Cleanliness

e. Encourage family to support patient.

f. Encourage patient in self help as long as he is able.

g. Do not show distaste at any procedure done because the patient is very sensitive to the nurse's reactions.

Physical Care

a. Of patient After Surgery give general post-operative care with special considerations on the effect of cancer.

b. External radiotherapy

i. Instruct patient not to remove or wash away any marks the radiologist makes on the skin. These are to delineate the exact area of the patient's body that is to be radiated.

2. Skin Care

(1) Apply lanolin or petroleum jelly to skin if irritated but with doctor's order or permission.

(2) Do not allow extreme heat or cold to be on the place.

(3) Do not use soap or water on the area.

i. Observe for signs of radiation sickness and report.
ii. Do not allow visitors with infections to visit.

3. General

a. Promote bed rest.

b. If nausea and vomiting, give small frequent feeding of a high caloric, high protein diet, and administer antiemetics.

c. Force fluids to 3000 ml. per day in order to maintain effective kidney function and avoid uric acid crystalluria and possible kidney shutdown.

d. Keep accurate intake and output.

e. Administer any drug that might be ordered. Vitamin B12; sedatives; antihistamines.

Of Patients on Chemotherapy

1. Always give the ordered dosage and at the proper time. i.e. a drug may be given only after the lab work has been done and reported.

2. Give gentle mouth care.

3. Bland soft diet if stomatitis is present.

4. Encourage nutritional and fluid intake.

5. Report early signs of infection (fever, sorethroat, chills), and nausea, vomiting, diarrhoea.

General Nursing Care

1. Stress the importance of follow up care.

2. Know the 7 warning symptoms of cancer.

3. In terminal cases, the relief of pain is very essential. Give large doses of powerful analgesics (tolerance does develop).

4. Try to prevent complications. i.e. Bleeding in those with decreased platelet or RBC count. Prevention of infection in those with lowered WBC. Pathologic fractures in cancer of the bone.
5. Try to maintain nutrition.

4.0 CONCLUSION

Neoplasm is a disease that is unusual in scope, shows no respect for economic and social statuses, but varies with regards to sex, age race and geographic locations. It is also clear that cancer has many causes and that a combination of many factors may be necessary for the actual clinical appearance of the disease. A combination of factors favours development that may include hereditary, hormonal state, and exposure to carcinogens.

5.0 SUMMARY

- A Nurse plays a vital role in cancer prevention by assessing individual at risk of and them about environment and personal risk fact.

- Major cancer sites include breast, rectum, lung, month, skin uterus.

- Environment and personal factor influence the growth of ca cells.

- Early detection and reaction direct at ↓ inciting cause.

6.0. TUTOR-MARKED ASSIGNMENT

Discuss the role of a nurse in the treatment and management of cancer.

7.0 REFERENCES/FURTHER READING

Brunner & Siddhartha. *Medical Surgical Nursing*. (10th Ed) Lippincott Wilkins, 2004.

UNIT 7 PAIN

CONTENTS

1.0 INTRODUCTION

Pain has been described as a complex series of events occurring between a noxious stimulus and the brain. Unlike other observations of a client, the observation of pain depends mainly on the client himself and not the nurse, hence the need for you to have a good knowledge of the concept of pain and pain management.

2.0 OBJECTIVES

Ay the end of this unit, you should be able to:

- define pain
- explain the theories and mechanism of pain
- describe ascending and descending pain ways
- apply nursing process in the alleviation and management of pain.

3.0 MAIN CONTENT

3.1 Key Concept

Pain Management

Alleviation of pain or reduction in pain to a level of comfort that is acceptable to the patient.

Medication Management

Facilitation of safe and effective use of prescribed or over-the-counter medicine.

Simple Relaxation Therapy

Use of techniques to encourage and elicit relaxation for the purpose of decreasing undesirable signs and symptoms such as pain, muscle tension, or anxiety.

Simple Guided Imagery

Purposeful use of imagination to achieve relaxation and/or direct attention away from undesirable sensations.

Emotional Support

Provision of reassurance, acceptance, and encouragement during times of stress.

Self-Esteem Enhancement

Assisting a patient to increase his or her personal judgment of self-worth.

Pain Level

Severity of reported or demonstrated pain.

Comfort Level

Extent of physical and psychological ease.

Addiction

A behavioural pattern of substance use characterized by a compulsion to take the drug primarily to experience its psychic effects.

Dependence

Occurs when a patient who has been taking uploads experiences a withdrawal syndrome when the opioids are discontinued; often occurs with opioid tolerance and does not indicate an addiction.

Noreceptor

A receptor preferentially sensitive to a noxious stimulus.

Non-nociceptor

Nerve fiber that usually does not transmit pain.

Pain

An unpleasant sensory and emotional experience resulting from actual or potential tissue damage. Overdue

Referred Pain

Pain perceived as coming from an area different from that in which the pathology is occurring.

Tolerance

Occurs when a person who has been taking opioids becomes less sensitive to their analgesic properties (and usually side effects). Characterized by the need for increasing does to maintain the same level of pain relief.

Pain Threshold

The point at which a stimulus is perceived as painful.

Pain Tolerance

The maximum intensity or duration of pain that a person is willing to endure.

Patient-Controlled Analgesia (PCA)

Self-administration of analgesic agents by a patient instructed about the procedure

Referred Pain

Pain perceived as coming from an area different from that in which the pathology is occurring.

Tolerance

Occurs when a person who has been taking opioids becomes less sensitive to their analgesic properties (and usually side effects). Characterized by the need for increasing does to maintain the same level of pain relief.

3.1.1 Concept of Pain

There are different definitions of pain. Pain has been described as psychological experience of events occurring within the patient's body, always unpleasant and often associated with the impression of damage to the tissues. Another definition is that pain represents the suffering induced by the psychic perception of real, threatened, or phantasied injury. From these definitions, it can be seen that pain is the result of a complex series of events occurring between a noxious stimulus and the brain. Although these definitions imply the ideas of injury and suffering, they do not mention actual physical injury. Unlike other observations of a client, the observation of pain depends mainly on the client himself, not the nurse...

3.1.2 Classification of Pain

Pain is usually classified as acute or chronic, mild or severe.

Acute Pain includes the sensation that results from a sudden injury e.g. broken tooth or a sharp stab in the arm. It is felt at once, and gradually diminishes either of its own accord or after treatment.

Chronic Pain is constant and intermittent pain that persist beyond the expected healing time as is often due to a specific cause or injury. There are different types of chronic pain. Intermittent chronic pain occurs only at periods; at other times the person is pain-free (as seen in migraine headaches). Persistent pain is always present, although there may be periods when pain is less intense (as seen with low back pain). Chronic pain is characterized by irritability (often compounded by insomnia), which leads to decreasing interests and isolation from friends and family. Added to that is the feelings of helplessness and hopelessness as.

Table 1 Comparison of acute and chronic pain

Characteristic	Acute Pain	Chronic Pain
Experience Source	An event External agent or internal disease	A situation, state of existence Unknown or cannot be changed or treatment is prolonged or ineffective
Onset	Usually sudden	May be sudden or develop insidiously
Duration Pain identification	Transient (up to six months) Pain vs. nonpain areas generally well identified	Prolonged (months to years) Pain vs. nonpain areas less easily differentiated; intensity becomes more difficult to evaluate (change in sensations)
Clinical signs	Typical response pattern with more visible signs	Response patterns vary; fewer overt signs (adaptation)
Meaning	Meaningful (informs person something is wrong)	Meaningless; person looks for meanings
Pattern	Self-limiting or readily corrected	Continuous or intermittent; intensity may vary or remain constant
Course	Suffering usually decreases over time	Suffering usually increases over time
Actions	Leads to actions to relieve pain	Leads to actions to modify pain experience
Prognosis	Likelihood of eventual complete relief	Complete relief usually not possible

Other types of Pain: Pain from Specific Sites

Pain may originate in the skin, subcutaneous tissue, muscles, or bones (somatic pain) or in body organs (visceral pain).

Referred Pain

Referred pain is felt in areas than those stimulated. For example, the person experiencing a heart attack may complain only of pain radiating down the left arm when in fact the tissue damage is occurring in the

myocardium. Referred pain seems to occur most often with damage or injury to visceral organs.

Psychogenic Pain

Psychogenic pain is pain that cannot be accounted for physiologically; it appears to originate in the person's mind. Usually sensation is perceived by the person as "pain," and it can be just as intense as pain originating from physical stimuli.

Phantom Limb Pain

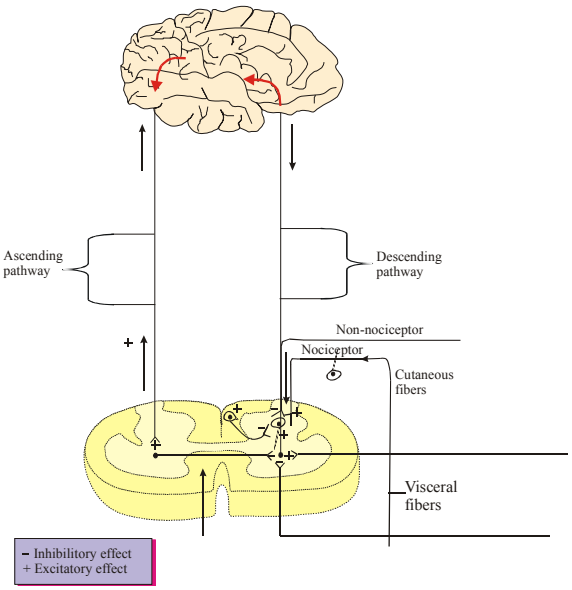
Phantom limb is pain or discomfort perceived by the individual to be occurring in an extremity that has been amputated. It is common with persons that have had the limbs amputated.

Neurologic Pain

Pain in the neurologic system occurs in different forms. Neuralgia is sharp, spasm like pain along the course of one or more nerves. Two common areas ones are the trigeminal nerve in the face and the sciatic nerve in the lower trunk.

Superficial Somatic

This refers to pain in body structures such as skin and subcutaneous tissue; fascia and fibrous tissue encasing the limbs and trunk; and the periosteum, ligaments, and tendon sheaths. These areas are well supplied with receptors and fibers.



3.1.3 Physiology of Pain

Stimuli causing pain may be of chemical, thermal, electrical, or mechanical origin. Nerve receptors respond to the stimuli and transmit the impulses by two types of fibers (fast myelinated A-delta fibers and slow unmyelinated C fibers) to the posterior horn (gray matter) of the spinal cord. See Fig. 1 Within the cord, the impulses are transmitted to the white matter on the opposite side, from which they ascend by the lateral spinothalamic tract to the thalamus. Impulses are then sent to the cerebral cortex (where perception takes place) by way of the corticothalamic tracts.

Descending pain pathways from the brain are of two types. One pathway, which descends from the brainstem reticular formation and ends in the posterior horn of the spinal cord, has the ability to inhibit pain transmission (by means of neurotransmitters resembling naturally occurring opiates called endorphins). The second pathway sends signals from the cortex through the spinal cord to the muscles to initiate action.

3.1.4 Theory of Pain Transmission

Numerous theories have been proposed over the years to explain pain transmission. The most commonly accepted theory is the gate control theory proposed by Melzak and Wall. This theory suggests that transmission of pain impulses can be controlled by a gating mechanism that, when open, permits the pain impulses to be transmitted, but which can be partially or totally closed to inhibit some or all of the impulse transmission.

According to the theory, pain transmission can be influenced by three factors:

1. Effect of impulses transmitted over the two types of pain nerve fibers (A-detal and C fibers) to the spinal cord.
2. Effect of impulses from the brainstem.
3. Effect of impulses from the cortex.

Stimuli travelling over the large fibers may block those from the slow fibers. Endorphins are present in the brainstem and in the substantial gelatinosa (gray matter in the dorsal horn of the spinal cord, where pain fibers synapse). The endorphins have morphine like action that inhibits pain transmission. The cortex may either inhibit or facilitate pain transmission, depending on variables such as thoughts, attitudes, past experiences. For example, believing that a pain will be controlled will

usually result in less pain perception than believing that pain will not be relieved.

3.1.5 Components of the Pain Experience

Initiation

For a long time is thought that pain occurred when a pain stimulus was perceived by a pain receptor and was transmitted along pain pathways to a pain centre in the brain. Today neurophysiologists discount that theory, that stimulation of receptors must always bring forth pain. Such a model, they point out, confuses the psychological experience with physiological function.

A theory currently accepted is Melzack's **gate-control theory**. This theory holds that

> When an input, whether coming from the body, the environment, or from the body, the environment, or from the mind (fantasy), is interpreted as signifying injury, the movement of impulses to the areas of the brain mediating avoidance and internal adjustment is facilitated, and the total complex of pain as behaviour and subjective experience is elicited.

Perception

In understanding the mechanisms of pain, it is important to remember the concept of perception. Perception is the process through which we understand something new by making it a part of our previous knowledge and experience. The experience of pain involves interpreting the sensory input in terms of previous experience, and the end result is influenced by current and past psychological experience. For this reason, two people can react differently to one stimulus, and the same person can react differently to one stimulus, and the same person can react differently at two different times.

In fact, a person can feel pain without even being actually injured. As one author explains, "Pain is not a perceptual fact until, and unless, psychological processing of underlying physical events in the nervous system has taken place."

According to the gate-control theory small-diameter fibers carry the pain signals. At the same time, large-diameter cutaneous fibers (**afferents**) may inhibit the transmission of these pain impulses from the spinal cord to the brain. This is accomplished by a gating mechanism that regulates the afferent patterns before the influence the central transmission cells in the posterior (dorsal) horn of the spinal cord. The client perceives pain

and responds to it when the output of the central transmission cells reaches or exceeds a critical level. The gating mechanism thus balances the stimulus due to pain signals against the inhibitory signals and conveys the net result to the brain. If the activity in the small fibers is greater than that in the large, pain is felt. If the activity in the large fibers is greater, the pain stimulus in the smaller fibers is overcome.

Fiber activity is not the only influence on the transmission of impulses. Brain activities set in motion by the afferent patterns in the dorsal column systems are also important. This means that present and past experiences also affect the system. The input is evaluated in terms of its physical properties as its meaning to the individual. Then it is felt as sensation.

Interpretation

The challenge to both nurse and physician is to interpret what a client means when he reports himself in pain. Complaints may reflect one or more of the following:

1. The present of local tissue injury or of a peripheral stimulus approaching the threshold of tissue injury.

2. A local afferent input that has become associated in the mind with the threat of injury or disease, so that a sensation not previously felt as painful is felt and reported as pain. For instance, a man who fears he has an ulcer may report a slight stomach upset as pain.

3. Peripheral or central nervous system damage that interferes with the normal modulation of small fiber afferent input (for example, the neuralgias, causalgia, and “central” pain).

4. An unconscious psychological need to suffer or to be punished or to assume the role of suffers.

5. A deliberate attempt to deceive others (malingering).

What is the case when the client says he feels no pain? Most obviously he may have suffered no injury, tissue damage, or peripheral stimulation. On the other hand, his receptors or pathways may by damaged or the tissue or structure involved may have no afferent nerve supply capable of transmitting impulses into the dorsal root system. Possibly there is not enough stimulation to activate the receptors, fibers, or connections of the dorsal root system.

It is also possible that the client reports no pain because his level of consciousness or attention is dulled. For psychological reasons he may reject the notion of injury or suffering, and therefore does not feel pain or does not wish to report it.

3.1.6 Factors Influencing the Pain Response

A person's pain experience is influenced by a number of factors, including past experiences with pain, anxiety, culture, age, gender, and expectations about pain relief. These factors may increase or decrease the person's perception of pain, increase or decrease tolerance for pain, and affect the responses to pain.

Past Experience

The way a person responds to pain is a result of many separate painful events during a lifetime. For some, past pain may have been constant and unrelenting, as in prolonged or chronic and persistent pain. The individual who has pain for months or years may become irritable, withdrawn, and depressed. The undesirable effects that may result from previous experience point to the need for the nurse to be aware of the patient's past experiences with pain. If pain is relieved promptly and adequately, the person may be less fearful of future pain and better able to tolerate it.

Culture

Beliefs about pain and how to respond to it differ from one culture to the next. Early in childhood, individuals learn from those around them what responses to pain are acceptable or unacceptable. Factors that help to explain differences in a cultural group include age, gender, education level, and income. In addition, the degree to which he or she will adopt new health behaviours or cling to traditional health beliefs and practices. The main issues to consider when caring for patients of a different culture are:

- What does illness mean to the patient?
- Are there culturally based stigmas related to this illness or pain?
- Are traditional pain-relief remedies used?
- Does the patient have any fears about the pain?

Nurses need to avoid stereotyping patients by culture and provide individualized care rather than assuming that a patient of a specific culture will exhibit more or less pain. In addition to avoiding stereotyping, health care providers need to individualize the amount of

medications or therapy according to the information provided by the patient.

Age

The effect of age on pain is inconsistent. Experts in the field of pain management have concluded that if pain perception is diminished in the elderly person, it is most likely secondary to a disease process (e.g., diabetes) rather than to aging.

The way an older person responds to pain may differ from the way a younger person does. Because elderly people have a slower metabolism and a greater ratio of body fat to muscle mass than younger people, small doses of analgesic agents may be sufficient to relieve pain, and these doses may be effective longer. Judgments about pain and the adequacy of treatment should be based on the patient's report of pain and pain relief rather than on age.

Gender

Researchers have studied gender differences in pain levels and in responses to pain. Once again, the results have been inconsistent.

3.1.7 Nursing Process

3.1.7.1 Assessment of Pain

This will involve both subjective and objective data.

Subjective Assessment of Acute Pain. This Include:

Pain Intensity

This can be determined by various means. One way is to ask the patient to describe the pain or discomfort. Another method is to ask the patient to describe the severity of the pain or discomfort using a pain scale. The pain scale score can be recorded on a flow chart to provide ongoing assessment of progression of the pain. A third approach is to ask the patient to mark an X on a visual analog scale (Fig. 1)

Pain Scale

0—No pain*	0—No pain	0—No pain
1—Mild pain	1—Mild pain	1—Slight pain
2—Discomfort	2—Moderate pain	2—Moderate pain
3—Distressing	3—Severe pain	3—Severe pain
4—Horrible	4—As bad as it could be	

5—Excruciating

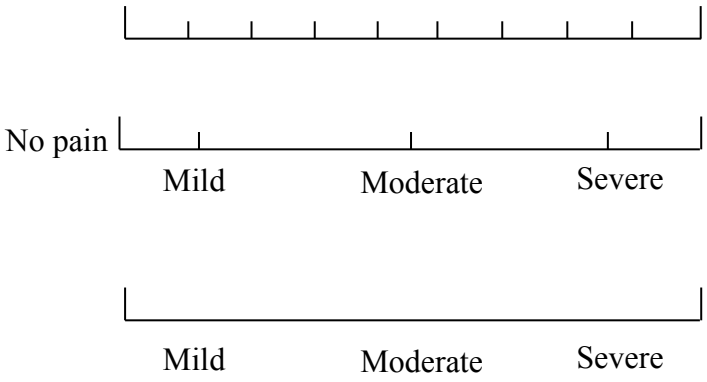


Fig. 1. Visual analog pain scales. Person marks line describing intensity of pain

When acute pain has subsided, further data can be collected about the meaning of pain for the person.

Timing

Sometimes the etiology of pain can be determined when time aspects are known. Therefore, the nurse inquires about the onset, duration, relationship between time and intensity, and whether there are changes in rhythmic patterns. The patient is asked if the pain began suddenly or increased gradually. Sudden pain that rapidly reaches maximum intensity is indicative of tissue rupture, and immediate intervention is necessary. Pain from ischemia gradually increases and becomes intense over a longer time. The chronic pain of arthritis illustrates the usefulness of determining the relationship between time and intensity, because people with arthritis usually report that pain is worse in the morning.

Location

The location of pain is best determined by having the patient point to the area of the body involved. Some general assessment forms have drawings of human figures, and the patient is asked to shade in the area involved. This is especially helpful if the pain radiates (**referred pain**). The shaded figures are helpful in determining the effectiveness of treatment or change in the location of pain over time.

Quality

The nurse asks the patient to describe the pain in his or her own words without offering clues. For example, the patient is asked to describe

what the pain feels like. Sufficient time must be allowed for the patient to describe the pain and for the nurse to carefully record all words that are used.

Personal Meaning

Patients experience pain differently, and the pain experience can mean different things. It is important to ask how the pain has affected the person's daily life. Some people can continue to work or study, while others may be disabled. The patient is asked if family finances have been affected. For others, the recurrence of pain may mean worsening of the disease, such as the spread of cancer. The meaning attached to the pain experience helps the nurse understand how the patient is affected and assists in planning treatment.

Aggravating and Alleviating Factors

The nurse asks the patient what if anything makes the pain worse and what makes it better and asks specifically about the relationship between activity and pain. This helps detect factors associated with pain. For example, the patient is asked if pain is influenced by or affects the quality of sleep or anxiety. Both can significantly affect the quality of sleep or anxiety. Knowledge of alleviating factors assists the nurse in developing a treatment plan.

Pain Behaviors

When experiencing pain, people express pain with many different behaviours. These nonverbal and behavioral expressions of pain are not consistent or reliable indicators of the quality or intensity of pain, and they should not be used to determine the presence of or the degree of pain experienced. Patients may grimace, cry, rub the affected area, guard the affected area, or immobilize it. Others may moan, grunt, or sigh. Not all patients exhibit the same behaviours, and there may be different meanings associated with the same behaviour.

Objective Data

Objective data assist the nurse in identifying possible pain or discomfort in a person who has not reported pain and in helping to clarify the subjective response. Behavioral manifestations of pain must be watched out for. This includes holding the body rigid, moving restlessly, frowning, gritting teeth, clenching fists, crying and moaning.

Other data collected may include the following:

1. Demographic data

2. Sociocultural data
3. History of the pain pattern from time of onset

4. Factors perceived to increase or decrease the pain
5. Effects of the pain on the person's life-style
6. Meaning of the pain for the person
7. Effects of the patient's pain on other family members or friends
8. Measures used in the past and present for pain relief.

3.1.7.2 Data Analysis and Planning

Data gathered must be analyzed and appropriate care planned. This plan must incorporate measures the patient thinks may help relieve the pain, even if these measures are different from those usually carried out in that institution. This may include non-prescription liniments, special applications of heat and cold, unusual positioning, or favourite homemade foods or drinks. That must be that if there are no contraindications. In some situations it may be appropriate for the patient to help plan the use of pain relief measures. For example, the patient may wish to receive potential analgesics at bedtime to improve sleep.

3.1.7.3 Nursing Diagnoses

Possible nursing diagnosis includes:

1. Ineffective breathing pattern related to pain in chest or abdomen
2. Anxiety related to increasing pain
3. Self-care deficit related to pain
4. Sexual dysfunction related to pain
5. Sleep pattern disturbance related to pain

3.1.7.4 Expected Patient Outcomes

1. The patient states that comfort is improved.

2. If pain is still present when patient is discharged, the patient or significant other can:

a. Describe general measures for pain relief (for example, exercises)
b. Explain prescribed medications (actions, dosages, frequency, side effects)
c. Describe when to seek medical assistance if pain is not relieved as expected

3. The person with chronic pain can:

a. State plans to participate in ongoing therapies
b. State plans for increasing independence in activities of daily living.

3.1.7.5 Nursing Intervention

Anticipate and Prevent Painful Stimuli

The nurse can use varied methods in alleviating the source of pain. However, the technique she chooses will depend on the pathology of the client's disease. Anticipating and meeting the client's needs can help reduce painful stimuli and reduce the client's anxiety. Examples of simple measures that can reduce pain include making sure the client is in a comfortable and proper position, giving the client back rubs to relieve tension and muscle aches, offering a bedpan for use, answering to call signal promptly, keeping the room clean and at a comfortable temperature are all ways to do this.

Relieve Pain Source

The goal is to break the circuit of pain at its source. For example, if a client with prostate hypertrophy is suffering from a distended bladder, the responsibility of the nurse is to empty the bladder by helping him void, by asking him to stand. This stimulates sensory nerves that bring about reflex contraction of muscles of the bladder wall. Several topical anesthetics can also be used to decrease the transmission of anxious stimuli that accompany some painful procedures. Foods can also be used to relieve pain. A glass of milk will often relieve burning sensations in the stomach, eating small fragment meals at a time, reduces gastric ulcer.

Decrease Pain Stimulus

This is done by changing position of the patient this reduces the intensity of the stimulation of pain receptors. She can also support the weight of the extremities on pillows and provide emotional support.

Block Pain Pathway

Pain pathway can be blocked with surgery, such as a nerve block or cordotomy, or injection of a drug to inhibit transmission of nerve impulses.

Decrease pain perception, modify pain interpretation, and decrease pain reaction

Another way that the nurse can relieve the suffering client is to decrease his perception of pain by raising the threshold of pain perception. This can be done, using analgesics, hypnotics, or distraction.
Generally, environment, state of mind, and bodily condition act in concert to intensify the pain experience. If a client is anxious, angry, bored, or lonely, it is likely that his pain threshold will be lowered, likewise his pain threshold will also be reduced,if he is hungry, thirsty, or tired. Similarly, glaring lights, unpleasant odours, excessive noise tend to aggravate pain.

Drugs play an important part in interrupting the pain pathway. Narcotic analgesics given in the presence of existing pain generally act only at the cortical level to modify pain interpretation or decrease pain reaction. If the same drugs are given earlier, they tend to act at both the cortical and thalamic levels to decrease pain perception.

Hypnotics, such as phenobarbital, both modify pain interpretation and decrease pain reactions when given in small doses. On the other hand, pain perception is decreased by the administration of large-dose hypnotics, such as sodium tipental and amobarbital, which act as general anesthetics.

Tranquilizers, such as reserpine and chlordiazepoxide, decrease pain reactions, as do mild sedatives or hypnotics. However, chlopromazine and related phenothiazines decrease both pain perception and pain reactions through their action at the thalamic and hypothalamic levels. They may also act at efferent nerve endings. Muscle relaxants, such as mephenesin, block the efferent skeletal muscle pathways and thus decrease skeletal muscle reaction. Antibiotic drugs, such as penicillin, relieve pain at the source.

Sometimes the nurse can help relieve pain by simply helping the client to relax. Besides reducing pain, relaxation may help the client sleep better and may aid in the reduction of tensions and anxiety.

3.1.7.6 Evaluation

It is vital that the effectiveness of the interventions be assessed to determine whether the interventions should be continued, modified, replaced with another intervention, or discontinued. The essential questions in acute pain are as follows:

1. Does the patient still have pain?

2. If so, how does it compare with the pain experienced before the intervention?

3. If it is better but still present, should the same intervention(s) be continued unchanged or modified?
4. Should new interventions be added?

5. If it is not better, was sufficient data obtained in the initial assessment to determine the cause of pain?

6. Is there new data to indicate a different diagnosis?

What are the pain and the modes of intervention?

One method of assessing the extent of pain relief is to ask the patient to rate the pain relief on a scale of 0 to 4. The answers can be documented on a flow chart to provide an ongoing assessment of effectiveness of pain relief. The essential questions for chronic pain are as follows:

1. To what extent is the patient participating in the planned therapeutic programme?

2. What is the patient's assessment of present pain?

3.1.8 Nontraditional Pain Treatments

1. Acupuncture is a detailed science of the treatment of disease that originated in China thousands of years ago. As a form of pain treatment, it has increased in popularity in recent years. There are approximately 1,000 acupuncture points, each connected with a part of the body. It is thought that in insertion of a needle into one or more of these points will help block the transmission of pain and will help cure the particular disease. The points can be used in both the diagnosis and treatment of disease.

2. Transcutaneous nerve stimulation is another treatment that attempts to block pain pathways. Electrodes are attached to one or more "trigger zones" on the client's body and are then stimulated by electricity. This is another radical treatment that is used only if other pain treatments have failed. It is particularly used in cases of advanced cancer.

4.0 CONCLUSION

Pain experience is influenced by a number of factors, including past experiences with pain, anxiety, culture, age, gender, and expectations about pain relief. These factors may increase or decrease the person's perception, tolerance and responses to pain.

5.0 SUMMARY

- Pain transmission can be influenced by three factors, effect of impulses transmitted over the two types of pain nerve fibers (A-detal and C fibers) to the spinal cord, effect of impulses from the brainstem and effect of impulses from the cortex.

- In assessing a client's pain, the nurse elicits where the pain is located, how intense, when it began, how long it lasts, and how it feels.

- How a client experiences pain depends, not only on physiological processes, but also on his physical condition, previous experiences, cultural attitudes, and emotional needs. All of these must be taken into account when the nurse assesses patient description of pain.

6.0 TUTOR-MARKED ASSIGNMENT

1. What is pain?
2. How can a nurse help in the alleviation of pain in a patient?
3. Discuss three theories of pain known to you.

7.0 REFERENCES/FURTHER READING

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MODULE 3 DIAGNOSTICS AND INVESTIGATIONS OF MEDICAL – SURGICAL CONDITIONS

UNIT 1 DIAGNOSTIC AND LABORATORY INVESTIGATIONS IN MEDICAL SURGICAL CONDITIONS

CONTENTS

1.0 INTRODUCTION

This unit introduces you to diagnostic and laboratory investigations done on patients. Diagnostic and laboratory investigations are used as adjunct in the treatment of patients. They compliment physical examination and nutritional assessment. They are usually used to confirm or rule out a patient's complaints.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain each of the various diagnostic procedures
- identify the tools and equipment used for the procedures
- explain the significance and factors affecting each procedure mentioned
- explain the precautionary measures involved in collection of specimen for investigation
- explain the need to record all findings from diagnostic procedures accurately.

3.0 MAIN CONTENT

Endoscopy

a. This is the examination of certain organs through a hollow instrument one of the body's openings.

b. Purpose

1. To locate a disease process
2. To obtain specimens for microscopic study
3. To remove foreign objects that may be lodged in an opening (ES: coin, pin, stone)
4. To make pictures of an area
5. To provide treatment or perform operative procedure for certain conditions.

c. Types

3.1 Oesophagoscope, Gastroscopy, and Bronchscopy

a. Definitions: a visualization of the oesophagus, gastric muscoa, trachea, and two major bronchi.

b. Procedure:

1. Explain the procedure to the patient well, asking him to be very still and to breathe through the nose. It is very essential to get the patient's cooperation. Children and patients with unpredictable behavior may need to be restrained or put under general anesthesia.

2. Written permission is obtained or put in some hospitals.

3. NPO 6 – 8 hours prior to exam to prevent regurgitation and to make muscosa visible.

4. Remove eyeglasses and dentures.

5. Give sedatives and atropine as ordered to lessen apprehension and decrease secretions.

6. Assist in holding the patient's posterior pharynx with a local anesthesia to inactivate the gag reflex and lessen local reaction to the instrument. IV Valium may be given.

7. Assist in holding the patient's head as the doctor may indicate.

8. After the procedure, have patient rest one to two hours, and do not allow him to eat or drink until gag reflex returns reaction.

9. Observe for expectoration or vomiting of blood due to perforation, or dyspnea due to laryngeal edema.

10. Advise patients with hoarseness of voice to talk little as possible and to use warm saline gargles.

3.2 Anoscopy, Proctoscopy, Sigmoidoscopy

a. Definition: Visualization of the mucosa of the anus, rectum, and sigmoid colon.

b. Procedure:

1. Instruct patient to low residue diet the evening before the procedure.

2. Give laxative and enemas to clean patient's bowel.

3. Explain the procedure to the patient and tell him that he will feel some discomfort and may feel a desire to defecate.

4. Keep on NPO liquids (clear) the morning of the procedure.

5. Help position patient – usually knee – chest position – and drape him adequately.

6. If patient has gas pain after the procedure, put him in knee – chest position to help expel the gas.

3.3 Cystoscopy

a. Definition: Visualization of the inside of the urinary bladder.

b. Procedure:

1. Force fluids on the patient before the procedure unless general anesthesia is anticipated (i.e. child). If so, Intravenous fluids will be given to insure adequate urine in the bladder.

2. x – rays are to be taken, the bowel is cleansed by enemas or laxatives or both before.

3. Give sedative as ordered for relaxation.

4. Obtain written permission if required by hospital.

5. The patient is placed in lithotomic position and draped.

6. The procedure should be explained to help patient relax because tension may cause spasms of the vesical sphincters and increase the pain.

7. Force fluids post procedure to lessen irritation to the lining of the urinary tract.

8. The patient can expect painful micturation.

3.4 Laparoscopy

a. Definition: Endoscopic examination of the peritoneal cavity performed through a transabdominal puncture site.

b. Procedure

1. Patient is kept NPO and given a light pre-op med.

2. Procedure is explained to the patient, and reason why it is done. If done for tubal ligation, an operative permit for sterilization is needed.

3. Catheterization is done in the theatre.

4. Incision can be done by one or two techniques. The point of inferior aspect of umbilical rim, with second incision at hairline of moons. Veneris.

5. CO2 (about 2 – 41) is introduced into the anterior peritoneal cavity, which pushes the bowel away from field of examination treatment. This permits safe introduction of instruments.

6. The procedure is done and then the air is removed.

7. The patient can leave hospital late in an afternoon or morning of the next day.

8. Assuming the knee – chest position can be helpful if patient has pain due to any gas that remains.

c. Complications

1. Pneumoperitoneum problems – cardiac and respiratory embarrassment, subcutaneous and mediastinal emphysema.

2. Trocar insertion problems – organ perforation, hemorrhage, and omental herniation

3. Bleeding.

3.5 X-Ray Special Procedures

Barium Gastrointestinal Series (Barium swallow meal)

1. Definition

This is the visualisation of the esophagus, stomach, and sometimes the upper small intestines by use of barium sulfate, fluoroscopy, and x-ray.

2. Technique

Barium is given mouth in the x-ray department. Barium, an opaque substance, outlines the GI tract as the doctor views the passing of the barium under fluoroscopy from the esophagus into the stomach. Many x-rays are taken at this time. Sometimes an x-ray is taken four to six hours after the administration of the barium.

Barium Enema

1. Definition

Introduction of barium sulfate into the colon for the purposes of outlining the colon on fluoroscopy and X-Ray.

2. Procedure

Barium is given by enema while lying under the fluoroscope X-ray pictures are taken as indicated. Patient expels the enema before leaving the x-ray department.

Cholecystogram or Gallbladder Series (GBS or GBV)

Definition: Visualisation of the gallbladder by fluoroscopy and x-ray after a dye has been gallbladder by fluoroscopy and x-ray after a dye has been given.

Chlangiogram (Bile Duct Visualization)

Definition: The visualisation of the bile duct after an injection of an opaque substance (Urokon) into the duct through a tube surgically placed in the duct, and then an x-ray is taken.

Intravenous Pyelogram (IVP)

1. Definition

The introduction of a radiopaque substance (Hypaque) intravenously. Since it is eliminated by the kidneys, a series of x-ray films are made at intervals to note the concentration of the contrast medium in the pelvis, uterus, and bladder.

2. Implications

After the test, fluids should be forced to flush any remaining dye from the urinary tract. The drug used contains iodine, the patient should be observed carefully for allergic reactions.

3. Preparation

See procedure book "K"

Retrograde Pyelogram

1. Definition

The introduction of a radiopaque solution into the Ureters and renal pelvis through catheters that have been placed in the Ureters by means of a cystoscopy.

2. Preparation

Same as for cystocopy plus cleaning of the bowel.

3.6 Kidney Function Tests

(The above two tests – IVP and Retrograde pyelogram – are also considered kidney function test).

a. BUN (Blood Creatine and Uric acid)

These are tests done on blood taken through a venapuncture
They are products normally excreted by the kidneys, but rise in the blood and tissues when the nephrons fail to eliminate them. Deterioration in renal function is manifested chemically by the rise in these products, but there must be a 50 – 75% decrease in renal function before the value rise.

Normal:	BUN 8 – 16%	
	Creatinine	0.8 – 1.7 mg%
	Uric Acid	4 – 5.5 mg%

b. Electrolyte Determination

This is a test done on venous blood determine levels of electrolytes present in the serum. Although other conditions may cause electrolyte disturbance in renal failure these determinations are greatly disturbed.

Normal:	Sodium	137 – 148	mEqL (low in renal disease)
	Potassium	3.9 – 5	mEqL (high in renal disease)
	Calcium	4.5 – 5.5	mEqL (lower in renal disease)
	Chloride	95 – 103	mEqL
	CO2 combining power	20 – 30	mEqL

c. Urine Concentration and Dilution Tests

In normal kidney function, the kidney has the ability to regulate the amount of water leaving the body dependent on the body's needs. EX: In excessive loss of body fluid or restricted intake more water is reabsorbed by renal tubules and specific gravity of urine is high. With large fluid intake, less water is reabsorbed, and volume of urine is greater with a specific gravity lower than normal. Normal specific gravity is 1.003 – 1.030. In tubular damage, this mechanism is impaired. Concentration test determines the kidney's ability to concentrate urine when fluid intake is restricted. Fluids are restricted over a specified time.

Two to three urine specimens are collected, and the specific gravity is determined on each. If kidneys are normal, specific gravity is not less than 1.024. Dilution test evaluations, the kidney's ability to dilute the urine, following a large intake. Patient remains in bed. First morning specimen is desired. Patient drinks one liter of fluid over a period of ½ hour, then voids at 1,2,3,4 hours and all urine is submitted to the laboratory. The time of voiding is indicated on each specimen. Specific gravity of first specimen voiding is indicated on each specimen. Specific gravity of first specimen should be about 1.002 with a gradual increase occurring in the others.

d. Phenolsulfonphthalein Test (PSP)

1. This test indicates the excretory ability of the renal tubules. Phenolshonpthalein, a red dye, is given intravenously and is completely excreted at a short time by normal kidneys. Less than total excretion of the amount given indicates tubular damage and inefficiency or obstruction of urinary now through the renal pelvis or lower urinary tract.

2. Procedure

a. Give patient 500 ml. of water, and have him void and discard.

b. USP is injected IV.

c. Urine specimens are collected in 15, 30, 60 and 120 minutes after dye is injected. All urine voided is included in specimen.

d. Each specimen is labelled as to the time and sent to lab.

e. Normally 40 – 50% of de is excreted in hr., and 75% in two hrs.

3.7 Urine Concentration and Dilution Test

Purpose

To test the ability of the kidney to vary the specific gravity of the urine. This importance function enables the body to deal with changes in the fluid intake, with the needs of the skin in changing temperatures, and with other emergencies in the fluid balance. The loss of ability to concentrate the urine indicates a late stage of renal failure, as in chronic nephritis.

Method

Many modifications of this test are in use; this is a typical one, not too rigorous. Nothing to eat or drink is allowed from 6 p.m. on the evening before the test. At 6 a.m. and 7 a.m. the bladder is emptied. The specific gravity of at least one of these specimens should reach 1.022.

The dilution part of the test follows; it is not ordered for patients who have odema. 1,000 ml. of water is drunk in the next half hour, and specimens are collected hourly for the next four hours. Normally most of this litre of water will have been excreted during this period, and a specific gravity of 1.003 or less is attained. If there is severe impairment of kidney function, the specific gravity of the urine usually remains fixed at about 1.010.

3.8 Urea Concentration

Purpose

The output of urea in the urine should rise if the amount of urea in the blood increases, and this test investigates the ability of the kidney to do this.

Method

Nothing is given after 9 p.m. until the test is complete on the following morning. At 6 a.m., the bladder is emptied, and 15 G. of urea is given dissolved in 100 ml. of water. At 7, 8 and 9 a.m. specimens 1, 2 and 3 are collected and sent to the laboratory. The amount of urea should exceed 2% in two of these if urea concentration is to be considered satisfactory.

3.9 Urea Clearance

Purpose

This is a test of glomerular function, and depends on the fact that urea is cleared from the blood into the urine at a steady rate, so that if the blood urea is known, and also the amount of urea per hour excreted into the urine, a satisfactory estimate of the filtration power of the kidneys can be made.

Method

No coffee or tea (which is diuretics) should be given on the morning of the test. At 10 a.m., the bladder is emptied and the specimen discarded. At 11 a.m., specimen one is collected, and at noon specimen two. The blood urea is estimated at 11 a.m. Specimens one and two are sent for examination, and the whole amount passed must be included.

For an accurate result, specimens must be obtained with strict punctuality. If there is any delay (e.g. if the patient is unable to micturate) the exact time when the urine was passed should be put on the label.

3.10 Creatinine Clearance

Purpose

This is another and more reliable test of glomerular function.

Method

No preparation is required. A 24-hour specimen of urine is collected, and a sample of this and a note of the total volume are sent to the

laboratory. 10 ml. of blood are collected on the same day. Sometimes the pathologist may ask for two 24-hour specimens: this is because collection for 24 hours is subject to fallacy because of loss of a specimen, especially if the patient is spending time out of the ward in connection with other examinations.

Renal Biopsy

Microscopic examination of small portions of kidney tissue obtained by needle biopsy may be a great help in diagnosis. An intravenous pyelogram is performed beforehand, unless the biopsy is to be done under X-ray control, to establish the position of the kidneys. The patient's blood group is ascertained, and a bottle of blood cross-matched and kept ready for emergency use. The prothrombin time and platelet count must be estimated, because abnormal findings indicate a risk of undue bleeding. If a local anesthetic is used, adequate sedation must be given beforehand. The following equipment is needed.

2 gallipots.
Gauze and wool swabs.
2 pairs of dressing forceps.
French's or handling forceps.
Paper towels.
5 ml. syringe.
Needles size 1 and 20.
Vim-Silverman or Menghini biopsy needle.
Exploring needs (e.g. lumbar puncture needle).
Masks, gowns, gloves.
Cleaning lotion (e.g. chlorhexidine 1 in 200 in spirit).
(All the above are sterile)
Adhesives.
Preservative for biopsy specimen.

The patient lies face downwards on a firm surface for the puncture. The right kidney is a little lower than the left, and so easier to reach but the liver is close by, and may be punctured in error. The skin is cleaned and anaesthetized, and then the exploring needle is passed to find the depth at which the kidney lies; when the needle is in the right place, it will move with each breath. It is then withdrawn, and the biopsy needle is passed along the same track. Cores of renal tissue are obtained and put into the preservative, and an adhesive dressing is obtained and put into the preservative, and an adhesive dressing is applied.

Bleeding down the ureter is common, and brisk bleeding is often seen. The patient is kept at rest in bed, and encouraged to drink freely to keep the urine diluted. If bleeding is free, clotting will occur, and the patient

will suffer from colic as the clots pass down the ureter and an analgesic must be given. The pulse and blood pressure must be taken hourly, and each urine specimen is saved separately to see if bleeding is getting less. Profuse haematuria or colic, falling blood pressure, rising pulse rate or sweating must be reported at once. Bleeding usually ceases spontaneously, and surgery is rarely necessary.

3.11 Liver and Biliary Test

Several tests are used to netermine whether or liver or disease is present. Liver function tests are used to determine the presence, and extent of liver damage, and to check the progress of liver disease. Since the liver has many functions, which are closely related, single tests of liver function usually give information about the efficiency of several of the organ's activities. Most liver tests involve taking samples of blood urine, or stool; taking of drugs, and fasting before procedures.

a. Protein Metabolism Tests

1. Serum albumin – globulins (A/G Ratio)

Albumin is produced by the liver and globulin by lymphoid tissue. Normally the A/G ration 3:1. In liver disease, albumin decreases and globulin increases, which reverses the ration. Patient is NPO; 10ml of blood is withdrawn.

NORMALLY:	Total protein:	6-8.2 mg%
	Albumin:	3.8-6.7 mg%
	Globulin:	1.2-3.2 mg%

2. Prothrombin

Blood is withdrawn and plasma is for tested prothrombin content. Several plasma proteins involved in blood coagulation are made by the liver. Capacity to male prothrombin depends on availability of Vitamin K ingested with food or formed by intestinal bacteria. It requires bile salts for absorption.

In liver cell damage, impairment is due to a deficiency in bile liver damage and obstructive jaundice, prothrombins time is prolonged.

3. Blood ammonia

This is increased in a failing liver because it cannot detoxify this endogenous waste product of intestinal protein metabolism, which is a normal liver function

Normal: 01-05 mg%

4. Flocculation tests

i. Cephalin floc is performed to distinguish jaundice due to liver disease from jaundice due to obstruction. Patient is NPO before blood is withdrawn. Normal is 1-14 U (no precipitation should be present). Abnormal results occur in hepatitis (except if mild and in cirrhosis (except if arrested). It is negative in non-infective, extra – hepatic biliary obstruction, even with associated hepatic damage.

ii. Thymol turbidity tests concentration of Gamma Globulin which may be elevated in liver damage. Normal is 0-5 U. Abnormal values suggest hepatitis and cirrhosis rather than obstructive disorders. It is of limited value for it can be high in other diseases.

b. Billiary excretion test

1. Serum bilirubin

Fasting blood is the serum which shows the functional capacity of the liver in breaking down, reusing, and excreting bile pigments. Normally, liver cells extract pigments from blood and convert it to a water soluble compound before excreting it in the bile. Hemoglobin released from old or injured red blood cells is reduced to the compound called "unconjugated" or "indirect" bilirubin, which is carried by the blood to the liver where chemical processes transform it into "conjugated" or "direct" bilirubin is increased in hemolytic jaundice. Direct bilirubin is increased in obstructive jaundice.

Normal: Total 0.2-1.4 mg%
Direct 0.1-0.8 mg%
Indirect 0.1-0.6 mg%

2. Urinary Bilirubin

Unconjugated Bilirubin is not excreted in urine because it is not water soluble. Pigment is present in urine in obstructive jaundice, but absent in hemolytic jaundice.

3. Urinary urobilinogen

Conjugated bilinogen is changed to urobilinogen by bacterial action when bile reaches the small intestine. Most is excreted in faeces and remainder is absorbed. The small amount that is absorbed is excreted in bile. If liver's cells are damaged, they do not reclaim it and the amount of urobilinogen excreted by the kidneys is increased. Amount is decreased in obstructive jaundice when bile is not reaching intestine, or if bacteria content as a two–hour afternoon urine specimen since maximal excretion is in afternoon and evening and Normal is below 4 mg. per 24 hours.

4. Serum cholestol

Since cholesterol is synthesized and excreted by the liver, the conception falls in liver disease when cell function is impaired. It rises in obstructive jaundice and cancer because of inhibited excretion and increased hepatic formation. A low cholesterol diet is given the day before the blood is taken. Normal: 135 – 260 mg depending on age and sex.

c. Enzyme Tests

1. Alkalin phoshatase

This is an enzyme that is normally excreted in bile by hepatic cells. It is increased both in obstructive jaundice and liver damage, due to its return to blood stream with bile in obstruction.

Normal: 2 – 4.5 U. There is less elevation with hepatitis than obstruction.

2. Serum transaminases

Liver cells contain Serum Blutamic Oxaloacetic Transminase (SGOT) and Serum Glutamic Pyruvic Transaminase (SGPT). Both are released into the blood when liver cells are damaged. Concentration can be used to estimate liver damage.

Normal: SGOT 6 – 40 U
SGPT 6 – 30 U

d. Metabolism of foreign substances

Bromsuphalein Excretion Test (BSP – Rosenthal's method)

a. Description

BSP is a dye that is normally excreted by the liver into bile. The dye is injected IV: blood is withdrawn in a prescribed amount of time (45 minutes to one hour) to determine the amount of time dye that has not been utilized by the liver and remains in the blood one hour later. Amount of dye is based on Kg of body weight. Rate of removal is influenced by hepatic blood flow function capacity of polyzonal cells and freedom from biliary obstruction.

b. Policy

1. NPO after midnight except water.
2. In exceptional cases, the test may be done four hours after last eating.
3. Do not allow patient to take food until lab has finished the test.
4. Dye is injected and all specimens are collected by lab.
5. Person may not leave the bed without permission of lab personnel.
6. Medication carried out as ordered by the doctor. Patients must be weighed before examination is begun since medication dose is 2 mg/Kg body weight.

3.12 Fractional Test Meals

Purpose

To investigate the quality of the gastric juice, and usually to assess the response of the stomach to food intake. The principle is to pass a Ryle's tube into the stomach of a fasting patient, and then to give some kind of "meal" and by serial withdrawals discover its effect on gastric secretion. The meal can consist of a pint of thin strained cereal, or 50 ml. of 7% alcohol.

The information that may be gained is

1. The amount of resting juice, i.e. the secretion in the stomach after a twelve-hour fast. It may be excessive in pyloric stenosis.

2. The amount of free and total hydrochloric acid in the stomach. Excessive acid (hyperchlorhydria) is characteristic of duodenal ulcer. Absence of acid (acholrhydria) is found in pernicious is found in

pernicious and some iron-deficiency anaemias, and usually in cancer of the stomach.

3. The response of the stomach to food. Normally there is a rise in the acid secretion, followed by a steady return to normal. In duodenal ulcer there is a steep rise and excessive free HCI is present throughout the test.

4. The response of the stomach to subcutaneous injection of histamine, if no acid is found at first. A histamine-fast achlorhydria is found in pernicious anaemia. Not all physicians like histamine.

5. The speed with which the stomach empties; the hyperchlorhydria of peptic ulcer is usually associated with quick emptying.

6. The amount of residual fluid, i.e. the amount left after two hours. In pyloric stenosis some of the meal may still be left in the stomach.

7. The presence of excessive mucus or blood, as in gastric ulcer or cancer of the stomach.

Preparation of the Patient. The patient is told of the test, and of the valuable information to be gained, to secure his co-operation. He must fast overnight.

The internal at which specimens are taken depends on individual dochar on local custom. Six specimens, withdrawn at twenty-minute intervals, is a usual number, and not more than 5 ml. should be taken at each aspiration, or the supply will be exhausted before the required number has been obtained. Each is put into a test tube, labelled with the time, and tested with litmus paper for acidity. If none is found in the first two specimens, the nurse may be asked to give histamine 0.5 mg. by hypodermic injection. This sometimes causes uncomfortable flushing and headache, and if this is severe, it may have to be relieved by giving one of the anti-histamine drugs.

3.13 Insulin (Hollander) Test

a. Use: To determine the completeness of a vagotomy in inhibiting acid output of the stomach. Insulin normally stimulates production of HCI.

b. Test: Dose of 0, 2 U/Kg of Regular Insulin is given IV or subq. Blood and gastric secretion are collected and acid output after Insulin is compared with proceeding baal secretion.

c. **Nursing Care**: Observe closely for hypoglycemia. If it occurs, 50% Glocose may be given.

3.14 Cerebrospinal Fluid Examination:

Cerebral spinal fluid is normally a clear, colorless fluid with a pressure of 7 – 10 mm Hg when the patient is in horizontal position. It is obtained through a lumbar puncture, and should be tested immediately because the cells tend to clump on standing giving wrong results.

Normal: WBC 0 – 5 – elevated in bacterial infections
RBC 0 - - - - indicates bleeding in CNS if present
Total protein 20 – 40 mg – increased in infection and tumor
Glucose 60 – 80% of blood level – lower in bacterial and TB infection.
Serology negative – positive in syphilis

3.15 Electrocardiogram (EKG, ECG)

This test records the electrical impulses generated by the heart onto special paper by a machine. Rhythm, position of heart, size of ventricles and presence of injury are revealed by the EKG tracing. The patient is at rest and feels no pain during the procedure. No special prep required. Leads from the machine are connected to the patient's chest and extremities.

3.16 Electroencephalogram (EEG)

Definition

This test records the electrical impulses of the brain cells onto a special paper for interpretation of possible abnormalities in the CNS. No pain is involved. Leads are attached to the patient's scalp. Readings are taken with him awake, asleep, and hyperventilating. Takes about two hours to complete.

Preparation of Patient

1. Patient takes no coffee, tea, coke, or other stimulants, and no alcohol for some time before test.

2. No medication is taken unless by special order of doctor.

3. Hair and scalp are washed well to remove all hair dressing and natural oils

3.17 Radioactive Scans

Definition

This is the use of radioactive substances to examine specific organs or tissue which show function of the organ or tumors present. The thyroid, kidneys, brain, liver, lungs, pericardium, and bone may be examined.

Method

A radioisotope, called tracer, is given orally or parentally. The drug will concentrates at the site of the tumor if one is present. It is then traced by a sensitive apparatus and records the concentration on sensitized paper by a synchronously moving pen. The apparatus may include Geiger – Muller counter, scintillation counters, specimen counters, scanners, gamma cameras and whole body encounters.

Radioactive Drugs

1. The drugs given for this purpose have a short half-life. They expend their energy rapidly and are excreted rapidly by the body.

2. The drugs given have a certain affinity for the particular organ being studied. EX: Radioactive iodine (1131) __thyroid; 198 Au___liver; radioactive mercury – brain.

3. The drugs are administered in minute dosage so there is no cellular destruction.

Procedure

2. The patient is given a trace dose of the appropriate radioisotope.

3. A period of waiting is necessary depending on the drug given. Varies from one hour for radioactive gold to 18 – 48 hours after injection of RIHSA (Radioiodized Human Serum Albumin).

4. During scanning, the patient is asked to be still and breathe normally while the scintillator measures the radioactive atoms concentrated in the organ under study and records its finding. If a patient is restless or agitated, sedation may be given to help him relax.

5. The procedure is painless, and is not harmful to those around the patient.

4.0 CONCLUSION

Laboratory investigations are done to test the fischoral ability of an organ in the body with the hope to institute correct measures.

5.0 SUMMARY

- The role of the nurse in laboratory investigation is to ensure the comfort of the patient.

- All investigation done must be documented and kept in patient's file for use by all the health team.

6.0 TUTOR-MARKED ASSIGNMENT

1. Discuss the importance of diagnosis in nursing.
2. List and explain three equipments used in diagnostic investigation.

7.0 REFERENCES/FURTHER READING

Malinda, Murray. *Fundamentals of Nursing*. 2nd Edition. New Jersey: Prentice-Hall, Inc., Englewood Cliffs, 1980.

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UNIT 2 CLINICAL OBSERVATIONS

CONTENTS

1.0 INTRODUCTION

Two topics are discussed in this unit –clinical observation and collection of specimen for investigations. The term “clinical observations” is used to describe the initial and basic observation of the temperature, pulse and respiration rate, in relationship to other significant changes in an individual. For newly admitted patient, the nurse must observed the following; his attitude in bed, his colour, and his state of nutrition; orientation to his surroundings, fear and anxiety or indifference She must also notice the feel of his skin and his muscle tone, his voice and conversation to know what part of the country he/she comes from, and educational status. This observation must be done within the context of nurse/patient relationship. Precautionary measures involved in collection of specimen for investigation are also explored in this unit.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain the significance of clinical observation
- identify the tools and equipment used for the observation
- explain the significance and factors affecting each procedure mentioned
- explain the precautionary measures involved in collection of specimen for investigation
- explain the need to record all findings from diagnostic procedures accurately.

3.0 MAIN CONTENT

3.1 General observation

Colour

The skin may be pale, suggesting anaemia, shock or fear; it may show cyanosis (blueness), indicating sub-oxygenation of the blood; a flush may suggest that the temperature is high; jaundice means yellowness, and is due to accumulation in the tissues of the pigments normally excreted in the bile.

Attitude

Patients with colic, whether of intestine, ureters or bile duct, tend to be restless with each attack with the hips flexed to slacken the tension of the abdominal muscles. Movement increases the pain, so they lie still, watching those around with alert anxiety. Patients with cerebral irritation often display dislike of light (photophobia). They lie on the side in an attitude of flexion, actively resenting any attempt to move or examine them.

3.2 Vital Signs

Temperature

The normal body temperature is said to be 98.4°F. (36.9°C.), but the temperature varies in different parts of the body. The skin temperature (usually taken in the axilla) may, in healthy people, be no more than 97°F. (36.1°C.), while the mouth temperature is usually a degree higher, and the rectal temperature may be 99°F. (37.2°C.). The temperature is usually a degree higher in the evening than in the morning because of

muscular and metabolic activity. The same site should always be used for the thermometer, or the chart will display unnatural variations.

Methods of Taking Temperature

Axillary Temperature

This method is not used if the patient is very thin, or if there is any local inflammation. Small children of one or two may resent having the arm held at the side, and the thermometer may then be placed in the groin, using the same technique as for the axillary method. This method is used if the patient is unconscious or not well-orientated.

Oral Temperature

It is used for all patients but contraindicated for the very old people, those with mental illness and any patient who cannot breathe through the nose. Hot or cold drinks affect the mouth temperature.

Rectal Temperatures

The rectal route is used for babies and for those subjected to low-temperature techniques. It is the most reliable site after head operations. When in use, the bulb is inserted an inch. into the anal canal and held there for the time indicated.

Recording Temperatures

It is usual to record temperatures graphically on a chart by making a spot in ink at the appropriate level and in the column that indicates the time and date.

The quickest way in which a temperature can rise and fall is seen in the rigor. Rigor can be describe as a sudden onset of fever in which the temperature may rise four or five degrees because of shivering, and it falls again because of sweating. The whole episode may be over in half an hour. Rigors are common in malaria; at the onset of a few infections like pyelitis and lobar pneumonia; as a reaction to the injection of foreign protein, either intramuscularly or intravenously.

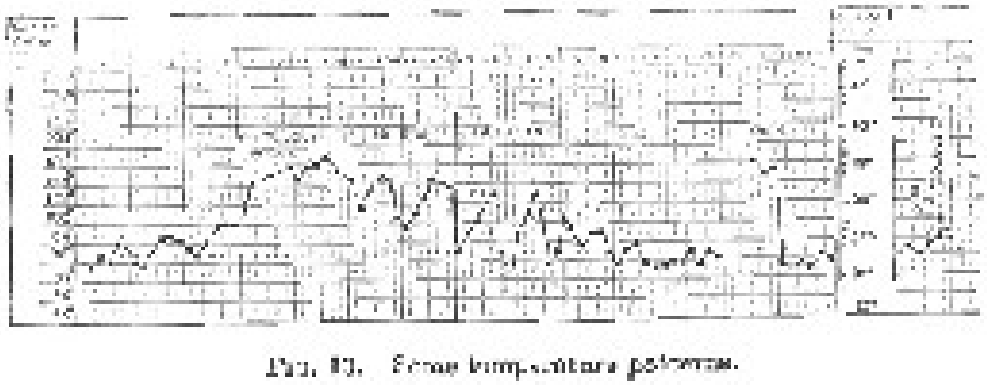

Figure 13: Some Temperature Patterns

The Pulse

The pulse is the wave of distension generated in an artery by the contraction of the heart, and it can be felt in any artery big enough or near enough to the surface to the surface to be palpable. It is usually taken in the radial artery at the wrist, a place convenient both for patient and nurse.

The points to be observed about the pulse are as follows:

1. **Rate:** The average adult rate is 72 beats per minute. In a baby it is 120 to 140, and at 12 years has fallen to 80.

2. **Rhythm:** This should be regular, the beats being evenly spaced.

3. **Volume:** This refers to the amount of blood distending the artery with each beat and only experience can tell the nurse if it is within normal limits.

4. **Tension:** This refers to the compressibility of the pulse, i.e. the ease or otherwise with which the flow can be interrupted by pressure. Unlike the other characters of the pulse, which are produced by the heart, tension is a property of the artery wall.

Respiration

A newborn baby breathes from 32 to 50 times a minute, an adult 16 to 20. The pulse rate is usually about four times quicker than the respiration rate, and disturbance of this relation between them is characteristic of some diseases (e.g. lobar pneumonia). The muscles involved in inspiration are the intercostals (supplied by nerves from the thoracic part of the spinal cord) and the diaphragm (supplied by the phrenic nerves).

Normal respiration is regular in rhythm and almost noiseless and the chest movement, or excursion, falls within easily recognized limits. The rate and the excursion are both increased by exercise and by rise in the temperature, and by emotion. Shallow breathing is noted in shock; in pleurisy; and in peritonitis. Deep breathing is characteristic of acidosis in uncontrolled diabetes. Sighing and yawning are signs of acute blood loss, and may be a valuable indication of internal haemorrhage. Torturous breathing is due to vibration of flaccid cheek and throat muscles, and is often noted in those unconscious after a stroke. Wheezy or bubbly breathing is due to secretions in the bronchi and is heard in bronchitis, pneumonia and broncchietasis.

Estimation of the Blood Pressure

The blood pressure is the pressure within the arteries, measured in millimeters of mercury. It is at its highest (systolic) when ventricular contraction sends more blood into the arteries, and at its lowest (diastolic) when that force is spent. The normal range of systolic pressure is 110-130 mm. Hg, and the diastolic is 70-90. The levels are influenced by emotion, by posture and by age as well as by pathological processes. The difference between the diastolic and systolic readings is the pulse pressure A fall in blood pressure is characteristic of shock, haemorrhage, fainting and Addison's disease. A rise is seen in essential hypertension, kidney disease, such as acute or chronic nephritis; raised intracranial pressure, and toxaemia of pregnancy.

The apparatus used to measure bloopressure is called the sphygmomanometer.

3.3 Observation of Urine

Urine contains in solution all the by-products of body metabolism except carbon dioxide. In addition, pus and blood may also be found. Examination of the urine may yield information of the greatest value in diagnosis, and such examination should be compulsory made for all new patients on admission, and afterwards at such intervals as their condition suggests. It is especially important before an anaesthetic is given, since it is quite common to discover undiagnosed diabetes mellitus in people admitted with some other condition. The amount in 24 hrs varies greatly with the fluid intake and the external temperature. Increased output (polyuria) is common in diabetes insipidus and uncontrolled diabetes mellitus. Oliguria or decreased urinary secretion is found in acute nephritis, congestive heart failure and dehydration. It is also normal in the first twenty-four hours after operation, owing to increased output of anti-diuretic hormone from the pituitary due to the surgical stress.

Cessation of urinary secretion is called suppression, or anuria. It may be caused by malignant pelvic growth involving both ureters, crushing injuries, acute nephritis, eclampsia, sulphonamide ureteric crystallization, and incompatible blood transfusion.

3.4 Observation of Faeces/Stools

Faeces are by-product of digestion. They are composed mainly of food residue, bacteria, salts and water. The bowels are normally opened once or twice a day. The faeces of a baby are soft and yellow but in an adult, they are well formed in consistency (neither hard nor fluid) and brown, because of bile pigments.

Abnormalities of Stools

Type of Stool

The stools may be:

- Black if iron medicine is being taken;
- Pale or clay-coloured in obstructive jaundice;
- Grey, bulky and offensive in caeliac disease;
- Green in babies with intestinal upsets.
- Or melaena. Melaena is a term used to describe the presence of altered blood in the stools.

The stool is black, tarry and sticky, with the characteristic smell of blood. It is caused by bleeding from the upper intestinal tract...

Unusual Content of Stool

- If faeces contain bright blood, this indicates that there is a lesion low down in the alimentary canal, probably from piles, or possibly a carcinoma of rectum.

- Mucus is not normally observable in the stools but may be obvious in pelvic abscess, faecal impaction or ulcerative colitis.

- Pus is present in ulcerative colitis or if an abscess ruptures into the rectum.

- Undigested food indicates small intestinal indigestion.
- Sloughs may be seen in the later stages of typhoid fever when they are separating from the typhoid ulcers.

- "Rice water" stools are used to describe abundant pale watery stools of cholera.

- Foreign bodies may also be present in faeces if swallowed. They may be passed out. Example of foreign bodies includes safety pins, beans, beads or chalk. All stools of a patient with a history of swallowing a foreign body must be inspected.

3.5 Observation of Cough

A cough is a reflex act whose primary function is to protect the airway from the entry of foreign material. Its centres are in the medulla. A cough begins with a deep inspiration; the diaphragm is fixed, the glottis closed and a strong expiratory movement forces the cords apart and the breath is audibly expelled.

Causes of coughing are:

1. Irritation of the larynx by fluid or particles of food; smoke, or fog; chemical fumes like ammonia.

2. Inflammation of the larynx, trachea or bronchi (bronchitis, whooping-cough).

3. The presence of secretion in the airway (chronic bronchitis, bronchiectasis).

4. Irritation of the vagus nerve endings in the lung by pneumonia, tuberculosis, etc.

5. Pressure on the trachea or bronchi.

6. Nervous causes. Such as a cough common before interviews.

Classification of Cough

Coughs may be classified as:

(a) Dry, if no sputum is produced.

(b) Productive, if sputum is expectorated. The aim of the treatment expulsion of the sputum by expectorant mixtures.

The points to be noted in connection with coughing are as follows

1. The time at which it occurs, e.g. whether the patient is kept awake at night, or coughing is most frequent early in the morning after sleep, when sputum has tended to accumulate, or is only paroxysmal.

2. Length of attacks. Some coughs, e.g. in tuberculosis, are persistent and exhausting, even if non-productive.

3. Presence or otherwise of cyanosis. Those with heart failure or pneumonia may become blue during coughing attacks.

4. Presence or Absence of Pain. Early acute laryngitis or tracheitis causes a dry cough obviously very painful to the sufferer. Acute pleurisy (as in lobar pneumonia, pulmonary infarct, and tuberculous pleurisy) makes the patient endeavour to cut short the cough in order to avoid the painful pleural friction, and the suppressed cough is often followed by a groan.

5. The nature of the sputum, if any.

6. Any special characteristics. The cough in acute laryngitis has a brassy, ringing note; in a child it often heralds an attack of measles. In asthma, it is tight and wheezy. Patients with bronchiectasis have spells of coughing with production of abundant sputum and cough-free intervals during which the sputum is accumulating again.

3.6 Observation of Sputum

This is produced from the respiratory tract by coughing and can be classified under these headings.

1. **Mucus –** This is the normal bronchial secretion, and is present in excess in very acute inflammation of the upper respiratory tract. Very soon, it becomes cloudy as infection supervenes.

2. **Mucous –** This contains mucus and pus and occurs in the later stages of such infections, e.g. bronchitis.

3. **Pus.** This occurs in bronchiectasis or lung abscess...

4. **Blood –** Coughing up blood is called haemoptysis. The blood is bright red in colour and is seen in early pulmonary tuberculosis.

Observations of the Sputum Include:

The amount;
The viscosity;
The odour,
The presence of any material or blood.

A suitable container for sputum must be provided and put within easy reach for patients that are coughing.

3.6.1 Observation of Vomitus

Vomiting is a reflex act, of which the centre lies in the medulla, and involves emptying the stomach and sometimes the upper part of the small intestine by reversed peristalsis. The main purpose is to rid the stomach of harmful material.

Causes of vomiting

- Irritation of the stomach by chemical or bacterial

- Stimulation of the vomiting centre e.g. by raised intracranial pressure, as in cerebral growths or injuries

- Intestinal obstruction, in which it is a leading sign; by

- Nervous stimuli, such as severe pain, or even the sight or thought of something the patient finds revolting.

The points to be noted are:

1. The amount.

2. The presence or absence of nausea. Vomiting occurs with little or no nausea when a brain tumor is present.

3. The force with which the material is vomited. In congenital hypertrophic pylonic stenosis vomiting is projectile.

4. The constituents of the vomitus:

(a) Stomach contents - Food is vomited if it has been taken recently or mucus if the stomach is empty, as in sea-sickness.

(b) Bile - Clear greenish fluid from the duodenum is characteristic of post-operative vomiting.

(c) Intestinal contents is seen in intestinal obstruction, when fluid from the small intestine wellsback into the stomach.

(e) Blood. Vomiting of blood is called haematemesis. This may come from a stomach lesion, such as a peptic ulcer, or from the oesophagus, as in oesophageal varices, or from blood swallowed, e.g. after tonsillectomy. If the bleeding is acute, the blood is vomited unchanged. If the blood is digested by the gastric juice it is known as coffee-ground vomitus.

3.7 Observation/Collection of Specimen

Examination by the pathologist of specimens submitted to him will often provide the diagnosis, and in many cases, decide the treatment of the patient concerned. It is, therefore, of the greatest importance that material sent to the laboratory is of the kind wanted, in suitable quantity, and as fresh as possible. The doctor will request the examination he wants and sometimes collects the specimen; the nurse's duties include providing his equipment, or the collection of material, and the labelling and dispatch of the specimen to the laboratory. The containers used should be suitable for the purpose, firmly closed, and labelled clearly with the name of the ward and patient; the nature of the material; the examination requested, and the date. Contamination of the outside of the container must be avoided in the interest of those who have to handle it. Specimens must be sent as some as possible after collection, with the signed requested card.

3.7.1 Specimens of Urine

Types of Urine Specimen

A. Ward Specimen

The urine is usually passed into a clean, dry receptacle and a specimen glass filled from it. The bottom of this glass is conical so that small amounts of sediment are easily seen. The bed number is attached using self-adhesive labels.

B. Clean Specimen

A specimen of urine is passed into a sterile container, after cleansing the urethral meatus. It is then examined for deposit and bacteria.

C. Catheter Specimen

These are used much less often than clean specimens, because of the risk of urinary infection.

D. Twenty-four-hourly Specimen

A Winchester bottle is labelled with the name of the ward and patient, and the date and times of collection. The patient empties the bladder early in the morning (e.g. 6 a.m.) and the urine is discarded. All urine passed up to and including the 6 a.m. specimen on the following morning is measured and put into the Winchester bottle. The amount passed is recorded and sent to the laboratory. The commoner indication for collecting a 24-hour specimen of urine is for estimation of excretion of 17-ketosteroids derived from the steroid hormones.

E Aschheim-Zondek Test

About 210-180 mls of an early-morning specimen is sent to the laboratory. This urine is very concentrated and is used in the diagnosis of early pregnancy, or certain malignant growths of the reproductive system.

3.7.2 Specimens of Stool

Specimens of Stool are usually collected for

Examination for Occult Blood

Blood in the stools may be indistinguishable to the naked eye but can be detected chemically. Specimens of three consecutive stools are collected for this test and examined.

Organisms

A small sample of stool is taken and examined for any abnormality, such as pus or blood.

3.7.3 Specimens of Sputum

Specimens of Sputum may be examined for pus, blood, or tubercle bacilli. In collecting sputum for examination for tuberculosis, phlegm must be collected and not saliva. This is because the organism resides in the phlegm from the chest and not inside saliva. If examination is to be made for tubercle bacilli, three consecutive specimens are collected and sent. Specimens of sputum are best expected directly into a carton. If a

specimen is taken from a sputum container, it must be one with no disinfectant in it. If a patient is unable to provide sputum, a Ryle's tube is passed through the nose or mouth into the stomach, 5 or 10 ml. of normal saline is injected with a syringe, and all the fluid in the stomach withdrawn for examination. This is best done early in the morning.

3.7.4 Specimens of Blood

Capillary Blood

Capillary Blood is used to estimate
The haemoglobin level
The red and white blood cell counts.
Blood-sugar estimation

And the nurse may be asked to collect it, since the fasting blood-sugar level is an important one and must be taken early before technicians are normally at work.

The blood is drawn into a special pipette and labeled, giving the time of collection as well as patient data. Estimation of the blood sugar may also be made by a paper dip-and-read test such as Dextrostix. A large drop of capillary or venous blood is spread over the end of the test-strip. After one minute the blood is rinsed off, and the colour of the test compared with a colour chart. Such a quickly-performed test is of great value in the speedy diagnosis of causes of unconsciousness, and in diabetic clinics.

Whole Blood

Whole blood is used for many investigations. Usually 5-10 ml. is taken.

3.7.5 Specimens of Pus

A throat swab may be dipped in pus from a wound, returned to its tube, and sent at once to the laboratory. Such swabs dry quickly and become useless, so it is important that the swab is well charged with pus if possible, and dispatched without delay. If pus is abundant, it may be transferred to a plain sterile tube with a pipette; it should never be scooped up with a tube. This soils the outside of the tube with organisms dangerous to the nurse and the technicians who will handle it, and to the patients to whom they may spread the infection.

3.7.6 Specimens of Tissue

Biopsy means the removal of tissue for examination. The amounts are often small if taken during sigmoidoscopy or bronchoscopy, and such fragments should be put into normal saline in a test tube, closed with a cork, not a swab.

Larger specimens (e.g. organs removed at operation) may be sent at once to the pathologist in a covered bowl, or enclosed in a polythene bag to prevent drying. Accurate labelling and careful handling of such specimens is vital, since, in many cases, the surgeon wants to know weather the condition is a malignant one or not.

Nurse's Responsibility in Fixation of Biopsy Specimens:

1. Any tissue given to the nurse should be carefully preserved.

2. As quickly as possible, pour fixative liquid over the specimen. The fixative is usually alcohol 80% and formation 10%. The recommended amount is about 10 times the volumes of the specimen.

3. Label with name, hospital number, and type of specimen. Fill out slip that with this. If any, send to the laboratory.

Specific Types of Biopsy:

1. Liver Biopsy: a special biopsy needle is passed into the liver through the skin either in subcostal or 9^{th} – 10^{th} intercostals area to obtain tissue for examination in cases of severe liver disease.

a. Contraindications:

i. Low prothrombin level
ii. Bleeding tendency
iii. Obstructive jaundice (may result in hidden hemorrhage or bile leakage from biopsy site)

b. Procedure:

i. Collect tray and assist doctor
ii. Explain procedure to the patient
iii. Patient should sign consent form
iv. Type and cross-match blood as precaution
v. Administer any sedative ordered
vi. Take vital signs before procedure for baseline

vii. Patient should lie on right side after the procedure with small pillow under costal margin in order to apply pressure to the biopsy site, with the right arm extended.
viii. Patient should maintain bedrest for 24 hours after test
ix. Take vital signs for 24 hours – every 15 min for two to three hours
x. Observe for abdominal pain, tenderness and rigidity and the report any, since bile may be leaking from the liver.

2. Bone marrow biopsy: This is the insertion of a special needle into the red bone marrow to obtain specimen for examination to determine the number and characteristics of cell content

a. Sites used: Sternum and iliac crest

b. Procedure:

i. Explain procedure to patient, and obtain consent.
ii. Shave, if needed, and clean skin over site to be used.
iii. Obtain needed equipment from CSP and notify lab personnel when doctor is ready to do the biopsy.
iv. The physician injects to local anesthetic and then introduces an aspiration needle. The stylet is removed and syringe attached.
v. After the specimen has been obtained and the needle is removed, a small dressing is applied over the site.
vi. The lab personnel take the specimen immediately for analysis.

3.7.7 Blood Determinations

Coagulation Tests – This is done on capillary blood.

1. Clotting time is the time is takes blood to clot.

2. Bleeding time is the time it takes bleeding to stop naturally. Normal is 0 – 5 minutes.

3. Prothrombin time is the time it takes for coagulation following the addition of thromboplastin and calcium to the specimen. Normal is based on the control.

4. Fibrinogen level: Normal is 200 mg/100 ml of blood.

a. Erythrocyte sedimentation rate (Sed rate or ESR): This is the rapidity with the RBC's settle out of clotted blood in one hour. It is a non – specific test done on venous blood and is used as a

rough index of the progress of an inflammatory disease, especially rheumatoid arthritis, rheumatic fever, and respiratory infections. Normal varies with method used, but is higher in women.

b. C – Reactive protein is used to diagnose and evaluate inflammatory disease (particularly rheumatoid arthritis, myocardia infaction, and active widespread malignant disease). A protein similar to that found in pneumococcus is present in the above diseases. Graded in degrees of 1+ to 4+.

3.8 Basal Metabolic Rate

Purpose

Basal metabolism is the amount of metabolism going on in a person lying at rest, having fasted overnight. It is affected by the height, weight and sex, and by the activity of the endocrine glands, especially the thyroid and the pituitary. It can be estimated from knowledge of the oxygen taken in and the carbon dioxide expired, and is expressed as a plus or minus percentage. The commonest cause of a rise in the basal metabolic rate is fever, and the temperature should be normal when the test is conducted. Thyrotoxicosis causes a rise, and myxaedema a fall.

Method

The patient's height and weight are ascertained overnight, and he is told that it is a simple breathing test, causing no more discomfort than having nothing to eat from supper time till after the test. Reassurance is especially needed for the toxic patient. Early in the morning the screens are drawn, the bladder may be emptied, and the patient is asked to rest quietly till the technician comes with his apparatus. An oxygen supply must be available. The patient simply breathes in and out of a bag for a few minutes. The results are calculated from the figures obtained and the data supplied by the nurse. Changes of less than 10% are not considered of much significance. Some physicians now prefer to estimate the level of the protein-bound iodine (for which only a blood sample is required) or to perform a radioactive iodine uptake test to give information on the metabolic rate.

3.9 Glucose Tolerance Test

Purpose

To investigate the ability to metabolise sugar. Normally the fasting blood sugar, estimated before breakfast, is about 80 mg. per cent, and if

sugar is taken there is a steep rise, followed by a gradual fall to normal in two hours as insulin action causes its removal to the liver. If the blood sugar rises above 180 mg. per cent, sugar will appear in the urine. In diabetes mellitus, the fasting blood sugar is often high, and taking sugar causes a rise without the steady return to normal. This test is used to distinguish diabetes from other causes of glycosuria.

Method

If the patient is ambulant, it may be more convenient for him to go to the laboratory. He fasts overnight, and at 9 a.m. a specimen of blood for fasting blood sugar is taken, and the bladder is emptied. He then drinks 50 G. of glucose in a glass of water flavoured with lemon juice. The blood sugar is estimated after ½ hour, 1 hour, 1½ hours and 2 hours, and specimens of urine are collected at 10 a.m., 11 a.m. and noon and sent for examination. It is unusual for the blood sugar to exceed the renal threshold level of 180 mg. per cent.

3.10 Tuberculin Skin Tests

People who have had an overt or sub-clinical infection with the tubercle bacillus become sensitized to tuberculin, and will respond with a reaction if it is injected into or applied to the skin. A negative reaction indicates that the subject has never been exposed to such infection and is therefore susceptible. Most adults in urban communities show a positive reaction, but with the decline in tuberculosis now taking place, there are increasing numbers who are negative. A proportion of students taking up nursing or medicine will be negative reactors, and in view of their occupational risk it is common practice to immunize them with B.C.G. (Bacille Calmette-Guerin), a weak strain of the tubercle bacillus.

Mantoux Test

This is the commonest and most reliable skin test. The doctor will bring his own sterile glass syringes, tuberculin, and normal saline. He should be supplied with swabs and ether. He injects 0.2 ml. of tuberculin, 1 in 1,000, intradermally into the skin of the forearm, and a corresponding amount of control solution into the other. A positive reaction is the development of a red reaction with a central zone of aedema at least 1.5 cm. across on the tuberculin side.

Patch Test

A piece of strapping containing tuberculin is applied to the back, usually of a baby, and the result read after forty-eight hours. It is not very reliable.

3.11 Cardiac Catheterization

A fine plastic catheter is introduced into the heart to enable the physician to obtain samples of blood from different parts of the heart and great vessels, and to measure pressure. Children usually need a general anaesthetic to prevent restlessness during the long examination, but adults only require a sedative. Antibiotic cover is sometimes necessary. Full aseptic precautions are taken during the introduction of the catheter.

The right heart can be reached by inserting the catheter into an arm vein, whence it can usually be manoeuvred without difficulty into the superior vena cava, the right atrium and the right ventricle, and thence into the pulmonary artery. The progress of the catheter is checked on a screen.

The catheter can be introduced into the femoral artery by puncturing this vessel in the groin with a large bore needle, threading a guide wire through this into the artery, and passing the catheter over it. The catheter is then guided up the aorta, valve into the left atrium and the left ventricle. After the examination, the catheter is withdrawn and firm pressure applied over the puncture site for ten minutes. An alternative method is to pass a long needle up the catheter when it is lying in the right atrium, puncture the septum, and pass the catheter over the needle into the left atrium.
Complications are not common after right heart examination, but catheterization of the left heart is more dangerous. The benefit to the patient of accurate assessment of his condition must be considered by the physician as greater than the risk involved. Disorders of cardiac rhythm, especially ventricular fibrillation or cardiac arrest, must be continually watched for, and the means available to deal with them. When the patient returns to the ward, the pulse rate and rhythm are observed every half hour, and the temperature is taken four hourly. The puncture site should be inspected regularly for signs of haematoma formation.

Among the facts that can be learned from cardiac catheterization are the presence, site and size of septal defects; lesions of he heart valves; the cardiac output; and the pulmonary resistance. In addition, angiocardiography may be performed by injecting hypaque 85% through the catheter and taking films.

4.0 CONCLUSION

Clinical observations describe the initial and basic observation of the temperature, pulse and respiration rate, in relationship to other

significant changes in an individual. This observation must be done within the context of nurse/patient relationship.

5.0 SUMMARY

- Whatever specimens to be collected for investigation must be of the kind wanted, in suitable quantity, and as fresh as possible.

- The doctor will request for the examination he wants and sometimes collects the specimen.

- The nurse's duties include providing his equipment or the collection of material, and the labelling and dispatch the specimen to the laboratory.

- The containers used should be suitable for the purpose, firmly closed, and labeled clearly with the name of the ward and patient; the nature of the material; the examination requested, and the date.

- Specimens must be sent as soon as possible after collection, with the signed requested card.

- All observations must be recorded.

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain the significance of clinical observation
2. Identify the tools and equipment used for clinical observation

7.0 REFERENCES/FURTHER READING

Malinda, Murray. *Fundamentals of Nursing.* 2nd Edition. New Jersey: Prentice-Hall, Inc., Englewood Cliffs, 1980.

UNIT 3 PRE-OPERATIVE INTERVENTION

CONTENTS

1.0 INTRODUCTION

Surgery is one of the major medical interventions of medical therapy. It is a stressful experience affecting a patient and members of his family. The nurse is in a position to assist the person to cope with the stressors, to seek relief from the pain, and to return to optimal functioning.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain the purposes of performing surgery on an individual
- understand the psycho-social effect of surgery
- describe the phase of pre-operative nursing care
- apply the nursing process in the assessment and physical preoperating patient for surgery.

3.0 MAIN CONTENT

Keywords

Common Surgical Suffixes

-ectomy	Removal of an organ or gland
-rrhapy	Suturing or stitching
-ostomy	providing an opening (stoma)
-otomy	Cutting into
-plasty	Plastic repair
-scopy	Looking into

3.1 Classification of Surgical Intervention

Surgeries may be classified in several ways, such as by

1. Location
2. Extent
3. Purpose of the surgery.

Location

Surgery may be performed externally or internally. In external surgery, surgery is on the skin or underlying tissues are readily accessible to the surgeon. External surgery has disadvantages; it may result in scarring or disfiguration that may be readily visible, leading to great concern and distress for some patients. Plastic surgery is an example of external surgery and is directed toward reconstruction and repair of deformed tissues.

Internal surgery involves penetration of the body. The scars of internal surgery may not be visible but may lead to complications such as adhesions. Surgery of major internal organs may lead to decreased function if sufficient tissue is removed.

Surgery may also be classified by location of body parts or systems, such as cardiovascular surgery, chest surgery, neurologic surgery, and so on.

Extent

Surgery may be classified as minor or major. Minor surgery presents little risk to life and is under local anesthesia. It may be done in an outpatient. Many minor surgeries are performed but general anesthesia may also be used. Although the operation is termed “minor,” it is

frequently not viewed as a minor episode by the patient and may evoke fears and concerns.

Major surgery is usually performed under general anesthesia in an inpatient surgical suite. It is more serious than minor surgery and may involve risk of life. There is a trend toward an increased number of surgical procedures being performed in hospital ambulatory centres in which persons are admitted to the centre on the morning of surgery, remain there for their immediate post-operative care, and are then discharged to their homes before the end of the day. Some major surgical procedures, such as herniorrhapy, are now being performed in this manner.

3.2 Purpose of Surgery

There are several purposes for performing surgery. These include:

a. For diagnostic and curative reason. In this regard, the surgery is done to determining the causes of the symptoms so that the affected organ can be removed or appropriate intervention done. For example exploration.

b. Restorative Purposes. Restorative surgery is done to remove a dead organ or part of an organ for maximum functioning. In some cases, restorative surgery may also be done to strengthen a weakened part of the body to correct any deformities. For example, herniarrhophy.

c. Palliative Surgery: This is often done to relieve symptom without living disease. For example, radical mastectomy (removal of a cancerous breast may be done not to be the disease, but to offer some pain relief.

d. Cosmetic Surgery: This is done for aesthetic reasons, often to improve appearance. For example, surgery may cure done to remove extra fat from the stomach or scars from the face. They are often called plastic surgery.

3.3 Effects of Surgery on the Patient

Surgery is a potential or actual threat to a person's integrity and thus may produce both physiologic and psychological stress reactions. The physiological stress reaction is directly related to the extent of the surgery, that is, the more extensive the surgery, the greater the physiologic response. The psychological response, however, is not directly related. A relatively minor surgical procedure, such as removal

of a cyst from the face, may evoke a greater psychological response than removal of an organ such as the spleen because of the former's potential for scarring. Removal of the uterus, however, may evoke a greater response than would, removal of the spleen. This is because of the implications and values attached to uterus.

Physiologic Responses

Major surgery is a stressor to the body and evokes a neuroendocrine response. The response, which consists of sympathetic nervous system and hormonal responses (Table 17-2), serves to protect the body from the threat of injury. When the stress to the system is severe or if blood loss is excessive, the body's compensatory mechanisms are overwhelmed, and shock is the result. Certain types of anesthesia used may also contribute to shock formation.

Metabolic responses

Metabolic responses also occur. Carbohydrates and fats are metabolized to produce energy. Body proteins are broken down to provide a supply of the amino acids used to build new tissues. Those amino acids that are not used are broken down to nitrogen end products, such as urea, and excreted. This leads to a negative nitrogen balance; that is, nitrogen loss exceeds nitrogen intake. This accounts for the weight loss after major surgery. A high protein intake is necessary for healing and for restoration of optimal functioning.

Psychological responses

Persons differ in the way they perceive the meaning of surgery, and thus they respond in different ways. Some of the fears underlying pre-operative anxiety are elusive, and the person may not be able to identify the cause. Others are more specific.

Fear of the unknown is most common. "Going to sleep and never waking up." Fears concerning pain, disfigurement, or permanent disability may be realistic or may be influenced by myths, lack of information, or lurid stories told by friends. The patient may also have other concerns related to hospitalization, such as job security, loss of income, and care of family.

3.4 Phases of Peri-operative Period

The surgical experience can be classified into three stages: pre-operative, intra-operative, and post-operative periods.

Pre-operative Phase

The pre-operative phase begins when the decision to proceed with surgical intervention is made and ends with the transfer of the patient onto the operating room table. The scope of nursing activities during this time can include establishing a baseline evaluation of the patient before the day of surgery by carrying out a pre-operative interview (which includes not only a physical, but also an emotional assessment, previous anesthetic history, and identification of known allergies or genetic problems that may affect the surgical outcome), ensuring that necessary tests have been or will be performed (preadmission testing), arranging appropriate consultative services, and providing preparatory education about recovery from anesthesia and post-operative care. On the day of surgery, patient's teaching is reviewed, the patient's identity and the surgical site are verified, informed consent is confirmed, and an intravenous infusion is started. If the patient is going home the same day, the availability of safe transport and the presence of an accompanying responsible adult are verified. Depending on when the preadmission evaluation and testing were done, the nursing activities on the day of surgery may be as basic as performing or updating the pre-operative patient assessment and addressing questions the patient or family may have.

Intra-operative Phase

The intra-operative phase begins when the patient is transferred onto the operating room table and ends when he or she is admitted to the postanesthesia care unit (PACU). In this phase, the patient's safety, maintaining an aseptic environment, ensuring proper function of equipment, providing the surgeon with specific instruments and supplies for the surgical field, and completing appropriate documentation. In some instances, the nurse can provide emotional support by holding the patient's hand during general anesthesia induction, or assisting in positioning the patient on the operating room table.

Post-operative Phase

The post-operative phase begins with the admission of the patient to the PACU and ends with a follow-up evaluation in the clinical setting or at home. The scope of nursing care covers a wide range of activities during this period. In the immediate post-operative phase, the focus includes maintaining the patient's airway, monitoring vital signs, assessing the effects of the anesthetic agents, assessing the patient for complications, and providing comfort and pain relief. Nursing activities then focus on promoting the patient's recovery and initiating the teaching follow-up care and referrals essential for recovery and rehabilitation after discharge. Each phase is reviewed in more detail in the three chapters of this unit.

3.5 The Use of the Nursing Process

3.5.1 Pre-operative Assessment

Data is collected in the pre-operative period to identify the patient's (1) knowledge of events that will occur, (2) psychological readiness for surgery, and (3) physiologic status before surgery.

Psychological readiness for surgery

Both subjective and objective data are collected to assess the anxiety.

Subjective Data includes possible changing in sleep pattern, religion and its meaning for patient, while

Objective Data includes observation of speech patterns and physical changes. There are increased pulse and respiratory rate, excessive hand movements, clammy hands and restlessness.

Physiologic Status

Data are collected in the pre-operative period concerning the patient's physiologic status to obtain baseline data for comparison in the intra-operative and post-operative phases and to identify potential post-operative problems requiring pre-operative intervention. Good sources of pertinent data are admission histories and physical examinations.

Other pertinent assessment includes:

- Ability to see and hear, use of aids
- Ability to communicate effectively. If patient is unable to communicate in English an interpreter is sought.
- Respiratory rate
- Ease and symmetry of respirations
- Presence and character of lung sounds
- Presence of upper respiratory tract infection
- Smoking habit
- Pulse rate, rhythm, and strength

- The height to weight ratio indicates whether the patient is overweight of underweight. The obese person presents numerous risks during the surgical experience. They also have greater difficulty expanding their chests, moving in bed, and walking. Fluid and electrolyte imbalances occur with dehydration and prolonged vomiting and diarrhoea. Undernourished persons already have diminished reserves of carbohydrates and fats.

Wound healing becomes considerably delayed in undernourished persons. In some cases if surgery is not an emergency, it is delayed until the patient's nutritional status is improved.

- Presence of nausea or vomiting

- Signs of dehydration (decreased skin turgor, dry mucous membranes, and high hematocrit level

- History of chronic constipation

- Bowel movement decreased activity after surgery predisposes a patient to constipation. Persons with a history of chronic constipation have a higher risk for developing constipation post-operatively.

- Diarrhoea

- Oxygenation**.** The ability to carry out deep breathing exercises. Circulatory data is particularly important for determining the risk for post-operative atelectasis or pneumonia.

- Activity Mobility and ambulation are important activities in the post-operative period for preventing post-operative complications. The patient's ability to move and walk pre-operatively will determine actions that must be taken to enhance maximum mobility.

1. Nursing History

The nursing history obtained before surgery provides client data that help the nurse to plan pre-operative and post-operative care. The history should include the following:

a. **Physical Condition –** Note the weight, hydration status and colour. Problems, such as obesity, malnutrition and dehydration may indicate the need for therapy, prior to surgery. For instance, the dehydrate client may need fluids administered intravenously.

b. **Mental Altitude –** Anxiety is a normal response to surgery. However, extreme anxiety can increase surgical risk and needs to be reported to the physician.

c. **Smoking Habits –** The lung tissue of a person who smokes is chronically irritated, and a general aesthesis irritates further.

d. **Use of Alcohol –** Heavy, consistent use of alcohol can lead to problems during an anesthesia, surgery and recovery.

2. Pre-operative teachings

Is more effective at this time when there is no pain. Pre-operative teaching improves the individual's coping skills by enhancing a sense of personal control. Effective pre-operative teaching helps reduce post-operative anxiety and discomfort. Pre-operative teaching includes moving, leg exercises, and coughing and deep TCDB breathing exercises:

a. **Moving –** Turning in bed and early ambulation are encouraged to help clients maintain blood circulation, stimulate respiratory functions, and decrease the stasis of gas in intestines.

b. **Leg exercises –** leg exercises help prevent thrombophlebitis due to slowed venous circulation (venous stasis). The major danger of thrombophlebitis is that thrombi can become embolic and lodge in the arteries of the heart, brain or lungs, causing serious injury or death.

c. **Coughing and Deep Breathing Exercises:** Deep breathing exercises help remove mucus, which can form and remain in the lungs due to the effects of general anesthetic and analgesics. These drugs depress the action of both cilia of the mucous membrane lining the respiratory tract and the respiratory center in the brain. Deep breathing also aerates lung tissue and thereby helps prevent pneumonia, which may result from stagnation of fluid in the lungs. Deep breathing frequently initiates the coughing reflex. Voluntary coughing in conjunction with deep breathing facilitates the movement and expectoration of respiratory tract secretions. If client will have an incision that will be painful when coughing, demonstrate how client can support it (splint) as the client coughs. Coughing uses the abdominal and other accessory respiratory muscles. Splinting the incision may reduce pain while coughing, if the incision is near any of these muscles.

3.5.2 Physical Preparation of the Surgical Patient

1. **Diagnostic Procedures:** Diagnostic tests and procedures are often ordered for a patient before surgery. Baseline information from various tests (e.g. urinalysis, chest x-ray) helps pinpoint problems before surgery.

2. **Pre-operative Skin Preparation:** Preventing microbial contamination of a surgical wound reduces the risk of wound infection. Surgical skin preparation (called"prep") includes cleansing the skin and, usually removing hair from areas surrounding the operative site. The skin prep is performed according to the health care facility policy. In some facilities, only specially trained personnel prep the skin. In others, the staff nurses perform the preps. Hair removal from the surgical site is controversial. Shaving the hair, the evening before surgery, has long been the standard practice. However, research indicates razor shaving contributes to increased rates of surgical wound infection. It has been suggested that a depilatory cream or an electric clipper be used instead.

3. **Preparing the Gastrointestinal Tract:** The G.I. tract is emptied or cleansed before surgery to reduce the risk of vomiting and aspiration during anesthesia, prevent contamination of the operative site from fecal material during bowel surgery, and to reduce post-operative nausea and vomiting, gastric distension and obstruction. Restricting foods and fluids during the pre-operative phase prevents vomiting. An empty stomach lessens the risk of aspirating vomits into the lungs during anesthesia. Food and fluid are usually prohibited 8 – 10 hours before surgery. Hospitalized persons are usually NPO after midnight. If a person accidentally eats or drinks before surgery, immediately inform the surgeon and anesthesiologist. Bowel preparation is essential for surgeries involving the GI tract or abdomen, cleansing the colon prevents contamination of the peritoneal cavity by spillage of fecal material during surgery. The surgeon may order an enema, or rectal suppository. Oral antibiotics may be ordered for two to three days before surgery to reduce the number of bacteria in the bowel. The insertion of gastric and intestinal tubes may be necessary to remove GI contents by suction.

4. **Preparation for Anesthesia:** Anesthetist or anesthesiologist needs to visit the patient to assess the person's physiologic condition related to the safety of anesthesia (e.g. smoking history, upper respiratory tract infection, and cardiopulmonary

dysfunction). He should also explain the complete procedure to him.

5. **Promotion of Rest and Sleep:** Promote rest by ensuring physical and emotional comfort. Give a back rub to aid relaxation. Encourage the person to discuss concerns or questions. A sleeping medication may be ordered for the patient.

3.6 Data Analysis and Planning

Nursing Diagnoses

After collecting the assessment data, the nurse identifies nursing diagnoses based on specific patient data. Possible nursing diagnoses might include the following:

Anxiety
Fear of death, disfigurement
Knowledge deficit
Potential injury

3.7 Expected Patient Outcomes

Expected patient outcomes might include the following:

1. Demonstrates no more than moderate anxiety.

2. Can explain (if conscious) the surgery to be performed and has signed the operative consent for (consent on chart).

3. Can explain sequence of events and physical activities expected in the early post-operative period (turning, deep breathing and coughing).

4. Has had a baseline assessment and current vital signs taken and charted.

5. Has had any significant physical or psychological changes reported to the surgeon.

3.8 Nursing Implementation/Intervention

Assisting with medical interventions or correction of existing deficiencies

Dehydration from vomiting and diarrhoea is treated with potential fluids to reestablish fluid and electrolyte balance.
Patients with chronic diseases should be at their optimal health level before surgery. The undernourished patient is placed on a high-protein, high-carbohydrate diet rich in vitamins B_1, C, and K. Supplementary vitamins may be ordered. If an oral is poorly tolerated or poorly absorbed, total parenteral nutrition (TPN) will be initiated. The obese patient is placed on a weight-reducing diet. Both the undernourished and the obese patient should understand the rationale for the diets. They may need considerable support and encouragement to maintain the diets.

Diet

Patient undergoing bowel surgery may be placed on a low residue diet, **but no food is allowed eight hours before surgery**. This is because the presence of food or fluids in the stomach increases the **possibility of aspiration of gastric contents.** If it should be discovered that the patient has consumed food or fluids when ordered "nothing by mouth" (NPO), the surgeon should be notified. This may necessitate rescheduling the surgical procedure.

Patients who are dehydrated will usually have parenteral fluids initiated before surgery. A nasogastric tube may be inserted before surgery, in case of abdominal surgery.

Bowel Preparation

The purpose of the pre-operative enema is to prevent injury to the colon and to provide better visualization of the surgical area. If a pre-operative enema is ineffectual, it may be repeated.

Skin Preparation

The purpose of pre-operative skin preparation is to free the operative site of as many microorganisms as possible.

A depilatory may be used if the skin is not sensitive to the depilatory. Shaving of the hair may be ordered either the night before or immediately before surgery. A sharp disposable razor is used with good lighting. Shaving must be against the grain of the hair shaft for a closer shave. The skin should not be scratched or nicked since microorganisms can harbor in broken skin surfaces.

Shaving of hair on certain areas of the body may have a special meaning for some persons. These areas include face, head, and pubic area. Pubic

hair is shaved only when necessary; the regrowth of this hair is uncomfortable to many patients.

Psychologic Counseling and Teaching

Both patient and family need opportunities to discuss their concerns and fears about the forthcoming surgery. The assessment of the patient's psychologic readiness for surgery provides the nurse with data about the patient's specific fears or concerns. Fear of the unknown can be decreased by an understanding of the events that will occur. The amount of information to give pre-operatively depends on the background, interest, and stress level of the patient and the family. A good rule to follow is to ask patients what they would like to know about forthcoming surgery and to base responses on the types of questions asked. Teaching is an important function of the nurse in the pre-operative phase and helps to allay anxiety when the patient knows what to expect.

Deep Breathing and Coughing Exercises

Deep breathing and coughing exercises are recommended for persons at high risk for developing post-operative pulmonary complications such as atelectasis or pneumonia.

The method for deep breathing and coughing exercises is listed as follows:

1. Lie in semi-Fowler or high Fowler's position with knees flexed to relax abdomen and allow full chest expansion.

2. Place a hand lightly on the abdomen.

3. Breathe in slowly through nose, letting chest expand and feeling abdomen rise against hand.

4. Hold breath for three seconds.

5. Exhale slowly through pursed lips (abdomen contracts with inspiration).

6. Inhale and exhale three more times. Following last inspiration, cough forcefully to expel any secretions.

7. Rest.

8. Repeat steps 3 through 7 two more times.

Leg Exercise

This is required for persons who will be on bed rest for several days after surgery. To maintain muscle tone and facilitate ambulation and prevent various stasis in the operative period. Quadriceps drills and gluteal tightening exercises are taught.

Assisting With Comfort

Anxiety often causes sleeplessness and restlessness. If the patient is extremely restless, a transquiliser may be given for one to two days before surgery. Ambulation is encouraged before surgery to give the patient a feeling of well-being, to stimulate circulation and ventilation, and to maintain muscle tone. Fatigue is to be avoided, and patients with chronic illnesses may need planned periods of rest.

The person should be permitted to sleep on the morning of surgery for as long as possible and to rest undisturbed until shortly before administration of pre-anesthetic medication.

Pre-operative Investigations

Special pre-operative tests may be ordered to establish baselines and detect presence of disease that can affect patient responses in intra-operative or post-operative phases. The temperature, pulse and respiration, and the weight are recorded, and the condition with regard to an anesthetic assessed. A chest X-ray may be needed, the hemoglobin level and the blood group may be ascertained, Patients often need explanations concerning the necessity for the sometimes numerous tests.

Pre-anesthetic Medication

A sedative is usually ordered the night before surgery to ensure a full night's sleep. If additional sedation or medication for pain is given during the night, it must be given at least four hours before the pre-anesthetic medication. Pre-anesthetic medications, commonly referred to as premedication, are given when the patient is "on call" for the operating room (usually about 45 to 90 minutes before surgery is anticipated). These are given to decrease anxiety, to provide a smoother induction and maintenance of anesthesia, and to diminish undesirable reflexes during emergence from anesthesia. Adults frequently receive a combination of drugs. Dosages may be decreased in the elderly.

All pre-operative routines should be completed before the pre-anesthetic medication is given. The patient should remain in bed following administration of the medication to promote maximum effect and to prevent falls from dizziness.

Commonly used pre-anesthetic medications are (1) Sodium (Nembuta) is used to reduce anxiety, promotes relaxation and sleep, (2) Trazepam is used to promote relaxation and sleep (3) Narcotics Morphine sulfate reduces anxiety, promotes relaxation, decreases pre-operative pain, decreases amount of anesthetic needed, (4) Vagolytic agents Atropine sulfate or Scopolamine hydrochloric ride (Hyoscine) is used for decreased secretions, prevention of laryngospasms.

3.8.1 Informed Consent

Informed consent is a basic legal consideration for individual undergoing surgery. This is a written permission obtained from the patient for each operation. The consent implies that the patient has been provided with the knowledge necessary to understand (1) the nature of the procedure to be performed, (2) the available options, and (3) the risks associated with each option. Informed consent must be obtained in that the signed permission protects the patient from undergoing unauthorized surgery. It also protects the surgeon and hospital against claims of unauthorized surgery or that the patient was unaware of the risks involved. The physician is usually responsible for explaining the surgery, options, and risks. The role of the nurse is to ensure that the consent form has been signed and witnessed before the patient is sent to surgery. Patient is allowed to consult with close family member or friend before signing the operative permit.

A patient's right to self-determination is protected by informed consent that is the right to decide whether surgery is in one's best interest. Every person having surgery, no matter how minor the procedure, must give written consent. Voluntary and written **informed consent** from the patient is necessary before any planned surgery can be performed. Such written consent protects the patient from unsanctioned surgery and also protects the surgeon from claims of an unauthorized operation. The nurse may ask the patient to sign the form and may witness the patient's signature. It is the physician's responsibility to provide appropriate information.

Before the patient signs the consent form, the surgeon must provide a clear and simple explanation of what the surgery will entail. The surgeon must also inform the patient of the benefits, alternatives, possible risks, complications, disfigurement, disability, and removal of body parts as well as what to expect in the early and late post-operative

periods. If the patient needs additional information to make his or her decision, the nurse notifies the physician about this. It is important that the consent form be signed before administering pre-medication, because of the influence of medications that can affect judgment and decision-making capacity of the patient. Informed consent is necessary in the following circumstances:

- Invasive procedures, such as a surgical incision, a biopsy, a cystoscopy, or paracentesis.
- Any procedure, such as an arteriography, that carries some risk to the patient.
- Procedures involving radiation.
- Major diagnostic procedures, such as a thoracentesis, bronchoscopy, etc.

The patient personally signs the consent if he or she is of legal age and is mentally capable. When the patient is a minor or unconscious or incompetent, permission must be obtained from a responsible family member (preferably next of kin) or legal guardian. An emancipated minor (married or independently earning his or her own living) may sign his or her own consent form. In an emergency, it may be necessary for the surgeon to operate as a life-saving measure without the patient's informed consent... In such a situation, contact can be made by telephone, telegram, fax, or other electronic means. The consent process can be enhanced by providing audio visual materials to supplement discussion, by ensuring that the wording of the consent form is understandable, and by using other strategies and resources as needed, to help the patient understand its content.

When the patient has doubts and has not had the opportunity to investigate alternative treatments, a second opinion may be requested. No patient should be urged or coerced to sign a consent form. A patient has a legal right to a surgical procedure. However, such information must be documented for other arrangements to be made. Where possible, additional explanations may be provided to the patient and family, or the surgery may be rescheduled. In an emergency situation, the surgeon may operate without written permission if the patient is unable to sign, is a minor, or is incompetent. Every effort is made, however, to contact a family member or guardian.

3.9 Evaluating the Safety of the Surgical Patient

Unless adequate precautions are taken, there is a possibility that an operation may be performed on the wrong patient, or on the wrong side, limb or digit. The safeguards against such an accident include the following: Before the patient leaves for surgery, the chart is checked to ensure that the following are done and charted:

1. Remove dentures if present.
2. Empty the urinary bladder (void).
3. Remove hair pins to prevent accidental scalp injury.
4. Remove all jewelry and store according to agency policy.
5. Remove eyeglasses, contact lenses, hearing aids, and other prostheses.
6. Skin preparation.
7. Vital signs (temperature, pulse, respiration, blood pressure) chart.
8. Regular medication charted.
9. Weight and height recorded (for use by anesthesiologist).
10. Informed consent signed, witnessed, and attached to chart.
11. All laboratory, radiographic, and ECG reports attached to chart.
12. Is the patient wearing a legible identification band, which has been checked?

3.10 Transportation to Operating Room

The patient is put on a stretcher and taken to the theatre by a porter. Before then, the nurse assigned to prepare the patient for surgery checks his/her record, accompanies the transportation attendant to the patient's bedside, checks the identification band, and signs the patient's identification form. This form is usually attached to the stretcher.

4.0 CONCLUSION

Surgery is a potential or actual threat to a person's integrity and thus may produce both physiologic and psychological stress reactions.

5.0 SUMMARY

- Informed consent is a basic legal consideration for individual undergoing surgery. This protects the patient from undergoing unauthorized surgery and the surgeon and hospital against claims of unauthorized surgery.

- The surgical experience can be classified into three stages: pre-operative, intra-operative, and post-operative periods

- Data is collected in the pre-operative period to identify the patient's (1) knowledge of events that will occur, (2) psychologic readiness for surgery, and (3) physiologic status before surgery.

- Special pre-operative tests may be ordered to establish baselines and detect presence of disease that can affect patient responses in intra-operative or post-operative phases...

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain the purposes of performing surgery on a patient.
2. Outline some of the psycho-social effect of surgery
3. Describe the phases of pre-operative nursing care.

7.0 REFERENCES/FURTHER READING

Malinda, Murray. *Fundamentals of Nursing*. 2nd Edition. New Jersey: Prentice-Hall, Inc., Englewood Cliffs, 1980.

UNIT 4 POST OPERATIVE NURSING CARE

CONTENTS

1.0 INTRODUCTION

This unit is a continuation of the previous unit. In this unit, you will learn how to give post-operative nursing care. Post-operative complications will also be discussed after surgery, and the person is transferred immediately from the Operating Room to the PACU. The PACU is an area designed for post-anesthesia care. After surgery, the patient remains in the recovery room until the condition is stable. The immediate post anesthetic period is critical. The patient must be observed diligently and must receive intensive physical and psychological support until the major effects of the anesthetic have worn off and overall condition has stabilized. The nurse is largely responsible for the patient at this period.

2.0 OBJECTIVES

At the end of this unit, you should be able to:

- explain the rudiments of post-operative nursing care
- identify post-operative complications in a surgical patient
- identify some clinical manifestations of post-operative complication.

3.0 MAIN CONTENT

3.1 Operation Beds

As soon as the patient has gone, her bed is made ready for her return. It should be made with clean linen, unless the operation is very minor, to provide clean surroundings for the operation site. Pillows are not usually allowed until consciousness is regained, but one flat one may be permitted, especially after neck or head operations, when it should have a jaconet cover. A mackintosh and towel at the head of the bed is necessary for some cases (e.g. tonsillectomy), and may be liked by the ward sister for all patients. Blocks may be ready for the foot of the bed, either to help in the treatment of shock in the recovery phase, or to help prevent the patient slipping down the bed later.

On the locker are the following:

(a) Vomit bowl and towel, or paper handkerchiefs
(b) Thermometer
(c) Mouth wash and receiver. If the patient is to take no fluids by mouth, a mouth tray is substituted
(d) Treatment board
(e) Suction machine

3.1.1 Post operative Assessment

This includes systematic assessment of:

a. Respiratory function: Ensuring patient airway, preventing respiratory distress, promoting adequate oxygen exchange.

b. Cardiovascular function: Preventing hypotension, shock and cardiac arrest and promoting adequate cardiac functioning.

c. Neurological and sensory function: Assessing level of consciousness, reorienting the person as he or she regains consciousness.

d. Water and electrolyte balance: Monitoring intake and output of fluids, restoring water and electrolyte balance.

e. Safe, comfortable physical and psychological environment: Maintaining body temperature, relieving discomfort, and promoting relaxation, providing support and reassurance.

f. Ability to move all four extremities

g. Consciousness: Ability of patients to answer simple questions and follow verbal commands.

h. Colour: Assess colour to make sure it is normal.

3.1.2 The Process of healing

The aim of the inflammatory process is to return the damaged tissue to its normal structure and function. This is accomplished through the process of healing or repair which begins early in the inflammatory process. Wound heals by multiplication of connective tissue and formation of a fibrous tissue over which epidermis grows. Wound may heal by first intention or by second intention, but the process is similar. The difference is merely the quantity of new tissue required to heal the wound. Healing by first intention occurs in incised wounds where the skin edges are in close contact, therefore only a thin-line of new tissue is required to bring about healing. In gaping wounds, there is loss of tissue causing a wide gap between the edges. A mass of new tissue is required to fill this gap. This is healing by second intention.

Repair proceeds in stages. In the early days, the wound is filled with a variable amount of tissue fluid and blood which quickly clots. New blood capillaries begin to form from the endothelium of blood vessels in the injured area. Almost simultaneously, fibroblasts formed from nearby loose connective tissue and enter the clotted exudates. These fibroblasts

cannot multiply if the plasma protein level is low, hence, the need for adequate intake of protein for efficient wound healing. After the removal of cellular debris, collagen fibers are laid arranging themselves in layers. This fibrillar collagen becomes strengthened, consistent and durable in the presence of Vitamin C. The collagen at this point is referred to as scar. Gradually, the fibrous tissue contracts. The scar changes over the months from pink to white and becomes less noticeable in case of incised wounds. Wounds heal efficiently and more rapidly in the presence of good blood supply

3.1.3 Nursing Care during the Intermediate Post-operative Stage

The intermediate post-operative stage begins when the person is discharged from the PACU and generally ends 48-72 hours later. During this period, the person remains at risk for post-operative complications, including respiratory, circulatory, or gastric dysfunction. The person returns to the surgical unit after stabilization in the recovery room. Constant monitoring is required at this stage.

3.1.4 Nursing Care during the Extended Post-operative Stage

A person enters the extended post-operative stage two to three days after surgery. Recovery progresses and the individual approaches discharge. Continue to intervene to meet the needs of the person. Support him to promote self care, and to prepare him for discharge.

Level of Consciousness

Level of consciousness should be ascertained. Variation in consciousness level from alertness to drowsiness will be observed. A decrease in consciousness level may indicate shock (from jarring motions during the transfer) and should be documented and reported along with any other pertinent data.

Positioning

Until protective reflexes have returned, the best position for the majority of patients is a side-lying or semi-prone position with the head tilted back and the jaw supported forward. It is to prevent aspiration.

Maintenance of Respiration

An orpharyngeal or nasopharyngeal airway is often left in place after administration of a general anesthetic to keep the passage open and the tongue forward until pharyngeal reflexes have returned. These artificial airways are made of rubber, plastic, or metal. They are removed as soon as the patient begins to awaken and have regained cough and swallowing reflexes.

No one should be left alone until the cough reflex has returned one to this level of consciousness. And at this level the patient is safe if the nurse is within reach in case of vomiting or restlessness. During the dangerous period before the cough reflex returns, asphyxia may occur for one of these reasons.

Removal of Secretions

If the patient cannot cough up an expectorate secretions, it must be suctioning. Pharyngeal suctioning is usually all that is necessary, although intratracheal suctioning may be indicated.

Adequate Ventilation

Post-operative hypoventilation can result from drugs (anesthetics, narcotics, tranquilizers, and sedatives), incisional pain, chronic lung disease, or pressure on the diaphragm. Oxygenation and ventilation can be enhanced by oxygen therapy and breathing exercises. Oxygen is administered by nasal cannula or catheter, disposable face mask or shield or endotracheal or tracheostomy tube if one is in place.

Breathing Exercise

Deep-breathing exercises are started as soon as the patient is conscious and able to follow directions.

Maintaining Circulation

The blood pressure, pulse, and respirations are usually taken every 15 minutes until they are stable, then every half hour for two hours, and then every four hours until ordered otherwise. The rate, volume, and rhythm of the pulse are carefully observed and the character and rate of respiration is noted the patient must be observed for shock. Restlessness is an early sign of shock.

After surgery of the extremities, local circulation is assessed by the presence and strength of peripheral pulses distal to the operative site or plaster cast. If the dressing is too tight, it should be loosened.

Possible Causes of Post-operative Shock

Moving patient from operating table to bed
Jarring patient (bed) during transport
Reactions to drugs and anesthesia
Loss of blood and other body fluids
Cardiac arrhythmias
Cardiac failure
Inadequate ventilation
Pain
Residual sympathectomy from conductive anesthesia

Preventing Injury

After anesthesia, side rails on the stretcher or bed are generally raised and are left so until patient is fully awake. The patient is turned frequently and placed in good body alignment to prevent nerve damage from pressure and muscle and joint strain from lying in one position for a long time.

Comfort

The patient is asked for symptoms of discomfort after having been transferred to the bed and positioned in supportive body alignment. This gives the nurse a quick indication of the level of alertness as well as symptoms of discomfort. An indirect question such as, "How do you feel?" will elicit data concerning nausea or pain without focusing on a specific area where may be no discomfort.

Dressing

The entire dressing is inspected for haemorrhage. Excess drainage is reported immediately.

Whenever it is anticipated that fluid may collect in a body area post-operatively, leading to delay in healing, the surgeon usually inserts a tube or drain to permit escape of the fluid. One end of the tube or drain is placed in or near the organ or cavity to be drained, and the other end is passed through the body wall, either through a separate "stab wound" or through the incision.

After most types of surgery, usually the surgeon changes the dressing for the first time. if these additional dressings become wet, they are removed and replaced soaked with new dressings, leaving the original

dressing intact. Dressings that can be changed by the nurse as often as necessary to prevent infection and to promote patient's comfort.

Safety

Bed side rails are kept raised until the patient is fully awake and responding or to prevent the heavily medicated patient from falling.

3.2 Data Analysis and Planning-Post-operative Care

In planning the patient's care the nurse uses previously collected data, present data, knowledge of factors related to specific types of surgery and specific post-operative needs and possible post-operative complications.

3.3 Expected Patient Outcomes

1. No injury occurs during hospitalization.

2. The incision heals normally without infection.

3. No avoidable complications (atelectasis, pneumonia, thrombophlebitis) occur.

4. Elimination patterns are re-established.

5. The person carries out activities of daily living at an optimal level, although fatigue may still be present.

6. The person has an opportunity to explore individual concerns.

7. At discharge the person or significant other can explain:

a. Treatments to be carried out at home, if any.
b. Medications to be taken at home (name, dosage, frequency, side effects).
c. Any dietary changes required by the surgery.
d. Activity limits incurred by the surgery and any exercise programmes to be carried out at home.
e. When and where to go for follow-up care by the surgeon.

3.4 Nursing Intervention

3.4.1 Obstruction of the Airway

The airway can be obstructed by vomittus or reflux of stomach contents or mucus which may be secreted by the respiratory tract in response to

anesthesia and instrumentation. Spasm of the Glottis can also block the airway. This is more likely to occur during induction of anesthesia than after operation. The artificial airway should not be removed until the patient is making movements of the tongue and lips to reject it. If the air way is out, and the patient lying on the back, the relaxed tongue may obstruct the glottis. This can be prevented by keeping the patient on her side, or at least keeping the head turned to one side.

3.4.2 Maintaining Fluid and Electrolyte Balance

Fluid is lost during surgery through blood loss and increased insensible fluid loss through the lungs and skin. During the surgical procedure, the blood loss is estimated and fluids are replaced intravenously. Intravenous administration of fluids is monitored carefully so that fluids are given evenly over the entire 24 hours. Peristalsis is present and can tolerate drinking fluids, the physician discontinues fluids are started orally as soon as sips of water are offered first to see if fluids can be tolerated.

3.4.3 Maintaining Adequate Nutrition

Two food substances of special importance in wound healing are protein and vitamin C. protein intake is necessary to restore nitrogen balance and to provide the necessary amino acids for anabolism. During catabolism in the early post-operative period, a negative nitrogen balance occurs. Nitrogen is an essential constituent of amino acids, the building blocks of proteins. Vitamin C is stored only in small amounts in the tissues, so must be supplied daily from an external source. The weight of the patient may be taken daily to encourage and teach post-operative patients to eat foods high in protein and vitamin C. Discuss with underweight persons their plans for obtaining the desired nutrients after discharge.

3.4.4 Maintaining elimination

Urine Elimination

A patient who is well hydrated usually voids within six to eight hours after surgery. Urinary retention, or the inability to void, may occur in the early post-operative period for several reasons.

Causes of Post-operative Urinary Retention

Recumbent position
Nervous tension
Anesthetic: decreased bladder sensation and ability to void

Narcotic: decreased bladder sensation
Pelvic surgery: interference with innervations of bladder muscles, and local edema

Urinary tract infections may occur in patients who must have prolonged bed rest after surgery, have a history of urinary tract indwelling catheters. Monitor urinary output equals fluid intake. Fluids are then encouraged up to 3000 ml, unless contraindicated, to prevent urinary stasis.

Bowel Elimination

Peristalsis will be decreased for at least 24 hours after abdominal or pelvic surgery and for several days after surgery of the gastrointestinal tract. Constipation occurs frequently after major surgery for several reasons.

Causes of Post-operative Constipation

Neuroendocrine response to stress (decreased gastrointestinal motility)
Anesthetic agents
Narcotics
Inactivity
Decreased intake of high-fiber foods

Monitor daily for bowel movement. If absent, ask if patient is passing flatus. Encourage maximal activity within prescribed limits. Encourage intake of foods high in fiber, if permissible.

3.4.5 Promoting Comfort from Vomiting, Abdominal Gas Distention

The major discomforts after surgery are nausea and vomiting, abdominal distention and gas pains, and incisional pain.
Nausea and vomiting may be related to a number of factors.

(a) Causes of Post-operative Vomiting

Anesthetic agent
Narcotic
Abdominal distention (fluid, gas)
Pain
Electrolyte imbalances
Drug idiosyncrasies

Interventions for the person who is experiencing nausea and vomiting include:

1. Side-lying position to prevent aspiration
2. No food or fluids until vomiting subsides
3. Sips of fluid (hot tea) or (crackers) after vomiting subsides
4. Frequent oral care
5. Prescribed antiemetics may be given.

(b) Abdominal Distention and Gas Pains

Post-operative distention results from accumulation of nonabsorbable gas in the intestines caused by a reaction to the handling of the bowel during surgery, or by swallowing of air during recovery from anesthesia or attempts to overcome nausea, and by passing of gases from the bloodstream to the atonic portion of the bowel. Distention will persist until the tone of the bowel returns to normal and peristalsis resumes.

(c) Pain

Pain is common after nearly all types of surgical procedures. It may result from stimulation of nerve endings by chemical substances released at the time of surgery or from tissue ischemia caused by interference of blood supply to the part, such as by pressure, muscle spasm, or edema, infections, distention, muscle spasms surrounding the incisional area, and tight dressings or casts. Post-operative pain usually lasts 24 to 48 hours but may continue longer depending on the extent of the surgery, the pain threshold of the patient, and response to pain.

Nursing Intervention for Pain

It is often impossible to prevent post-operative pain, but it can be minimized so that the patient is relatively comfortable. -Patients who have had adequate pre-operative instructions and who have confidence in the surgeon, in the nurse, and in the outcome of the surgery usually have less post-operative pain than apprehensive patients because they have less tension:

- Measures to reduce anxiety and apprehension will also help reduce pain. Relief of pain may encourage the patient to move and breathe more deeply, thus preventing post-operative complications, which cause more pain.

- Find out the cause of pain.

- If the cause of pain is determined to be other than incisional, measures are taken to relieve the cause. Emptying a full bladder can relieve what was though to be pain from a lower abdominal incision. Elevation of a part may relieve venous stasis. Loosenig of a tight bandage, if permissible, will relieve ischemic pain. Other measure includes:

1. Encourage patient to move in bed or to ambulate, to decrease pain from muscle tension and increase circulation to the part.

2. Move the injured part as a whole; for example, move trunk as one unit.

3. Support an injured limb during a move (a pillow is a useful support).

4. Give pain medications as ordered according to the guidelines for acute pain.

a. Narcotics are usually required on a regular basis for 12 to 48 hours after major surgery.

3.4.6 Maintaining Activity

Early ambulation is a significant factor in hastening post-operative recovery and preventing post-operative complications. Numerous benefits are derived from the exercise of getting in and out of bed and walking during the early post-operative period. Ambulation is usually contraindicated when there is a severe infection or thombophlebitis.

Effects of early post-operative ambulation are:

1. Increased rate and depth of breathing
2. Increased circulation
3. Increased micturition
4. Increased metabolism
5. Increased peristalsis

3.4.7 Maintenance of Circulation to Prevent Shock

Shock is a condition of which the underlying pathology is a fall in the blood pressure.

Signs and Symptoms

- The blood pressure is low (i.e. he systolic pressure is less than 100 mm. Hg.).
- The pulse is feeble, tending to be slow at the onset and becoming quicker in rate and thinner in volume as the condition progresses.
- The temperature is subnormal and the skin cold and moist.
- The colour is “livid” i.e. pale with a tinge of cyanosis.
- Vomiting is common
- Thirst if the patient is conscious.

The characteristics mood is apathetic

Shock is caused by trauma, especially crushing injuries, fractures, painful injuries like burns, major operations involving resection of tissue, or traction on the mesentery or lung roots. It is made worse by fluid loss, as from hemorrhage, vomiting, diarrhoea or profuse sweating, or leakage from raw areas; by pain; by fear. Until recently, exposure to cold would have been added to this list, but recent work makes this doubtful.

The classical treatment for shock include:

Rest

The patient must be moved as little as possible. The foot of the bed is elevated to allow the blood to reach the heart and brain where it is most needed.

Relief of Pain

Fractures must be temporarily splinted, and burns covered. Morphine has enjoyed a high reputation, and for patients with internal bleeding, pain or fear is excellent. Its chief danger is that when given to a patient with circulation impaired by shock, it may remain in the tissues and only be released as the condition improves.

Fluids

If shock is not severe, fluids by mouth can be freely given. If these are contra-indicated, tap water of N/5 saline per rectum is useful. If the condition is more than moderate, intravenous fluids will be needed. Blood is incomparably the best, but plasma or dextrin may be life-saving. Saline can only effect a temporary improvement. Large amounts of fluid are sometimes needed, and watch must be kept on the pulse, respiration and superficial veins lest right heart failure threaten from dilation of the right side of the heart by the incoming fluid.

Oxygen

Poor circulation results in lack of oxygen in the tissues, and for severe shock oxygen at eight litres per minute are valuable.

3.4.8 Hemorrhage

Hemorrhage may be internal when it takes place into the peritoneal or some other body cavity, or external when it is manifest on the surface. It can be classified to the vessel from which it is taken place:

Arterial

The blood is bright red and appears in spurts corresponding to the heart beats. It may be seen (briefly) in the theatre when small arteries are severed, before artery clamps are applied.

Venous

The blood is darker in colour, and wells out. Such loss may be very severe. If a large vein near the heart (e.g. internal jugular) is cut, the negative pressure in the vein may allow air to be sucked in and carried to the heart.

Capillary

The blood oozes capillary bleeding cut if is taking place from a large raw area, it can be troublesome, especially if it is maintained by a failure to clot, as in *jaundiced* patients, or those in whom the intestine has been sterilized by antibiotics; both are short of Vitamin K, and therefore have a low prothrombin level.

A classification of bleeding useful to the nurse depends on the time at which it occurs

Primary Hemorrhage occurs at the time of injury. In surgical practice, it takes place in the theatre and the surgeon sees that it is checked before the patient leaves.

Reactionary Hemorrhage occurs as the blood pressures rises following shock and vessels begin to bleed that were unnoticed at operation. It, therefore, takes place within a few hours of operation. Patients who are suffering from shock must be watched closely for bleeding as their condition improves. No patient is immune, but the operations most commonly followed by bleeding are *prostatectomy, transillectomy,* and operations on the *rectum, vagina* and *blood vessels.*

Secondary Hemorrhage is always due to sepsis, and therefore, a few days normally elapse before it occurs. The classical day is the clot that is sealing the severed vessels, and arterial bleeding is possible.

The signs of internal hemorrhage are as follows: low temperature and blood pressure, a pulse rising in rate and falling in volume ("thready"), pallor and sweating, sighing respiration, yawning (especially with bleeding into the stomach), fainting, and anxiety. If patient is unconscious, this picture will, of course, be somewhat modified, and a nurse may be undecided if her patient is suffering from shock or concealed bleeding. She should make regular observation of the temperature, pulse, respiration and blood pressure and watch the colour. A progressive deterioration in these, however small, will make her suspect hemorrhage and inform the surgeon, since shock should become less when the operation is over and adequate anti-shock treatment instituted.

3.5 Other Post-Operative Discomforts

Pain

Wound pain is normal, but can be effectively relieved. *Morphine* or one of its allies (e.g. *omnopon)* is necessary after major operations, and usually is repeated once or twice. It is used very cautiously after chest or head operations because of its depressing effects on the respiratory centre. Pethidine by mouth or intramuscular injection is less depressing and very effective for gynecological and thoracic patients. Once the first day or so is over one or two compound codeine or any strong analgesic tablets are effective. *Aspirin* is excellent for sore throats, as after tonsillectomy of thyroidectomy. Pain may be associated with many of the complications described below and their effective treatment will relieve it.

Vomiting

This is a side effect of anesthetics, but it may once or twice as consciousness is regained. A clean bowl should be given each time a patient vomits, and the mouth rinsed out. An anti-emetic drug like perphenazine ("Fentazin") is often prescribed.

If vomiting continues for more than twelve hours, it may be due to nervous tension and anxiety abdominal complication. A Ryle's tube can be passed transnasally into the stomach and retained to prevent vomiting. The character of the fluid and its amount is noted. Fluid may be given intravenously to replace fluid.

Flatulence after abdominal operations is due to wind collecting in the inactive gut. This is common on the second and third days. The distention stretches the wound painfully and impedes the movement of the diaphragm. Early mobilization will help to prevent it. Drinking of peppermint water may help. A flatus tube may be passed. The tube is lubricated at the eye end, and the other is attached to a glass connection and a piece of rubber tubing which lies under a bowl of water. About 6 in. is passed into the rectum, and left for 10 minutes, or longer. Its relief is experienced. Heat (e.g. an electric pad) to the abdomen is comforting. An enema or glycerin suppository may be given on the third day if there are no contradictions. Once the bowels are open no further trouble is experienced.

Urinary Complications

Retention of urine is the inability to pass urine although the bladder is full. It is common in the patient who must have lied in an unusual position, or after operations on the rectum or vagina. It may be prevented sometimes by introducing the patient to the use of urinal or bedpan before the operation, and by seeing that the patient is comfortably settled in privacy when the first attempt is made to empty the bladder. A note should always be made as to when the patient first passes urine, and the amount recorded.

To allow a patient to sit on a commode is usually effective in curing nervous retention, and many who would once have been thought too ill may now be permitted to do so. No perturbation should be shown if difficulty is experienced, and simple methods of suggestion such as a sharp drink like lemonade, or the sound of a running tap may help. A woman may have a pint of warm water poured over the vulva while sitting on a bedpan. An injection of *carbachol* helps to increase the tone of the bladder and is often effective. Catheterization must not be delayed until the bladder is unduly distended, and urine measurements must be continued until the bladder is being satisfactorily emptied. If very small amounts of urine are being passed at frequent intervals, it usually indicates that *retention with overflow* has been reached, and the use of an indwelling catheter is discussed more fully in connection with gynecology (P. 292).

Suppression of urine or anuria means that no urine is being secreted and the bladder remains empty. It is a serious condition, since if secretion is not re-established, it must be fatal. Treatment depends on the cause.
Cystitis or inflammation of the bladder is signalized by frequent painful micturition and may occur if the operation causes trauma to the bladder or retention is allowed to go untreated. Its incidence can be reduced by good operative methods, aseptic catherization. A high fluid intake of

about 5 pints, or 3000 mls a day is aimed at, to dilute the infection within the urinary system.

Respiratory Complications:

Broncho-pneumonia

This is quite common after abdominal and thoracic operations, and may follow any type of anesthetic. Contributory causes are:

1. Poor movement of the chest and abdomen allowing accumulation of bronchial secretion. Since men depend more on abdominal movement than women, they are more liable to Broncho pneumonia.
2. Immobility in bed permitting congestion of the lung bases.
3. Pre-existing bronchitis.
4. Heavy smoking. On this count, too, men outnumber women.
5. Irritating anesthetics.
6. Heavy sedation with drugs depressing to the respiratory centre, e.g. Morphine.

Signs and Symptoms

About twenty-four hours after operation, there is a light cough and is heard rattling in the bronchi. The temperature, pulse and respiration rate all rise slightly (e.g. 99.6°F. (37.5°C.); p. 90; R. 22). If not promptly and effectively treated, the temperature will fluctuate irregularly up to 101° or 102° F. (38.3° or 38.9°C.), and the pulse and respiration rate are correspondingly elevated. An undue rise in the strain and beginning to fail. The course of bronchopneumonia is indeterminate with remissions and relapses as the infection spreads in one part of the lungs and clears in another.

Treatment

Prevention is better than cure. Before operation, any bronchitis should be treated effectively, smoking should be cut or forbidden, breathing exercises should be taught; nurses should see that all these are observed. After operation, deep breathing and coughing are encouraged; supporting the wound may be a great help, and percussion over the chest by the physiotherapist will help to loosen secretions .post-operative drugs should be judiciously prescribed and given to susceptible patients.

When pneumonia is first susceptible, all these efforts at improving the chest movement should be redoubled. Steam inhalations are helpful if the sputum is tenacious, and fluids are freely given. A course of a broad-

spectrum antibiotic, such as ampicillin, is begun. If improvement is not obvious in twelve hours, a specimen of sputum is sent to the bacteriologist to find the antibiotic to which the infecting organism is sensitive. Although broncho-pneumonia is painful and prolongs convalescence, it is not as dangerous as before.

Lobar Collapse

If a bronchus is plugged with mucus, so that air entry is stopped, the air remaining in the lobe is absorbed and that portion becomes solid. The onset is more dramatic than that of bronco-pneumonia, with a sudden and marked rise in temperature, pulse and respiration rate (e.g. T. 102.4°F. (39.1°C); P.120; R. 32) and the patient looks ill and anxious on exanimation, the chest is dull over the collapsed lobe.

It is vital that the mucus be coughed up at once to allow the lung to re-expands. The patient may be laid on the good side with the head low and vigorous clapping over the affected lobe and coughing undertaken. If the mucus is too thick to be expectorated, resort will have to be made to bronchoscopy. A good fluid intake (intravenous if necessary) must be kept up to make the bronchial secretions more fluid.

Pulmonary Embolism

A pulmonary embolus begins as a blood clot, usually in a vein and the measures described in the next section on how to avoid such clothing will also help to prevent embolism.

Minor cases of embolism are treated by encouraging activity and giving anticoagulant drugs by mouth. In more severe cases, intravenous heparin is given extension of the clot. Some surgeons, once the initial stage of shock is over, perform arteriography by intracardiac. Catherterization, to see how much of the lung is affected, and if it is large, give intravenous streptonase to attempt to dissolve the clot and restore function to the lung. Patients with a large embolus who might be expected otherwise to make a good recovery may be taken to the theatre, and have the clot removed after opening the pulmonary artery. This is a severe operation for a dangerously ill person, but is sometimes successful.

Intravascular Thrombosis

Clotting within blood vessels occurs in two different ways, and the cause, prognosis and treatment is quite distinct. (A) *Thrombophlebitis* often seen at the site of an intravenous infusion. Pain is invariably present, and the vein is tender and can be felt as solid with clot; the temperature rises, usually to 90°-100° F. (37.2-37.8° C.), but sometimes

higher. The clot is firmly adherent to the inflamed vein, and its detachment to form an embolus is unlikely. Warmth by kaolin poultices will relieve the pain, and the patient's progress is not delayed long. Intravenous dextrose is especially liable to cause thromobophebitis, and infusions should be continued longer than is strictly necessary. (B) Clotting within the *deep* veins of the calf appears to be caused by a combination of some of these factors:

1. Pressure on the calves on the theatre table or in bed.
2. A prolonged subnormal blood pressure, as in shock.
3. Anemia.
4. Pelvic operations.

The vein wall is normal, the clot does not usually fill the lumen, and is only loosely adherent, so that the danger of pulmonary embolism is very great, and is what this condition so important. There is very great, and is what makes this condition so important. There may be a little fever, cramp or tenderness may be felt in the calves, and if the clothing becomes extensive, there may be edema of the leg.

This phlebothrombosis should be *prevented*. Pressure on the calves on the table can be relieved by a sandbag under the Achilles tendons. Shock should be adequately treated and anemia relieved. Deep breathing exercises will improve the return of blood to the heart, and early rising after operations and mobility in bed are important. Nurses should feel the calves while giving a bed bath after abdominal or pelvic operations, and report tenderness at once.

If clotting occurs, an intravenous course of heparin (e.g. 10, 000 units six-hourly on the first day) followed by dindevan (e.g. 50-100 mg. twice a day) is usual, to lower the clotting powers of the blood, unless hemorrhage is feared. Surgeons' practices vary according to whether they believe mobilization will bring the risk of embolism nearer, or if they think confinement to bed encourages the growth of the clot. Most would probably keep the patient in bed if there was any fever, but encourage mobility as soon as it disappeared. The prothrombin time is estimated daily as long as dindevan is being given, and not allowed to fall below 20% lest bleeding occur.

The importance of breathing exercises and of activity is apparent in several of the above sections. Good diaphragmatic movement lessens the risk of pneumonia, of thrombosis in the legs, and of pulmonary infarct and lobar collapse. It must not be thought, however, that post-operative patients need little care other than of their own wounds. It is true that many of them benefit from performing their own toilet, but unless they are encouraged and helped with it in the early days, they

may quite understandably do it with as little disturbance to themselves as possible, and not very efficiently. Activity should be planned; to hope that it will result from leaving the patient to fend for himself, shows lack of nursing insight.

Infection

Infection has always been a problem in surgical wards and still is. We rarely see the gas-gangrene that used to be common in the eighteenth century, and streptococcal infections can be speedily and successfully treated. It is the staphylococcus, strains of which have acquired resistance to many antibiotics that is still a major problem.

Staphylococci infect human tissues to produce boils, styesmyelitis, pneumonia or pyelitis. But staphylococci may also be present on the skin and in the anterior part of the nose of people who are quite healthy, and who merely carry the organism. Patients, nurses, doctors and domestic or lay staff who work in surgical wards may thus be sources of infection to others. This is termed cross-infection.

In addition, staphylococci from such sources may be transferred to objects in the ward by direct contact or through the air, and bed clothes, curtains, dust bath, screens and all kinds of ward equipment. These act as depots in which organisms can survive for long periods, and eventually may be transferred to patients. Staphylococcal infections may endanger life, and at least will prolong the patient's stay in hospital.

The measures that will reduce the incidence of infection include these:

1. Ward premises should be clean and beds well spaced. Surfaces that can be easily cleaned are desirable.

2. Nursing staff should maintain a high standard of hygiene in their work.

3. Techniques for dressing should be aseptic, and carried out conscientiously.

4. Wound and other infections must be recognized early; precautions to prevent spread are taken, and the patient isolated.

5. Contamination of the articles in the ward must be avoided. Wounds are kept covered, discarded dressings are disposed of quickly. Hands must be washed after touching infected surfaces.

6. Possible depots of infection must be removed. Ward cleaning must be effective, and methods that disperse dust into the air are dangerous. Bedding, curtains and screen covers are changed regularly.

7. Method of sterilization must be effective.

8. Susceptible people must be protected, small babies are an obviously example.

9. The guidance of a bacteriologist on acceptable techniques of ward hygiene should be available.

4.0 CONCLUSION

1. The Post Operative period is divided into two phases; the intermediate post-operative stage and the extended post-operative stage. The intermediate post-operative stage begins when the person is discharged from the PACU and generally ends 48 - 72 hours later. A person enters the extended post-operative stage two to three days after surgery.

2. During these periods, the person remains at risk for post-operative complications, including respiratory, circulatory, or gastric dysfunction.

3. Constant monitoring is required at this stage.

5.0 SUMMARY

- The post-operative period is critical and the nurse is largely responsible for the patient at this period

- The patient must be observed diligently until the major effects of the anesthetic have worn off and overall condition stabilized.

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain the rudiments of post-operative nursing care.
2. Mention some likely post-operative complications noticeable in a surgical

7.0 REFERENCES/FURTHER READING

Malinda, Murray. *Fundamentals of Nursing*. 2nd Edition. New Jersey: Prentice-Hall, Inc., Englewood Cliffs, 1980.