

INSTRUCTIONAL DEVELOPERS: LECTURERS IN THE
DEPARTMENT OF PUBLIC HEALTH, SCHOOL OF PUBLIC AND
ALLIED HEALTH



ENHANCED CURRICULUM FOR HEALTH PRINCIPLES

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GEDS 112 COURSE STUDY GUIDE

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FOR
HEALTH PRINCIPLES**

COURSE CODE: GEDS 112

COURSE STUDY GUIDE

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COURSE DESCRIPTION

This course will introduce the meaning and scope of health and well-being and it will provide an opportunity for learners to understand the dynamics of how various factors in our environment influence the outcome of health and quality of life for each individual in the process of prevention and control of disease in human populations. Major focus is on the concept of health, demonstrating how the biblical foundations of life is expressed in health, disease, the environment, deteriorating conditions of the environment as it affects water supply, sanitation; industrial and solid waste management, vector control, and atmospheric pollution control. The course will begin with definitions of basic terms in health and explore the dynamics of factors that influence health, explain basic human biology in order to understand the body function and disease processes, ending with contemporary issues and trends in population health.

Objectives

The course is designed to enable the students at the end of the study to:

1. Define health, and discuss the scope of health and disease,
2. Identify the basic components of the human body and function,
3. Recognize God as the creator of the human body system,
4. Identify factors that determine health and well-being,
5. Define nutrients, malnutrition and
6. Determine nutrient-based factors that facilitates growth and development of the human body,
7. Explain the relationship between the environment and its constituent components,
8. Explain the processes involved in environmental degradation and possible remediation,
9. Define mental health and Identify factors responsible for physical and mental stress,
10. Explain mechanisms and consequences of substance abuse,
11. Discuss contemporary trends in health,

Teaching Methodologies

Students would be expected to read extensively from learning resource materials recommended, learn from other learning resources including power point presentations and video footages, forum discussions, systematic evaluation of what has been learned through tests and contextual project that should deepen understanding of concepts in environmental health.

Table 1: Course Content

Serial number	Titles and Sub-Titles	Descriptions
1	Introduction: An overview of the nature and Scope of Health; i. Concept of Health and scope, ii. Health in the physical domain, iii. Health in the mental domain, iv. Health in the social domain	This section attempts to provides an understanding of the nature of health, its scope and the different dimensions in which the concept of health is expressed. Here health does not of behavior as the basis of outcomes of environmental health. Review of selected mechanisms for the maintenance of ecological adaptive balance.
2	The Determinants of Health; i. Heredity, ii. Environment, iii. Health Services, iv. Social and behavioral factors.	Module describes the factors considered to be very important in health and disease. These are the determinants of health.
3	Basic Human Biology; i. Organization and functions of the biological system, ii. The brain and the nervous systems, iii. The heart, kidneys, blood and immune systems, iv. Digestive, endocrine and reproductive system	Module describes the organization of the human body system identifying the major organs and their functions. In describing the functions of the cells for each organ-system, mention should be made of the cellular processes sustaining life processes and the role of oxygen and food.
4	Ecology of Human Diseases; i. Principles of disease causation, ii. Infectious diseases, iii. Chronic diseases, iv. Health in transition and disease prevention.	Module will focus on principles of disease causation and natural history of diseases identifying infectious diseases and chronic illnesses with their characteristics features. Examples of common infectious and chronic diseases will be used to illustrate causation and final events representing the various outcomes.
5	Food, Nutrition and Health; i. Energy-based nutrients, ii. Growth and body building nutrients, iii. Vitamins and minerals, iv. Metabolic and health implications.	Module explores the sources of foods and characteristics of each nutrient. Furthermore, the module will show how every nutrient contributes to health maintenance lack contributes to malnutrition. Metabolic implication shows the link between health and disease.
6	The Environment and Health; i. Components of the environment, ii. Concept of Ecological balance, iii. Waste, Sanitation and health, iv. Water resources and pollution.	Module attempts to provide an understanding of the nature of the environment and the dynamics of the interconnecting components of the environment are interdependent. Examine the outcome of the impact of disruptions of the balance occurring within the environment may affect health.
7	Substance Abuse and Mental	Module describes the brain, neurons and

	Health; i. The mind and mental health, ii. Stress and Health, iii. Substance abuse and health outcomes iv. Mental Health promotion.	explores the relationship between the brain and mental dispositions. What is stress and mental health? How does substance abuse relate to health outcomes?
8	Contemporary Trends in Global Health; i. Human right issues, ii. Poverty and health disparities, iii. Terrorism and disaster management, iv. Urbanization and Globalization,	The environment in which populations in the urban and rural setting spend most of their lives has important bearing of the quality of their lives, hence this module will describe the indoor environment and the types of hazards that are prevalent.

INTRODUCTION

WHAT WILL BE LEARNT IN THIS COURSE: the historical insight to how God created man to be perfect in health at all times. Information about public health and what determines health as related to the physical, mental, spiritual and ecological environment of man. Basic human anatomy and physiology, with concentration on the cell, tissue and organs, and the interaction among the system. Food hygiene, human activities within the environment and the safety precautions required to enhance health are enumerated. It also spans air quality, housing, waste, water management, as well as waste management. A classic analysis of drugs prescribed by health practitioners and the danger associated are also outlined. The side effects of the substances and misuse of drug are discussed.

COURSE AIM: to inculcate in students health principles that can empower them to prevent, promote and restore their health.

TEXTBOOKS AND REFERENCES

1. Fundamentals of health principles: Theory and Practice is available for purchase online.
2. The Mammalian digestive, circulatory and respiratory systems, by Akinboye D. O. *Sterling-HordenPublishers,Nig. Ltd.* Available for purchase at Babcock Bookshop.
3. Ministry of Healing by E.G white
4. Counsels on Health by E.G White
5. Counsels on Diets and food by E.G white
6. (e-Books) available at <http://www.intechopen.com/books>
7. Available at <http://www.intechopen.com/books/biodiversity-the-dynamic-balance-of-the-planet>
8. Howard Frumkin (2010) Environmental Health from global to local. Second edition. Jossey-Bass.

9. Electronic Resources (Five Textbooks and 12 Journal articles 2012 to 2015):

<https://www.dropbox.com/sh/qj4ib9d9nhkft7b/AAB0DoBMWJ1fa0t-67UgyDmaa?dl=0>

ASSIGNMENT FILE

- Discuss Leviticus 11 in line with current scientific evidence
- Summarized Outdoor Life and Physical Activity; Counsels on health E.G white pp.163-202 (500 words).
- Summarized Fruits, Cereals, and Vegetables; Counsels on Diet and Food pp309-335 (500 words).
- Summarized Stimulant and Narcotics. The Ministry of healing E.G White pp.326-338. (500 words)

PRESENTATION SCHEDULE

- ASSESSMENT
- TUTOR-MARKED ASSIGNMENT
- FINAL EXAMINATION AND GRADING
- COURSE MARKING SCHEME

Table 2: How actual course marking is broken down.

Assessment	Marks (This may vary due to Covid 19)
ActiveForum Participation	This will count as 5% of course mark.
TMA 1	10% of overall course marks
TMA 2	10% of overall course marks
Mid-semester tutor marked assignment	15% of overall course marks
Final examination	60% of overall course marks
Total	100% of course marks

COURSE OVERVIEW

- HOW TO GET THE MOST FROM THIS COURSE
- READING SECTION
- FACILITATORS/TUTORS AND TUTORIALS
- CONTACT YOUR TUTOR IF: you have any questions
- SUMMARY

- NEWS FORUM
- CONTENT MODULES AND UNITS
- MODULE (OVERVIEW)
- LECTURERS - INTRODUCTION AND PHOTOGRAPH
- LEARNER'S SELF - INTRODUCTION

MODULE 1: Historical Perspective of Health

Introduction: in this module historical perspective of health including the biblical foundations of health will be discussed. Also the dimensions of health and the relationship between health and disease will be explained. The module ends with the discussion on determinants of health.

General Objective for the Module:

At the end of this module students will be able to:

1. Describe the historical perspective of health
2. Define health
3. List the dimensions of health
4. Discuss the relationship between health and disease.
5. Explain the determinants of health

UNIT 1

Specific Objectives to:

1. Explain the biblical foundations of health
2. Define health and explain its dimensions
3. Discuss the determinants of health

Unit -1.1.Biblical foundations for Health Principles

The purpose and plan of God, from beginning of time, is for man to prosper and be in health even as his soul prospers (3John 1:2). This plan of God is affirmed by World Health Organization's (WHO) definition of health which is not just the absence of disease but the state of physical, social and psychological wellbeing. Wholesomeness of spirit, soul and body is predicated by the fact man was made in the image of God. God has never been reported to be sick therefore man is not expected to be in ill health. The current situation of illness and disease, as experienced by mankind, came as a result of sin (Rom 3:23).

We may be restored to God's original plan of wholeness by divine intervention of God's promises (1Peter 1:4) if we use the road map to health as laid out in the holy scriptures (Proverbs 3:8; 4:22). Paying attention to divine guidance promises to give health to the flesh and strength to the bones. Man has been instructed that if we follow the commandments, diseases will be removed from us. While our world will continue to wrestle with the realities of a fallen nature, those who adhere to biblically based health principles will minimize the effects of illness and disease. In general terms, scripture provides guidelines for diet and nutrition (Lev.15), community sanitation (Deut. 23:13), mental health (Prov. 17:22), just to mention a few.

The combination of the practice of sound health principles and belief in divine intervention places a person in a position of optimum health.

1.2 Life and the Source of life

Life is very difficult to define. When you say life, what come to mind is God or existence? In this case, we need to review what life is and the genesis of life. This aspect begins with the Christian view of life and health. It can also be viewed from the scientific perspective. In this case, we will look at the Biblical-Christian perspective and science. From the Christian perspective, the Lord God formed man out of the dust of the ground and breathed into his nostrils the breath of life and man became a living being (Genesis 2:7)

Let us take a critical look at this verse, the breath of life from God energized and quickened the life body into a vibrant and active life which awakes the consciousness and enable individuals to express fully intrinsic value which God has endowed on human persons consciousness so as to be able to recognize or react to responds to stimuli around us. The following signifies life:

- a. Breath
- b. Movement
- c. Speech

These factors are important but only speech distinguishes us from animals. We reason while animals have instinct- that is why animals can run from danger. Therefore, in alive, we accurately have a great perceptive of the senses. The five senses, - sight, hearing, touch, smell and taste - serve as a basic or avenue that shapes the perceptive faculty from learning also takes place. Through consciousness, learning begins, as well as reasoning and intellectual ability. Intrinsic knowledge acquired awakens and further expands consciousness. This is why learning and education are regarded as being very important to every human being as a right to life. Without life, there is no consciousness. As a matter of fact, life and health are linked together. In other words, only someone who is live can be said to be healthy. God gave humans begins four gifts when he created them:

- a) Life
- b) Companionship
- c) Sabbath
- d) Environment

All the four gifts are meant for human begins to live in. these gifts constitute the framework for which human begins exist and have total experience. Through the gift of life, human begins can enjoy companionship, the Sabbath and the environment.

In Genesis 1:27 and 28, it was stated that God created man in his image, in the image of God created him; male and female created he them. And God blessed them and God said to them, be fruitful and multiply the earth and subdue it: and have dominion over the fish of sea and over the fowl of the air and over every living thing that moves upon the earth. This indicates that the creation of human being was not by accident but a deliberate act of the divine God head. The creation of male and female was a crowning glory of creativity because God said

everything he created was good, man and woman inclusive. The four gifts given to man at creation- life, companionship, Sabbath and environment were perfect gifts to complement, maintain and enjoy perfect health.

ITQs:

1. The combination of the practice of _____ and belief in _____ places a person in a position of optimum health
2. _____ distinguishes humans from lower animals
3. List the four gifts God gave humans at creation?
4. The purpose and plan of God, from beginning of time, is for _____ to prosper and be in _____

ITAs

1. Sound health principles, divine intervention
2. Speech
3. Life, Companionship, Sabbath, Environment
4. Man, Health

UNIT2. Meaning and Dimension of Health

Specific Objectives to:

- Define health
- List the limitation of World Health Organization definition of health
- State the images of health
- Enumerate the dimensions of health

2.1 The Meaning, Concept and Scope of Health

Health can also be defined as a state of being well and free from all the body illness. The body may not function well, if the system is bad, for example, fever, cancer, blood pressure, show defects in the body system and will not allow the body to function well. This is best illustrate by the immune system. Every human being is prone to having disease which is predictable as this is part of human experience, what matter most is how to cope with it.

In 1984, the World Health Organization (WHO) defined health as “a state of complete physical, mental and social wellbeing and not merely the absence of disease of infirmity”.

However, this definition has received a lot of criticism over the years. This definition has been criticized that health cannot be defined as a “state” but must be seen as a continuous adjustment to changing situations of life. Other limitations include:

1. Health is dynamic and not a state
2. The dimensions are inadequate
3. The definition is subjective
4. Measurement is difficult
5. The definition is too ideal and not realistic
6. Health is not an end in itself but a means to an end.

2.2 Images of Health

These images explain the complexity of health and how they are related.

1. Health as an antithesis of disease: This means that health is the opposite of disease. When a person is sick in a society he/she is said to be unhealthy.
2. Health as a goodness of fit: being fit physically that is frequency, intensity and time.
3. Health as functionality: This is the ability to perform a given task at the right time.
4. Health as growth: The right development of the human body at each stage of life.
5. Health as wholeness: Totality of man. Holistic nature of health is central to healing
6. Health as a sense of well-being: thought to include level of happiness.
7. Health as transcendence: Growth and development are limitless.
8. Health as empowerment: Enabling people to exert control over the determinants of health.

2.3 Dimension of health

1. Physical dimension: Perfect functioning of the body
2. Mental dimension: Good mental health is the ability to respond to the many varied experiences of life and adjust to them.
3. Social dimension: This has to do with the relationship between individuals. It has to do with the level of social skills one possesses social functioning and ability to see oneself as a member of a larger society.
4. Spiritual dimension: it is that part of the individual which reaches out and strives for meaning and purpose in life.
5. Emotional dimension: Mental health has to do with knowing or cognition while emotional health relates to feeling.

ITQs:

Define health according to WHO

List the limitation of WHO definition

State five dimensions of health

ITAs

1. Health according to WHO is defined health as” a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity’.
2. Health is dynamic and not a state, the dimensions are inadequate, the definition is subjective, measurement is difficult, the definition is too ideal and not realistic, and health is not an end in itself but a means to an end.
3. Physical, mental, social, spiritual and emotional dimension.

TMA: Discuss Leviticus 11 in line with current scientific evidence

UNIT 3. Relationship between Health and Disease

Specific Objectives to:

1. Explain the relationship between health and disease
2. Discuss behavior, health enhancing behavior, and health depleting behavior

3.1 Relationship between Health and Disease

Modern sciences and technologies have not really hundred percent impact on diseases and poverty. Every second, minute, hour, day, week, month and year, human beings are threatened by different types of diseases that affect the wellbeing of mankind. Sometimes it could be form of an outbreak (epidemic) that may affect individuals or the whole population consequently causing death. Hence, the world is battling with HIV/AIDS and hunger. This is common in Africa and Asia. It has been observed that some of these diseases are caused by our social environment, industrialization, urbanization, etc. individuals, organizations, and non-Governmental organizations (NGOs) are all trying to see that they create awareness so that everyone will have a healthy life.

3.2 Behavior

Behavior means action or inaction, performed or observed by man, evoked or provoked by underlying circumstance. Behavior can include feelings, attitude, thoughts and other mental processes as well as all internal event which cannot be observed directly.

All behaviors are health-related; it can be enhanced or de-enhanced. Behaviors affect our health. When one eats what is high in cholesterol, one will become obese. Therefore, behavior help us to against health principles.

3.2.1 Health–Enhancing Behavior: are behavior that prevent disease, decrease morbidities, improve the quality of life, and decrease healthcare costs. Health enhancing behaviors include:

1. **Preventive health behavior** - Any activity undertaken by an individual who believes himself to be healthy, for the purpose of preventing illness and attaining an even greater level of health.
2. **Illness behavior** - Is any activity undertaken by an individual who perceives himself to be ill geared toward defining the state of his health and to discover a suitable remedy. This may be regarded as health-seeking and may include visit to the hospital for check-up and diagnosis.
3. **Sick-role behavior-** Any activity undertaken by an individual who considers himself to be sick for the purpose of getting well. It includes receiving treatment from appropriate therapists.

Good health can be enhanced by the following:

- Good nutrition which should comprise of 70% fruit and vegetable
- Exercise
- Balanced diet
- Water (4-6 glasses of water daily is commended not for Nigeria)

- Rest
- Keeping the skin clean

3.2.2 Health –Depleting Behaviors

The underlined behavior are detrimental to human health:

- Consumption of Alcohol
- Smoking
- Unwholesome Entertainment
- Watching Television all Hours of the Morning Going to Disco Parties
- Eating in –Between Meals

ITQs

1. _____ means action or inaction, performed or observed by man, evoked or provoked by underlying circumstance
2. List the types of health enhancing behavior.
3. Why is a behavior considered to be health depleting?

ITAs

1. Behavior
2. Preventive health behavior, Illness behavior, Sick-role behavior
3. Health depleting behaviors are action or inaction performed by man that have negative impact on our health.

UNIT 4: Determinates of Health

Specific Objectives to: Discuss the determinates of health

4.1 DETERMINANTS OF HEALTH

The range of personal, social, economic, and environmental factors that influence health status of individuals and communities are known as determinants of health. It is the interrelationship among these factors that determine individual and population health. Because of this, interventions that target multiple determinants of health are most likely to be effective. Determinants of health reach beyond the boundaries of traditional health care and public health sectors; sectors such as education, housing, transportation, agriculture, and environment can be important allies in improving population health.

The determinants of health include:

- Biology and Genetics
- Physical environment
- Social determinants
- Health services
- Individual lifestyle or behavioral factors

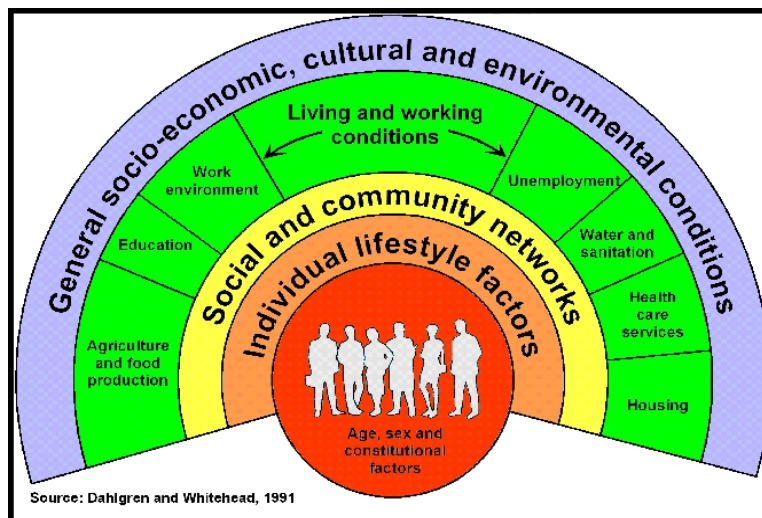


Fig 1: The determinants of health include

4.1 Biology and Genetics

Inheritance plays a part in determining lifespan, healthiness and the likelihood of developing certain illnesses. Personal behavior and coping skills, i.e. balanced eating, keeping active, smoking, drinking, and how we deal with life's stresses and challenges all affect health. Some biological and genetic factors affect specific populations more than others. For example, older adults are biologically prone to being in poorer health than adolescents due to the physical and cognitive effects of aging.

Sickle cell disease is a common example of a genetic determinant of health. Sickle cell is a condition that people inherit when both parents carry the gene for sickle cell. The gene is most common in people with ancestors from West African countries, Mediterranean countries, South or Central American countries, Caribbean islands, India, and Saudi Arabia.

Examples of biological and genetic determinants of health include:

- Age -
- Gender - Gender refers to societal determined roles, attitudes, behaviors and values that are associated with males and females. Many health issues can be attributed to disparities in gender-based status. Females, for example, are more vulnerable to physical violence, low income and single parenthood. Males are more likely to die prematurely of certain diseases compared to females. Gender inequalities and gender bias addressed both within and outside the health system can improve population health.
- HIV status –
- Inherited conditions, such as sickle-cell anemia, hemophilia, and cystic fibrosis
- Carrying the BRCA1 or BRCA2 gene, which increases risk for breast and ovarian cancer
- Family History of diseases

4.2 Physical Environment

Poor health outcomes are often made worse by the interaction between individuals and their social and physical environment. Safe water and clean air, healthy workplaces, safe houses, communities and roads all contribute to good health. Employment and working conditions also contribute to the health status of individuals. People in employment are healthier, particularly those who have more control over their working conditions. Other examples of physical determinants of health include:

- Natural environment; such as plants, weather, or climate change
- Built environment; such as buildings or transportation
- Worksites, schools, and recreational settings
- Housing, homes, and neighborhoods - Housing is an important determinant of health status. Several built-in factors, like the quality of water, sanitation and exposure to contaminants or physical hazards, can influence health. Housing may be unsafe for a variety of reasons, including poor construction, inadequate ventilation, inadequate heating or overcrowding. Living in such conditions can contribute to poor health (e.g. respiratory illnesses and gastro-intestinal infections).
- Exposure to toxic substances and other physical hazards
- Physical barriers, especially for people with disabilities
- Aesthetic elements, such as good lighting, trees, or benches

Studies indicate that geographic (e.g. natural and built environment) and social (e.g. civic life and cohesion) factors can contribute towards promoting good health. There are indications that certain community characteristics may play a role in differences in health status among similarly disadvantaged groups. Several physical characteristics such as the availability of open spaces, as well as social characteristics of the community such as community organizations, can possibly influence people's health.

4.3 Social determinants

The social determinants of health are the circumstances in which people are born, grow up, live, work, and age, as well as the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies, and politics. They impact a wide range of health, functioning, and quality-of-life outcomes. Examples of these social determinants include:

Availability of resources to meet daily needs, such as educational and job opportunities, living wages, or healthful foods - higher income and social status are linked to better health. The greater the gap between the richest and poorest people, the greater the differences in health. Health status improves with education level. People with low education levels are more likely to be unemployed and poor, and to suffer from poorer health, than those with high levels of education. There are more opportunities for employment and higher income with higher education. Education provides people with knowledge and skills to tackle issues and helps provide a sense of control and mastery over life situations. It enables people to access and understand information in order to be healthy.

- Social norms and attitudes, such as discrimination - The health of members of some ethnic or cultural groups can be vulnerable because of cultural differences and risk factors. Some persons or groups may face health risks due to lower socio-economic conditions and lack of access to culturally appropriate health care and services.

- Exposure to crime, violence, and social disorder, such as the presence of trash
- Social support and social interactions - greater support from families, friends and communities is linked to better health. Customs and traditions, and the beliefs of the family and community all affect health.
- Exposure to mass media and emerging technologies, such as the Internet or cell phones
- Socioeconomic conditions, such as concentrated poverty
- Quality schools
- Transportation options
- Public safety
- Residential segregation

4.4 Health Services

Access and use of services that prevent and treat disease influences health. Lack of access, or limited access, to health services greatly impacts an individual's health status. For example, when individuals do not have health insurance, they are less likely to participate in preventive care and are more likely to delay medical treatment. Barriers to accessing health services include:

- Lack of availability of health services
- High cost of treatment
- Poor social amenities
- Limited language access
- Inadequate supply of drugs, vaccines and other medical supplies
- Poor communication system
- Lack of good referral systems

These barriers to accessing health services lead to:

- Unmet health needs
- Delays in receiving appropriate care
- Inability to get preventive services
- Hospitalizations that could have been prevented

4.4.1 Individual lifestyle or behavioral factors

Personal health behavior refers to those actions taken by individuals that can either prevent or contribute to diseases. People make a number of choices about what and how much they drink, smoke and eat. For example, some people choose to wear helmets while riding bicycles while others do not. It is being recognized that personal behaviors are influenced by several social, economic and environmental factors.

Examples of individual lifestyle determinants include:

- Diet
- Physical activity
- Alcohol, tobacco, cigarette and other drug use
- Handwashing

ITQs: Answer true or false to this Statement

1. Poor health outcomes are often made better by the interaction between individuals and their social and physical environment.
2. Actions taken by individuals that can either prevent or contribute to diseases.
3. The individual determinants of health are the circumstances in which people are born, grow up, live, work, and age, as well as the systems put in place to deal with illness
4. List the determinants of health

ITAs:

1. False
2. True
3. False
4. Biology and Genetics, Physical environment, Social determinants, Health services, Individual lifestyle or behavioral factors

TMA's

Explain three determinants of health that has not be mentioned.

SAQs

1. What is health?
2. State the images of health
3. Enumerate the dimension of health
4. List the health depleting behaviors.
5. What is the purpose and plan of God for man?
6. Explain determinants of health.

MODULE 2 HUMAN ANATOMY AND PHYSIOLOGY

Introduction

In this module, highlights of the basic structures of the human body and their respective functions will be discussed. Also, the body's defense mechanism will be briefly explained.

General Objective for the Module

At the end of this module students will be able to:

- Explain the basic unit of life
- Identify the various organelles and their functions
- List the various systems in the human body and their functions
- Discuss how the body defends its self against various infections/germs.
- Explain how the body develops immunity against disease.
- Appreciate God's creative power

UNIT 1The Cell

Introduction

Living things are highly organized and structured into a hierarchy of different components and according to their functions. This unit identifies and describes the levels of organization in organisms, from the cell which is the basic unit of structure and function of all living things to the organism. The description of the functions of the cells for each organ-system will include the cellular processes that sustain life processes and the role of oxygen and food. The organization of organisms in the biological system is as follows from the simplest to the most complex.

Specific Objectives to:

- Define cells
- List the types of cells
- Mention the organelles in the cells and their functions

1.1 Brief History of the cell

The cell was discovered by Robert Hooke in 1665. Matthias Jakob Schleiden and Theodore Schwann first developed the cell theory in 1839 which states that all organisms are composed of one or more cells, all cells come from preexisting cells, vital functions of an organism occur within cells, and all cells contain the hereditary information necessary for regulating cell functions and for transmitting information to the next generation of cells.

The human body is composed of trillions of cells which are divided into about 200 different types. Our muscles, liver, and blood every part of our bodied are made of cells. They provide structure for the body, take in nutrients from food, convert those nutrients into energy, and carry out specialized functions.

The cell is the building blocks of life because it is the smallest unit of life that is classified as a living thing. Cells are the basic structural, functional and biological unit of all known living organisms. Cells have many parts called organelles, with each having different functions.

1.2Types of cells

There are two distinct types of cells with structural differences.

- Prokaryotes -Bacteria
- Eukaryotes – Animal, Plant

1.3 Organelles and their Functions

Table 3: Organelles and their Functions

Organelles	Function
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Cell wall	<ul style="list-style-type: none"> • Support (grow tall) • Protection • Allows water, oxygen, Carbon (iv) oxide to diffuse in and out of cell
Cell membrane	<ul style="list-style-type: none"> • Support • Protection • Controls movement of materials in/out of cell • Barrier between cell and its environment • Maintains homeostasis
Nucleus	<ul style="list-style-type: none"> • Controls cell activities • Contains the hereditary material of the cell
Nucleus membrane	Controls movement of materials in/out of nucleus
Cytoplasm	Supports and protects cell organelles
Endoplasmic reticulum (ER)	<ul style="list-style-type: none"> • Carries materials through cell • Aids in making proteins
Ribosome	Synthesizes proteins
Mitochondrion	<ul style="list-style-type: none"> • Breaks down sugar (glucose) molecules to release energy • Site of aerobic cellular respiration
Lysosome	<ul style="list-style-type: none"> • Breaks down larger food molecules into smaller molecules • Digests old cell parts
Golgi Apparatus	<ul style="list-style-type: none"> • Modify proteins made by the cells • Package & export proteins

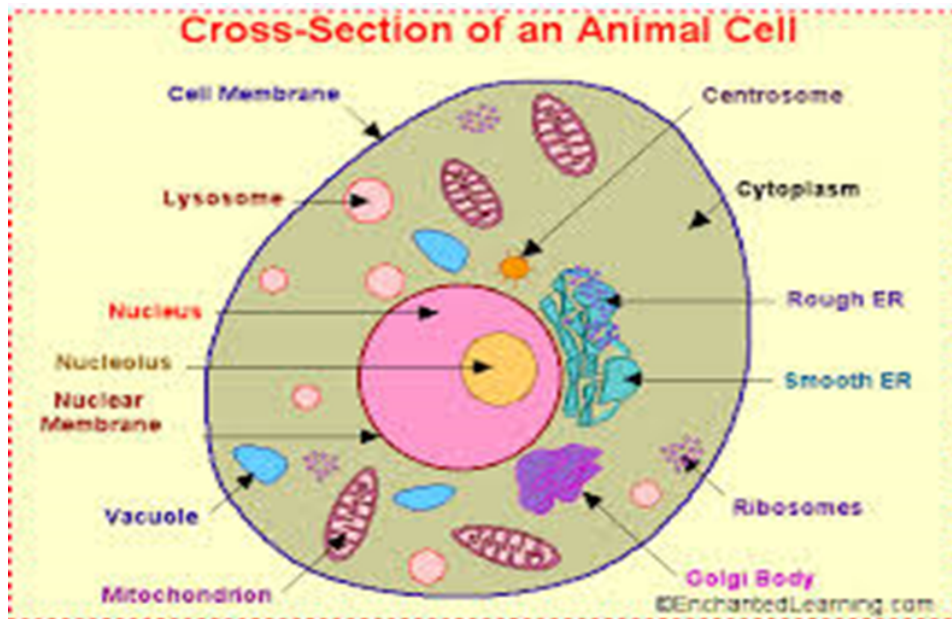


Fig 2: The Cell

ITQs

1. Cells was discovered by _____ in _____?
2. The parts of cells are referred to as _____
3. _____ is the basic unit of life
4. Mitochondria is referred to as _____?
5. The activities of the cell is controlled by _____

ITAs

1. Robert Hooke , 1665
2. Organelle
3. Cells
4. The power house
5. The nucleus

UNIT 2: TISSUES OF THE HUMAN BODY

Introduction

Specific Objectives to

Define tissues

Explain the types of tissues

2.1 Definition of tissue

A tissue is a group of cells that have a similar shape and function. Different organs have different types of tissues.

2.2 TYPES OF TISSUES

In humans, there are four types of tissues namely: epithelial, muscle, connective and nervous tissues.

Table 4: Types of tissue and their functions

Tissue	Function
Epithelial	Act as protective linings and coverings. In some locales, absorption and secretion are important functions of these lining and covering cells. As secretory cells, epithelial form most glandular structures of the body. The skin is an organ made up of epithelial tissue which protects the body from dirt, dust, bacteria and other microbes that may be harmful.
Connective	Serve as connective and supportive tissues that bind and hold body structures together. Specialized fluid connective tissue types serve as liquid media important in transport, exchange, and body defense. The following tissues are found in the human body, ordinary loose connective tissue, fat tissue, dense fibrous tissue, cartilage, bone, blood, and lymph, which are all considered connective tissue.
Muscle	Tissues with the unique capability to contract or shorten. Smooth muscle is found in the walls of internal organs and blood vessels. It is an involuntary type. The cardiac muscle is found only in the walls of the heart and is involuntary in nature.
Nervous	Nerve cells are specialized for conduction. Nervous tissues therefore serve as the complex telecommunications network of the body. These tissues act in a sensory capacity, to receive, disseminate, and store information collected from receptors. In a motor capacity, nervous tissues provide response potential by controlling effectors such as muscles or glands.

ITQs

1. Define tissue
2. List the types of tissue

ITAs

1. A tissue is a group of cells that have a similar shape and function. Different organs have different types of tissues.
2. Epithelial tissue, connective tissue, muscle tissue, nervous tissue

TMA: differentiate between prokaryotes and eukaryotes cells

UNIT 3 ORGANS IN HUMAN BODY

Introduction

Organs are made up of two or more tissues which perform a common function. For example, the heart contains all 4 types of tissues. There are about 78 organs in the human body which

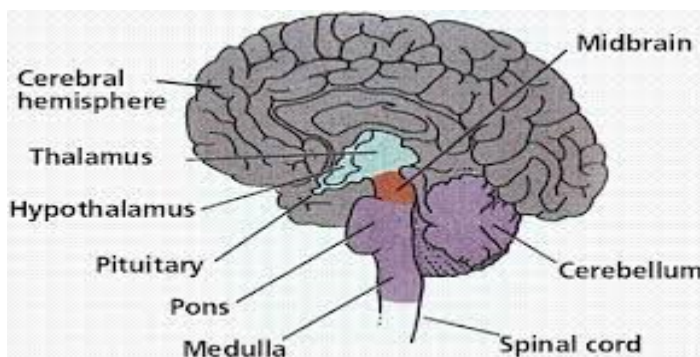
varies according to their sizes, functions or actions. Out of these 78 organs of a male or female body, skin is the largest organ with respect to its size and weight. The major organ in the body of human beings is the brain which is primarily responsible for performing all the functions and actions of the body.

Specific Objectives to:

1. Explain the human brain and its functions
2. Discuss the human eyes and its functions
3. Explain the human ear and its functions
4. Discuss the human hearts and its functions
5. Discuss human blood and its functions

3.1 The brain

The human brain is the most complex organ in the body, which allows us to think, move, feel, see, hear, taste, smell and experience the world. It co-ordinates our body, receives information, analyzes information, and stores information (our memories). The brain lies within the skull and is shaped like a mushroom.



The electrical signals together with the chemical reaction produced by the brain sent by the nerves enable the various parts of the body to communicate. The average human brain weighs about 1.5kg which is only 2% of the body's weight. At birth, the human brain weighs less than a pound which reaches its full size at about 6 years of age. Blood vessels supply the brain with oxygen and nourishment and take away wastes (20% of oxygen and 20% of blood flow). If the brain cells do not get oxygen for 3 to 5 minutes, they begin to die.

The brain is divided into two hemispheres, the left and right hemispheres connected by a bundle of nerve fibers called the corpus callosum. The hemispheres are strongly, though not entirely, symmetrical. The left brain controls the muscles on the right side of the body; and the right brain controls the left side of the body. One hemisphere may be slightly dominant above the other which explains the reason for being right-handed or left-handed. The cerebrum is divided into three parts; they are the

1. Cerebrum: it is the largest portion of the brain and fills the skull almost entirely; it is responsible for problem solving, thinking, remembering, feelings and movement. The Cerebrum which is commonly referred to as the brain itself has its outermost layer as the cortex; the cortex is where thinking and voluntary movements are initiated. It is divided into four lobes:

The frontal lobes which is for solving problems, judgment and the functioning of the motors.

The parietal lobes manage sensation, handwriting, and body position. The temporal lobes are involved with memory and hearing. The occipital lobes contain the brain's visual processing system.

2. Cerebellum: this is located behind the cerebrum just at the base of the skull and is responsible for coordination and balance.
3. Brain stem: It connects to the spinal cord; it consists of medulla oblongata, pons and midbrain. It is responsible for the control of automatic functions such as breathing, digestion, heart rate and blood pressure.

3.2The Human Eye

The human eye is the organ which enables us to see. The human eye does not only let us view our surroundings, but also enables us to differentiate between colors.

3.2.1 The eye structure

Eyes exist in pairs, each one being approximately 2.5 cm in diameter. Each eye consists of the following main parts.

- **Sclera:** The white part of our eyes is known as sclera. It consists of fibrous tissues and protects the internal parts of the eye.
- **Cornea:** The transparent tissue through which light enters the eyes is called cornea. It exists in front of the eye.
 - **Iris:** Iris is made up of muscles which contract or relax in order to adjust the amount of light which enters the eye.
 - **Pupil:** Pupil is an aperture controlled by the iris muscles. For instance, when it is dark, the iris muscles relax, causing the pupil to open up wider. Therefore, more light enters them which enable us to see well. On the other hand, the pupil becomes narrow due to the contraction of the iris muscles in the presence of excessive light in order to protect the cells of the eyes.
 - **Lens:** The lens is present behind the pupil. Light enters the pupil, passes through the lens and is focused on the retina of the eye. The lens is capable of changing its shape in order to help us see near or far off objects.
 - **Retina:** The retina converts light into electrical signals which are transferred to the brain for processing. The retina contains two types of cells: rods and cones. These cells are sensitive to light. Rods are important for night-time vision when there is little light. On the other hand, cones play an important role in helping us see colors.
 - **Optic Nerve:** The optic nerve takes electrical signals from the retina of the eye to the brain.

3.2.2 Function of the Eyes

Eye functions are associated to our sense of sight. The eyes convert light into electrical signals which are deciphered by the brain into images.

- They help us view our surroundings.
- Our eyes enable us to see colors. For instance, animals, such as dogs, cannot see colors.
- Eyes help us see near as well as distant objects.

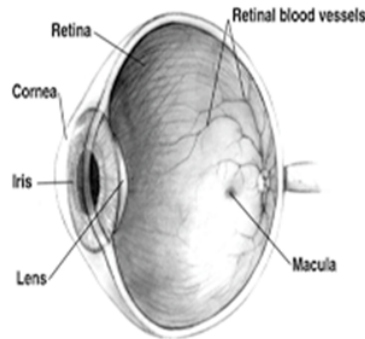


Fig 3: Structure of the eye

3.3 The Ear

The ear is the organ that detects sound. It not only receives sound, but also aids in balance and body position. The ear is part of the auditory system. Physically, the ear consists of three parts: the outer ear, the middle ear, and the inner ear. All three parts of the ear are important for detecting sound by working together to move sound from the outer part through the middle and into the inner part of the ear. The outer and middle ears mostly collect and transmit sound. The inner ear translates those sound waves for transmission to the brain.

The outer ear includes:

- Auricle (cartilage covered by skin placed on opposite sides of the head)
- Auditory canal (also called the ear canal)
- Eardrum outer layer (also called the tympanic membrane)

The outer ear is the part that is visible and is made of folds of skin and cartilage. It collects sound which travels through the auricle and the auditory canal; a short tube that ends at the eardrum.

The middle ear includes:

- Eardrum
- Cavity (also called the tympanic cavity)
- Ossicles (3 tiny bones that are attached)
 - Malleus (or hammer) – long handle attached to the eardrum
 - Incus (or anvil) – the bridge bone between the malleus and the stapes
 - Stapes (or stirrup) – the footplate; the smallest bone in the body

The inner ear includes:

- Oval window – connects the middle ear with the inner ear

- Semicircular ducts – filled with fluid; attached to cochlea and nerves; send information on balance and head position to the brain
- Cochlea – spiral-shaped organ of hearing; transforms sound into signals that get sent to the brain
- Auditory tube – drains fluid from the middle ear into the throat behind the nose.

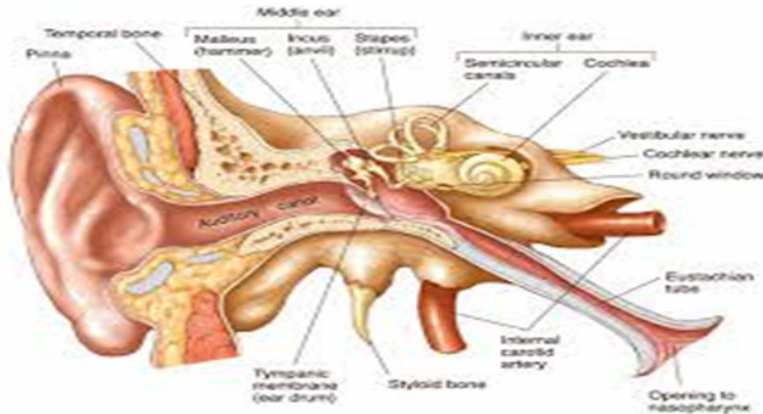


Fig 4: The ear

The Heart

The heart is the organ responsible for pumping and circulating blood to all parts of the human body. There are four chambers of the heart namely: the left and right atria; and the left and right ventricles divided into left and right compartments.

- The right atrium receives blood from the veins and pumps it to the right ventricle.
- The right ventricle receives blood from the right atrium and pumps it to the lungs, where it is loaded with oxygen.
- The left atrium receives oxygenated blood from the lungs and pumps it to the left ventricle through the arteries.
- The left ventricle (the strongest chamber) pumps oxygen-rich blood to the rest of the body. The left ventricle's vigorous contractions create our blood pressure.

Note: The atria receive blood returning from the body through the veins while the ventricles pump out blood through the arteries.

The Heart is made up of three layers:

1. Epicardium: the outermost covering of the heart wall, it is a thin layer of serous a membrane that helps to lubricate and protect the heart.
2. Myocardium: it is the middle layer of the heart; it makes up the majority of the thickness and mass of the heart wall and is the part of the heart responsible for pumping blood.

3. Endocardium: it is the inner layer of the heart and prevents blood from clotting or sticking to the inside of the heart.

Four valves regulate blood flow through your heart:

1. The tricuspid valve regulates blood flow between the right atrium and right ventricle.
2. The pulmonary valve controls blood flow from the right ventricle into the pulmonary arteries, which carry blood to your lungs to pick up oxygen.
3. The mitral valve lets oxygen-rich blood from your lungs pass from the left atrium into the left ventricle.
4. The aortic valve opens the way for oxygen-rich blood to pass from the left ventricle into the aorta, your body's largest artery.

The coronary arteries run along the surface of the heart and provide oxygen-rich blood to the heart muscle.

The cardiac cycle: the cardiac cycle is of two major phases, that is systolic, which is the period of active contraction and diastolic which is the period of relaxation and dilation. The cycle is considered to begin at diastole.

The Kidney

The kidney is a bean shaped organ for filtering blood, removing waste and controlling the balance of body fluid.

Functions of the kidney

1. It excretes waste: The kidney gets rid of unwanted substances within the body by filtering out toxins, excess salts and urea, which is a nitrogenic waste produced by cell metabolism.
2. It balances water level: The kidney helps to balance the level of water in the body by reacting in response to increase or decrease in water intake. The kidney helps to maintain the water in the body when there is a decrease in water intake instead of excreting it.
3. It regulates acid: As cell metabolism occurs acid is produced in the body and the food we eat either increase or neutralizes the acid in the body, to keep the body healthy the kidney ensures a proper balance of these chemicals.
4. It regulates the red blood cells: A hormone called **erythropoietin** that stimulates bone marrow to produce oxygen-carrying red blood cells is produced when the kidneys don't get enough oxygen.
5. It regulates blood pressure: one way the kidney regulates blood pressure is by producing a blood vessel-constricting protein (**angiotensin**). This signals the body to retain sodium and water. Both the constriction and retention help restore normal blood pressure.

The Blood

There are four components of blood in the body. They are:

Red blood cells or Erythrocytes: Red blood cells (RBCs), also known as erythrocytes, have two main functions:

- To pick up oxygen from the lungs and deliver it to tissues elsewhere
- To pick up carbon dioxide from other tissues and unload it in the lungs

An erythrocyte is a disc-shaped cell with a thick rim and a thin sunken center. The plasma membrane of a mature RBC has glycoproteins and glycolipids that determine a person's blood type. The cytoplasm of a RBC consists mainly of a 33% solution of hemoglobin (Hb), which gives RBCs their red color. Hemoglobin carries most of the oxygen and some of the carbon dioxide transported by the blood.

White blood cells or Leukocytes: have two main categories they are granulocytes and agranulocytes. The granulocytes have cytoplasm that contain organelles that appear as coloured granules through light microscopy, hence their name. Granulocytes consist of neutrophils, eosinophils and basophils. In contrast, agranulocytes do not contain granules. They consist of lymphocytes and monocytes.

1. Granulocytes

- **Neutrophils:** These contain very fine cytoplasmic granules that can be seen under a light microscope. Neutrophils are also called polymorphonuclear (PMN) because they have a variety of nuclear shapes. They release chemicals that destroy the growth of bacteria.
- **Eosinophils:** These have large granules and a prominent nucleus that is divided into two lobes. They function in the destruction of allergens and inflammatory chemicals, and release enzymes that disable parasites.
- **Basophils:** They have a pale nucleus that is usually hidden by granules. They secrete histamine which increases tissue blood flow via dilating the blood vessels, and also secrete heparin which is an anticoagulant that promotes mobility of other WBCs by preventing clotting.

2. Agranulocytes

- **Lymphocytes:** These are usually classified as small, medium or large. Medium and large lymphocytes are generally seen mainly in fibrous connective tissue and only occasionally in the circulation bloodstream. Lymphocytes function in destroying cancer cells, cells infected by viruses, and foreign invading cells. In addition, they present antigens to activate other cells of the immune system. They also coordinate the actions of other immune cells, secrete antibodies and serve in immune memory.

- **Monocytes:** They are the largest of the formed elements. Their cytoplasm tends to be abundant and relatively clear. They function in differentiating into macrophages, which are large phagocytic cells, and digest pathogens, dead neutrophils, and the debris of dead cells. Like lymphocytes, they also present antigens to activate other immune cells.

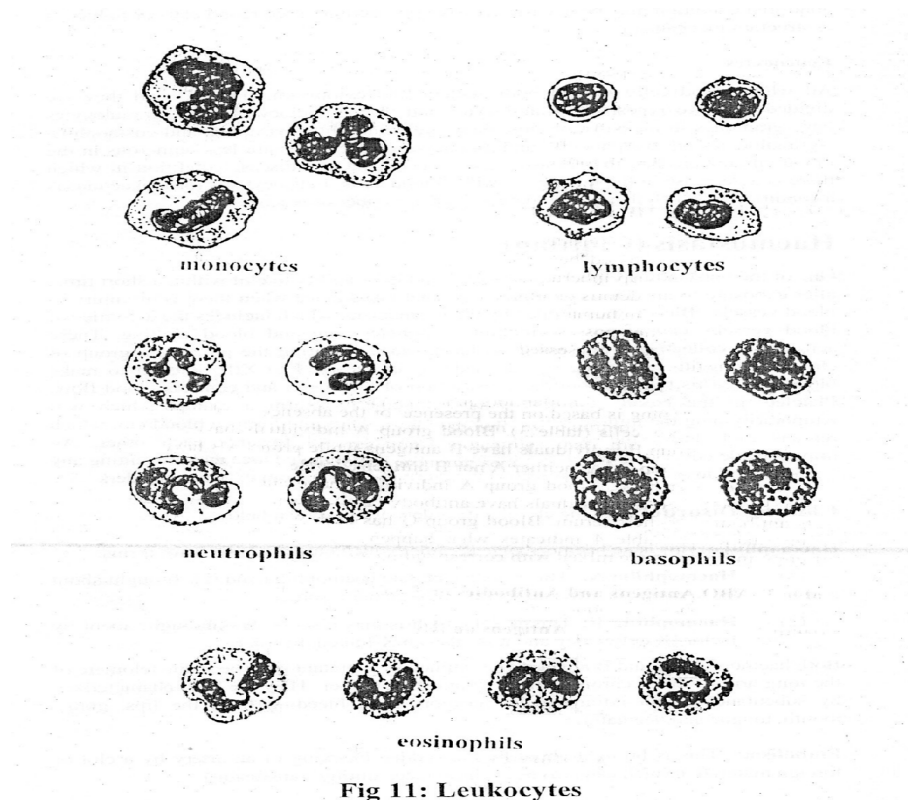


Fig 11: Leukocytes

Fig 4: White blood cells, (leukocytes)

3. Platelets: Platelets are small fragments of bone marrow cells and are therefore not really classified as cells themselves.

Platelets have the following functions:

- Secrete vasoconstrictors which constrict blood vessels, causing vascular spasms in broken blood vessels
- Form temporary platelet plugs to stop bleeding
- Secrete procoagulants (clotting factors) to promote blood clotting
- Dissolve blood clots when they are no longer needed
- Digest and destroy bacteria

- Secrete chemicals that attract neutrophils and monocytes to sites of inflammation
- Secrete growth factors to maintain the linings of blood vessels
- The first three functions listed above refer to important haemostatic mechanisms in which platelets play a role in during bleeding: vascular spasms, platelet plug formation and blood clotting (coagulation).

4. Plasma: Blood plasma is a mixture of proteins, enzymes, nutrients, wastes, hormones and gases.

Functions of blood: the three main functions of blood are Transportation, protection and Regulation.

Transportation: Blood transports the following substances:

- Oxygen and Carbon dioxide between the lungs and rest of the body
- Nutrients from the digestive tract and storage sites to the rest of the body
- Waste products to be detoxified or removed by the liver and kidneys
- Hormones from the glands in which they are produced to their target cells
- Heat to the skin so as to help regulate body temperature

Protection: Blood has several roles in inflammation:

- Leukocytes, or white blood cells, destroy invading microorganisms and cancer cells
- Antibodies and other proteins destroy pathogenic substances
- Platelet factors initiate blood clotting and help minimise blood loss

Regulation: Blood to regulate:

- pH by interacting with acids and bases
- Water balance by transferring water to and from tissues

ITQs

1. The average human brain weighs about _____
2. _____ are small fragments of bone marrow cells

3. _____ it is the largest portion of the brain
4. There are four chambers of the heart namely _____, _____, _____ and _____
5. Granulocytes consist of _____, _____ and _____

ITAs

1. 1.5kg
2. Platelets
3. Cerebrum
4. The left and right atria and the left and right
5. Neutrophils, eosinophils and basophils.

UNIT 4 SYSTEMS IN THE HUMAN BODY

Specific Objectives to discuss different systems in the human body and their functions.

4.1 Definition of systems

The human body is made up of several organs which work together as a unit to keep the body functioning.

Table 5: Major systems of the body and their functions

SYSTEMS	MAJOR SYSTEMS OF THE BODY	PRIMARY FUNCTIONS
Circulatory	Heart, blood vessels, blood	Transports nutrients and gases to cells and tissues throughout the body.
Digestive	Mouth, pharynx, esophagus, stomach, intestines, salivary glands, pancreas, liver, gallbladder	Breaks down food polymers into smaller molecules to provide energy for the body.
Endocrine	All glands secreting hormones: Pancreas, testes, ovaries, hypothalamus, kidneys, pituitary, thyroid, parathyroid, adrenal, intestinal, thymus, and pineal	Helps to maintain growth and homeostasis within the body.
Immune	White blood cells, lymph vessels and nodes, spleen, thymus, and other lymphatic tissues	Defense against foreign invaders; return of extracellular fluid to blood; formation of white blood cells

Integumentary	Skin, nails, hair, sweat gland	Protects the internal structures of the body from damage, prevents dehydration, stores fat and produces vitamins and hormones.
Muscular	Muscle	Enables movement of the body.
Nervous	. Brain, spinal cord, nerves	Monitors and coordinates internal organ function and responds to changes in the external environment
Skeletal	Cartilage, bone, ligaments, tendons, joints, skeletal muscle	Support, protection, and movement of the body
Reproductive	Male: Testes, penis, and associated ducts and glands Female: Ovaries, uterine tubes, uterus, vagina, mammary glands	Production of sperm; transfer of sperm to female Production of eggs; provision of a nutritive environment for the developing embryo and fetus
Respiratory	Nose, pharynx, lungs, trachea, bronchi, esophagus, stomach, intestines, salivary glands, pancreas, liver, gallbladder	Provides the body with oxygen via gas exchange between air from the outside environment and gases in the blood.
Urinary/Excretory	Kidneys, urethras, bladder, urethra	Removes wastes and maintains water balance in the body.

ITQs:

- Mention five systems in the body

ITAs

- Skeletal system, respiratory system, nervous system, Muscular system and reproductive system

TMA's

SAQs

1. Outline the levels of organization of a biological system and explain each level of organization
2. Identify the two types of organisms and explain them.
3. Describe the Nervous system
4. Identify and explain the two sub-divisions of the Nervous system
5. Identify and explain three functions of the Nervous system
6. Explain how the heart functions
7. Outline the functions of the kidney
8. What are the components found in blood
9. Describe the immune system
10. Describe the process of digestion
11. Explain the process of reproduction
12. Outline the functions of the endocrine system

MODULE 3FOOD, NUTRITION AND HEALTH

Introduction: This module will introduce us to the concept of nutrition from a holistic perspective. The principles needed to maintain optimal nutrition will be reported in a simple discussion style format. Basic nutrients will also be discussed in brief including their functions, and food sources. Three killer diseases with future implications will also be discussed with emphasis on causation and prevention.

General Objective for the Module: At the end the module student will be able to:

1. Appreciate the foundation of food and relevance to health;
2. Define the different food groups/nutrients, their functions and sources;
3. Familiarize self with lifestyle related diseases, their causes and prevention;
4. Know more about special areas in modern nutrition;
5. Practice good nutritional principles leading to good health.

UNIT – 1 FOUNDATIONS OF FOOD

Introduction

Health and long life are natural for humans or so it was supposed to be when man was created. God, the creator of man, made man and gave him food to eat that would ensure optimal health. The foods prepared for us by the master chef were intended for clean bodies and clear minds and to keep us free from disease. Good nutrition, which is the intake of adequate, well-balanced diet combined with physical activity, provides us with good health. *For I have given you every **herb bearing seed**, which is upon the face of all the earth, and every tree, in which is the **fruit of a tree yielding seed**, to you it **shall be for meat** (Genesis 1:29).* Poor nutrition can lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development, and reduced productivity. Many have strayed from this path and the consequences have been noticeable in our current diseased state. What was man's original food like?

How have we come about the changes we see today? Are all “foods” good for man’s consumption? This unit provides us with adequate answers.

Specific Objectives to:

- Discuss where food began
- Define foods
- Discuss the digestion of food

1.1 Where Food Began

Prior to man’s creation, God (Chief Gardener) planted food which He intended for man to enjoy and nourish man’s body. And God said “*Behold I have given you every herb (vegetable) bearing seed, which is upon the face of all the earth, and every tree in which is the fruit of a tree yielding seed, to you it shall be for meat.*” Genesis 1:11. The word “meat” stands for food also referred to as subsistence or sustenance. It was not until the 13th century that the word meat derived other meanings and was broadened to include “flesh food.”

Britannica defines food as a material consisting essentially of protein, carbohydrates and fat used in the body of an organism to sustain growth, repair and vital processes and to furnish energy.

After man sinned, the food bracket was then further broadened to include the plants of the field. Genesis 3:18. The roots, leaves and stalk were included. All these are vegetables, which help us draw a conclusion that man’s original food was largely “vegetarian.”

Let us now take a closer look at the composition of the original diet with few examples.

Behold I have given you every:

Herb- a plant without a strong woody stem or trunk which bears seeds-commonly known as grains such as wheat, oats, corn, rice, rye, barley, millet.

Seed – sunflower seeds, pumpkin seeds, sesame, flax and many more.

Legumes – soybeans, kidney beans, lentils, split peas, peanuts and so on.

Other seed containing foods- eggplant, bell pepper, cucumbers, tomatoes, okra etc

Tree with fruit bearing seed- mango, guava, apple, pears etc

Nuts- almonds, pecans, cashews, walnuts, macadamia nuts

Plants of the field given after sin- leafy, flower and root vegetables-lettuce, spinach, parsley

God provided a rich variety of healing foods.

1.1.1 Dietary characteristics of Prehistoric man

Total fat intake of 20% total calories

High ratio of unsaturated to saturated fatty acids

Fiber intake of about 45grams per day

High intake of vitamin C, calcium, potassium and other micronutrients

1.1.2 Introduction of Flesh Foods

After the flood nothing was left on the earth except the animals Noah took into the ark prior to the flood. God in His infinite mercy then permitted the eating of flesh foods since plant foods would take a while to come up after the destruction. (Ministry of Healing 24: 311).

Let's remember at this point that men living on God's original menu lived to be almost 1000 years. Methuselah lived to be 969 years old. (Genesis 5:27). Shortly after the introduction of flesh foods, the lifespan dropped to about a 100 years.

Flesh foods were introduced with caution and restrictions but flesh with the life thereof, which is the blood thereof shall ye not eat. (Genesis 9:4).

Although plant foods are the recommended food for man, for those who must eat flesh foods there are simple to follow rules which one must follow to preserve health.

Aquatic animals

Eliminate those not having fins and scales such as the blow fish, catfish, shellfish (crustaceans and mollusks based on the fact that they are carnivores which feed on decaying organic matter. They either feed primarily on dead and decaying animals (carrion eaters); choose to eat the sick or weak germ contaminate ones (Carnivores) or eat their young or other injured species of their own kind (Cannibals). They are grouped together with mollusks such as snails, oysters, clams and squids to name a few. They harbor the most germs, and accumulate the most contaminants and toxins, since they concentrate everything present in their food sources.

In spite of their diseased states, shellfish can be flavorful and used in many exotic dishes, nutritious-crustaceans contain very high quality protein similar to that of fish, rich in Vitamin B12 and iron-only liver of mammals exceeds oysters in Vitamin B12 and iron.

Do not be deceived by the few positive aspects of shellfish because on the other hand, these characteristics do not in any way compensate for the numerous risks associated with eating them, all of their nutrients are better provided by other more healthful foods. In fact, they need to be avoided if one chooses to be on a healthy diet.

Other drawbacks include:

They decay rapidly- this makes them more dangerous because they contain more bacteria promoted by the presence of free amino acids.

Difficult to digest- their flesh contains abundant connective tissue rich in collagen, which slows the action of digestive juices.

Cholesterol- Crustaceans contain around 150 mg/100g more than double that of beef.

Uric acid- they are rich providers of uric acid in the body. A high level of uric acid in the body is called *hyperuricemia*. This leads to gout- a type of arthritis and may lead to high blood pressure, kidney failure, acidosis and many other illnesses

Allergies- eating shellfish particularly shrimp and squid lead to allergies such as asthma and rhinitis

Contamination: they concentrate germs, toxins and industrial chemical pollutants such as mercury and others

Fowl

Eliminate all carnivores or those that feed on carrion such as eagles or crow.

Mammals

Those acceptable are the split-hoofed ones and that chew the cud such as cattle, sheep, goats and deer. Those that should be excluded are the swine (pigs) with split hoof but do not chew the cud; horse with only one toe and does not split the hoof; hare and rabbit without split hoof and do not chew the cud.

These ungulates (split hoof and chew cuds) have been chosen because they are herbivores. They being at the lower level of the food chain contain less toxic residues. The less carnivorous the animal, the less toxic and vice versa; plus they have a complex gastric system which allows for some disinfection of their food before being absorbed into the blood stream. This characteristic cannot be found in the monogastric animals such as the rabbit, horse and even humans.

Given all these, it is no surprise that many anthropologists and nutritionists agree today that the ideal for maintenance of good health is a plant based diet. Even the W.H.O. recognizes the significant difference between the meats of various animals. Modern evaluation of toxins in animal meat show that all clean animals are in the *safe non-toxic range*, while the unclean animals are in the *unsafe toxic range*.

1.2 Digestion of food

The digestive tract consists of mouth, esophagus, stomach, small intestine and large intestine

Small intestine is divided into 3 segments namely: duodenum, jejunum and ileum

The large intestine also known as the colon has 4 components: ascending, transverse, descending and sigmoid

Accessory Organs of digestion are: Salivary glands producing salivary amylase

Pancreas which produces pancreatic amylase, chymotrypsin, trypsin, and pancreatic lipases

Liver producing bile salts and

Gallbladder from which bile is produced

1.2.1 Process of Digestion

This can be divided into:

a) Mechanical digestion which involves masticating/chewing and mixing of food, taking place in the mouth and stomach. The food is then converted into a form which enzymes can act on.

Taste buds in the tongue allows for sweet, sour, salt and bitter taste, while the oesophagus serves to transport food from mouth to stomach by peristalsis,

b) Chemical digestion. For carbohydrate, this begins in the mouth, while the chemical digestion of all other nutrients begins in the stomach.

In the stomach, parietal cells produce hydrochloric acid (HCl), chief cells produce pepsin intrinsic factor and mucous.

Mechanical breakdown of food also occurs in the stomach, with the smooth muscle surrounding stomach contracting, mixing food, acid and enzymes into chyme. The content of the stomach then empties into the duodenum which contains a variety of enzymes, where alkaline secretions from pancreas are added to neutralize acid from stomach.

1.2.2. Enzymes in Digestion

Location: Enzymes are located in the mouth, stomach, pancreas, and small intestine.

The mouth and stomach make a few enzymes, while the pancreas and small intestine synthesize. The pancreas can adapt to enzyme production based upon need. These enzymes are responsible for speeding up digestion.

Hydrolysis is a chemical reaction in which a compound is broken down by the addition of water.

1.2.3. Gastrointestinal Hormones

These are part of the endocrine system to regulate the activities of the GI tract, and they include:

- i) Gastrin secretion which is triggered by the presence of food in the stomach, followed by the production of hydrochloric acid and enzymes to begin digestion.
- ii) Secretin, triggered by acid chyme and partially digested proteins, with the production of bicarbonate
- iii) Cholecystokinin (CCK), triggered by fat and proteins, with the secretion of pancreatic digestive enzymes
- iv) Gastric Inhibitory Peptide, triggered by fat and proteins in chyme, stimulate insulin secretion

1.2.4. Absorptive Cells

Cover surface of villi and participate in nutrient absorption. Lie side by side with goblet cells and endocrine cells. Newly formed absorptive cells constantly migrate from crypts to replace dying ones.

1.2.5. Types of Absorption

- Passive- nutrients enter absorptive cells without a carrier or energy expenditureEg: water, most fats, some minerals.
- Facilitated- uses a carrier molecule to shuttle nutrients into the absorptive cellsEg: simple sugar fructose
- Active- uses a carrier and requires energyEg: glucose, galactose, amino acids
- Endocytosis- a type of active absorption in which the absorptive cell forms an indentation in its membrane and particles (phagocytosis) or fluids (pinocytosis) are engulfed by the cell

1.2.6. Portal and Lymphatic Circulation in Absorption

Two different sets of vessels drain the villi in the intestine: portal and lymphatic

The nutrients follow one of these systems based on solubility in either water or organic solvents

- Water-soluble nutrients (proteins, carbohydrates, B vitamins, etc) are absorbed into the blood which ends up inside the villi from the heart.
- Blood then leaves the capillary beds and accumulates in a large portal vein, which leads directly to the liver where absorbed nutrients are processed before entering general circulation.
- Lymphatic vessels carry particles that are either fat soluble or too large to pass through the capillaries into the bloodstream.
- Substances pass through the vessels of the lymphatic system by muscular activity which drain into the thoracic duct which is connected to the blood stream by the left subclavian vein (near the neck).

Storage: Nutrients not used can be stored as Glycogen and Fat

ITQs

1. What is man food at creation?
2. List the process of digestion

ITAs

1. Herb bearing seeds and every tree in which is the fruit of a tree yielding seed (Genesis 1:29)
2. Mechanical and chemical

UNIT 2: FOOD GROUPS AND THEIR FUNCTIONS

Introduction

At the beginning of the 20th century only four food components were known: water, carbohydrates, fats and proteins. It was thought that food was complete with these. Little by

little during the first half of the 20th century, vitamins and minerals present in small amounts in foods began to be identified. The first discovery was Vitamin A in 1913 and the last Vitamin B12 in 1955. In the 1980s further chemical analysis uncovered phytochemicals in plant-based foods. This Unit will discuss the most up to date nutrients, their sources and functions.

Specific Objectives to

1. Define nutrients
2. Explain types of nutrients and their functions

2.1 Nutrients

Nutrients are organic and inorganic substances contained in food and needed by the body for maintenance, repair and growth. Nutrients can be divided into two broad groups.

- A. Macronutrient
- B. Micronutrient

What are macronutrients?

As the term “macro” in the word implies, these are the big nutrients. They are needed in large amounts and form the bulk of our food. They are proteins, carbohydrates and fats.

What are micronutrients?

Micro meaning “small” implies that these nutrients are needed in small amounts from a milligram to several grams. They are the vitamins and minerals.

2.2 Macronutrients

2.2.1 PROTEIN (Growth and Body-Building nutrients)

Proteins are complex organic nitrogenous compounds. They are basically composed of carbon, hydrogen, oxygen, nitrogen and sulphur in varying amounts. Their nitrogen composition differentiates them from carbohydrates and fats. Proteins are usually broken down into amino acids, otherwise known as the building blocks of protein. Proteins are the major builders and repairers of the cells, however they can serve as a source of energy, but only when the carbohydrate sources have been exhausted. There are 22 amino acid molecules but only 8 are essential and must be gotten from our food to maintain good health. Meats, fish, milk, cheese, eggs and legumes (beans, peas and lentils) are examples of food rich in protein.

2.2.2 CARBOHYDRATES (Energy-based nutrients)

Carbohydrates are made of compounds of carbon, hydrogen and oxygen called sugars or saccharides. They are the body's most efficient supplier of energy fuel. Carbohydrates are made by plants and stored in their leaves, roots, stems and fruits. Carbohydrates can be divided into two broad groups: Simple and complex carbohydrates.

Simple carbohydrates or monosaccharide are sugars such as glucose and corn syrup. Simple sugars enter the blood stream very quickly. They are found in fruits, vegetables and milk.

Complex carbohydrates are either starches or dietary fiber. They are processed and used more slowly. Starches are long chains of simple sugars. They supply the most needed energy

for active people. They come in the form of grain breads, tubers and legumes. Dietary fiber is of two types. Soluble fibers such as oats, beans and nuts help maintain an even blood sugar, while insoluble fibers such as whole wheat, bran, seeds, fruits and vegetables promote regularity and prevent constipation. The only animal source of food that contains significant amounts of carbohydrates is milk, however, this simple sugar, lactose cannot be digested by most adults and often results in indigestion. Examples of sources of carbohydrates are bread, honey, sweet fruits, rice, yam and cassava e.t.c

2.2.3FATS

Fats are cushions for the cells and store houses of energy. Fats are solid at 20°C and when liquid at this temperature are called oils. Fats can be classified as saturated and unsaturated. Fats aid the absorption of fat-soluble vitamins A,D,E & K. Saturated fats are mostly found in animal based foods and some oils such as palm oil, while unsaturated fats are found in plant based foods and some oils such as olive in the form of oleic acid. Fatty acids and glycerol are by products of fats. Twenty to thirty percent of an individual's daily intake should come from fat.

2.3 Micronutrients

2.3.1Vitamins

Vitamins are organic compounds, which though needed in small amounts, help regulate many body functions. They must be provided in the food we eat because the body cannot produce them. They are not a source of energy. There are six major vitamins, A, B, C, D, E and K. Each vitamin has several uses in the body.

Vitamins can be divided into two categories:

1. Fat-soluble vitamins (A, D, E and K): They are soluble in fats and fat solvents. They are insoluble in water. Therefore, they are only utilized if there is enough fat in the body.
2. Water-soluble vitamins (B vitamins and vitamin C). They are soluble in water and therefore, cannot be stored in the body.

A deficiency of any of the vitamins can lead to specific deficiency diseases. They are also known as co-enzymes because they work with enzymes to kick start all body processes.

Fig 6: Functions and Sources of Vitamin

Vitamins	Function	Food sources
Vitamin A	Night vision Healing epithelial cells Normal development of teeth and bones	Breastmilk, tomatoes, cabbage, lettuce, pumpkins Mangoes, papaya, carrots Liver, kidney, egg yolk, milk, butter, cheese cream
Vitamin D	Needed for absorption of calcium from small	Ultra violet light from the sun Eggs, butter, fish

	intestines Calcification of the skeleton	Fortified oils, fats and cereals
Vitamin K	For blood clotting	Green leafy vegetables Fruits, cereals, meat, dairy products
B complex	Metabolism of carbohydrates, proteins and fats	Milk, egg yolk, liver, kidney and heart Whole grain cereals, meat, whole bread, fish, bananas
Vitamin C	Prevention of scurvy Aiding wound healing Assisting absorption of iron	Fresh fruits (oranges, banana, mango, grapefruits, lemons, potatoes) and vegetables (cabbage, carrots, pepper, tomatoes) Breastmilk

2.3.2Minerals

Minerals are compounds in our food. They are also needed in small amounts and are vital for many body processes of growth, repair, and regulation of functions. They can be divided into two groups: Major minerals (calcium, phosphorous, sodium, potassium and magnesium; trace minerals (e.g, iron, iodine, fluorine, zinc, copper and manganese).

Table 7: Minerals, functions and the food sources

Minerals	Function	Food sources
Calcium	Gives bones and teeth rigidity and strength	Milk, cheese and dairy products Foods fortified with calcium, e.g. flour, cereal*s. eggs, fish cabbage
Iron	Formation of haemoglobin	Meat and meat products Eggs, bread, green leafy vegetables, pulses, fruits
Iodine	For normal metabolism of cells	Iodised salt, sea vegetables, yogurt, cow's milk, eggs, and

		cheese Fish; plants grown in iodine-rich soil
Zinc	For children to grow and develop normally; for wound healing	Maize, fish, breastmilk, meat, beans
Fluorine	Helps to keep teeth strong	Water

2.4Water

Water is a major nutrient needed by all living things. Water is found in every cell, tissue and organ. Water hydrates the body without adding calories. The body is made up of 50 to 55 percent water. Water is lost when we urinate or sweat or even exhale. Water that is lost needs to be replaced often. This can be done by drinking lots of water through the day or water food sources such as fruits with 85% to 95% water content such as tomatoes, water melon and some beverages. Caution needs to be taken with caffeinated and sweetened beverages because these make us lose water or add calories.

ITQs

- What are nutrients?
- Mention the types of nutrient?
- List the water soluble vitamin

ITAs

- Nutrients are organic and inorganic substances contained in food and needed by the body for maintenance, repair and growth.
- Macro and micro nutrient's
- A,D,E,K

TMA's:

Discuss food label in purchasing of food items.

UNIT 3 Diet and Chronic Disease

“Let food be thy medicine and medicine be thy food”; this was the thought and hope of one of the early fathers of medicine, Hippocrates, the Greek physician. It was as if Hippocrates had the “mind of God” when thinking of what food should mean to humans. Some young men in AD...knew better and chose health rather than disease causing “rich foods” and were rewarded with good health (Daniel 1: 5-21).Today, due to our indulgences or idiosyncrasies about foods, the human body has become a host for disease propagation. Chronic diseases by virtue of their risk behaviors have transcended borders at an alarming rate. This changing trend has not occurred as a result of chance, but as a result of change in lifestyle behaviors such as diet, physical activity, tobacco use and alcohol intake. Chronic diseases or non-communicable diseases, which were once considered western diseases, have begun to impact the world, especially developing or poorer countries and poor populations within countries.

These diseases have been projected to account for almost three-quarters of all deaths worldwide by 2020.

In this unit certain contemporary diseases most of which we hear about in the news, read in the papers or some publications, in relation to dietary intake will be discussed.

Specific Objectives

3.1 DIABETES

Diabetes is a chronic condition that is known to affect an estimated 347 million people worldwide. More than 80% of deaths from diabetes occur in low and middle-income countries.

Diabetes occurs when the pancreas does not produce sufficient insulin or when the insulin produced cannot be used effectively by the body. Basically the body's normal metabolism is disturbed.

First, let's take a look at what happens during normal metabolism.

The process of normal metabolism

- We eat food
- Food is digested and the carbohydrate part is broken down into simple sugars-glucose
- Glucose (blood sugar) enters the blood, and insulin is produced by the pancreas to manage its transport and distribution round the body
- Insulin opens doors for glucose into different cells for different purposes. Some for short term energy and others for long term energy.

The process of abnormal metabolism- diabetes

As diabetes develops this normal metabolism is disturbed and basically collapses giving rise to elevated blood sugar. There are two types of diabetes- Type 1 diabetes and type 2 diabetes.

3.1.2 Type 1 diabetes

Type 1 diabetes or insulin-dependent diabetes mellitus (IDDM), juvenile or childhood-onset diabetes occurs when the insulin producing cells of the pancreas are destroyed and can no longer produce insulin. Insulin then has to be administered daily. Symptoms include excessive excretion of urine (polyuria), thirst (polydipsia), constant hunger, weight loss, vision changes and fatigue. Recently this type of diabetes has been linked to diet in early childhood.*

Type 2 diabetes

Type 2 diabetes or non-insulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes occurs when the insulin produced becomes ineffective in carrying out its distribution duty, which is referred to as insulin resistance. This type of diabetes majorly occurs as a result of excess body weight and physical inactivity. Symptoms may be similar to those of Type 1 diabetes, but are often less marked. As a result, the disease may be diagnosed several years after onset, once complications have already arisen. Due to the rising prevalence of obesity in children, type 2, which was formally unknown in children, is beginning to surface.

3.1.3 Symptoms of Diabetes.

Figure 5 Illustrates the symptoms of diabetes.

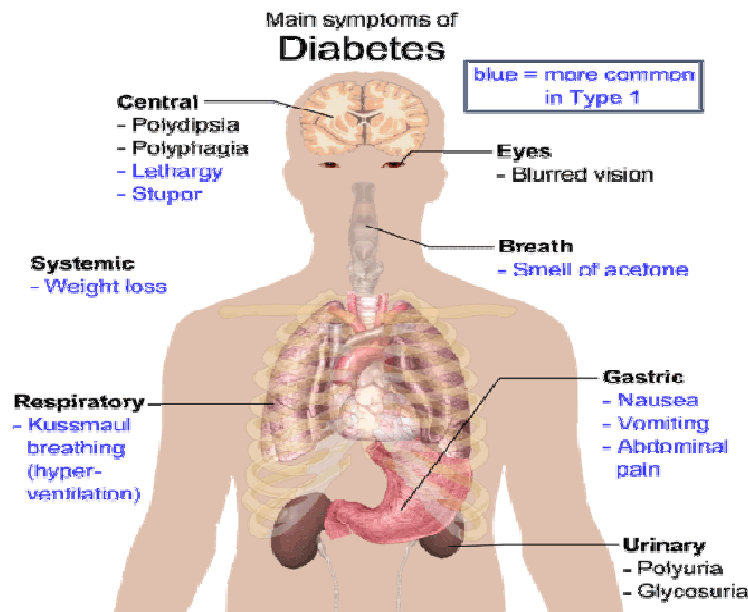


Fig 5: Illustrates the symptoms of diabetes.

3.1.4 Risk factors for Diabetes

- Unhealthy diet
- Genetic predisposition
- Age
- Sedentary lifestyle
- Blood lipid profile (low HDL)
- High blood pressure
- Other lifestyle factors

3.1.5 Complications of Diabetes

Heart Disease

- 50% of people with diabetes die of cardiovascular disease (primarily heart disease and stroke).

Amputation

- Combined with reduced blood flow, neuropathy (nerve damage) in the feet increases the chance of foot ulcers, infection and eventual need for limb amputation.

Blindness

- Occurs as a result of long-term accumulated damage to the small blood vessels in the retina. One percent of global blindness can be attributed to diabetes

Kidney Disease

- Diabetes is among the leading causes of kidney failure

Death

- The overall risk of dying among people with diabetes is at least double the risk of their peers without diabetes

Pregnancy complications

- High blood sugar levels can be harmful to babies during the first few weeks of pregnancy when vital organs- brain, heart, kidneys and lungs develop

Increased susceptibility to other illnesses**3.1.6 Dietary influences on Diabetes**

Historical and scientific evidence provide links between diet and diabetes

- ✓ Individuals who were placed on an unrestricted low-fat, vegan diet, receiving 75% of their energy from carbohydrates, 10% from fat, 15% from protein and avoided all animal products (meat, dairy, fish, eggs), added oils, fried products, avocados, nuts and seeds, and favored low-glycemic index foods, such as beans and green vegetables showed better control of glycemia and plasma lipid than their counterparts placed on a conventional diabetes diet.
- ✓ As carbohydrate intake goes up and fat intake goes down, the number of deaths from diabetes plummets from 20.4 to 2.9 per 100,000 people.

3.2 HEART DISEASE

The heart is the centerpiece of life and also death. Any slight malfunction of the heart will lead to deadly injuries to the body and if not managed may lead to death.

Cardiovascular Diseases (CVDs) are the number one cause of death globally. More people die annually from CVDs than from any other cause. The number of people, who die from CVDs, mainly from heart disease and stroke, will increase to reach 23.3 million by 2030. Heart attacks and strokes are usually acute events and are mainly caused by a blockage that prevents blood from flowing to the heart or brain. The most common reason for this is a build-up of fatty deposits on the inner walls of the blood vessels that supply the heart or brain. Strokes can also be caused by bleeding from a blood vessel in the brain or from blood clots. The most important behavioral risk factors of heart disease and stroke are unhealthy diet, physical inactivity, tobacco use and harmful use of alcohol. These factors are also responsible for about 80% of coronary heart disease and cerebrovascular disease.

3.2.1 The development of heart disease

One major component is plaque (fatty deposits) a greasy layer of proteins, fats and cholesterol, immune system cells that accumulate in the coronary arteries.

Plaque accumulates over a period of time and overloads the heart and severe blood restriction occur which causes chest pain (angina) and shortness of breath. A hard shell or scar covers the plaque and these plaques have various sizes and shapes. Some plaques are unstable and can rupture or burst. When this happens, a blood clot will form inside the artery. If the blood clot totally blocks the artery, it stops blood flow completely. This is what happens in most heart attacks and strokes.

Too much cholesterol in the blood, damage to the artery wall, and inflammation appear to play important roles in **plaque buildup**.

This build up of plaque is what is known as atherosclerosis, which eventually leads to coronary artery disease. Atherosclerosis is the main cause not only of coronary artery disease but of the whole group of diseases called cardiovascular diseases. Clogged arteries in the brain can result in stroke.

Less than 50% of the plaque accumulation leads to heart attack. Each buildup has layer of cells called caps. These caps separate the core of the plaque from the blood flowing. In some plaques the cap is weak and thin. Consequently, the cap gets eroded and ruptured with time. This leads to a mix of blood and plaque. The blood clot begins to accumulate around the rupture until it blocks the artery. Blood flow downstream of the rupture is severely reduced and the heart muscles don't get enough oxygen. Heart muscle cells begin to die, heart pumping mechanisms begin to fail and severe pain is felt in the chest, arm or neck and jaw. This may then lead to a heart attack and eventually death.

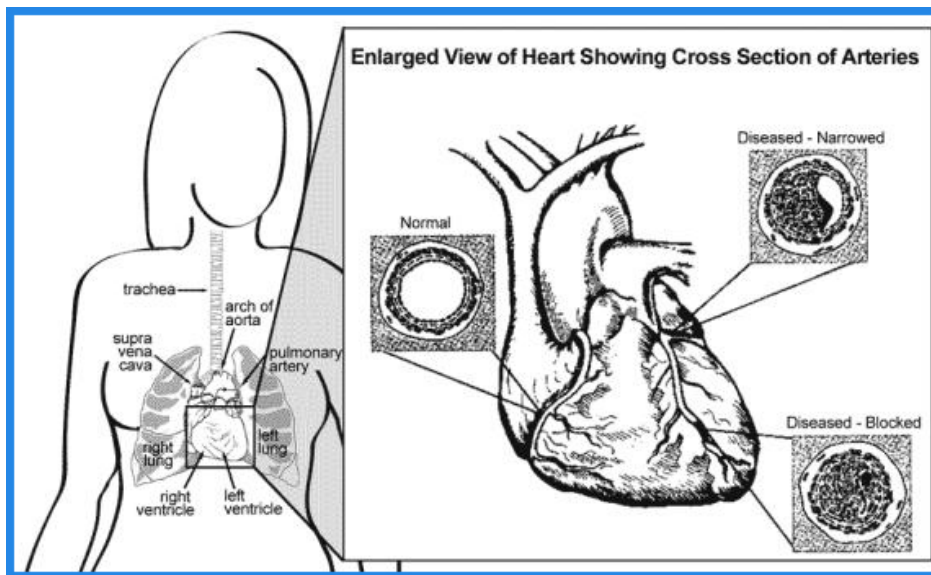


Fig. 6: Heart Disease

3.2.2 Risk factors for heart disease

1. High blood pressure
2. Diabetes
3. Smoking
4. Being overweight
5. Being physically inactive
6. Family history
7. Age

3.2.3 Dietary Influences on Heart Disease

A key finding from the Framingham study- a Premier heart study, on cholesterol showed a strong correlation between high blood cholesterol and heart disease. Men with cholesterol levels over 244mg/dL had more than three times the incidence of coronary heart disease as do those with cholesterol levels less than 210mg/dL.

This study helped to dispel the previous thought of most medical personnel that heart disease was not curable and one had to live with it as they aged till eventual death. They now believed that a lowering of the risk factors such as blood cholesterol and blood pressure lowered the risk of heart disease.

Further studies proved the correlation of animal based food and heart disease death. In a study of men aged fifty-five to fifty-nine years across twenty different countries, it was found that the more animal protein eaten, the higher the death rate.

Excess fat and cholesterol consumption caused atherosclerosis (hardening of the arteries and the accumulation of plaque) in experimental animals. Eating cholesterol in food caused a rise in cholesterol in the blood. High blood cholesterol might predict and/or cause heart disease.

3.3 CANCER

Cancer is one of the leading causes of death worldwide. It accounted for 8.2 million deaths in 2012. The leading cancers are lung, liver, stomach, colorectal and breast cancers. About 30% of cancer deaths are due to the five leading behavioral and dietary risks: high body mass index, low fruit and vegetable intake, lack of physical activity, tobacco use and alcohol use.

Cancer is a term used for diseases in which abnormal cells divide without control and are able to invade other tissues. Cancer cells can spread to other parts of the body through the blood and lymph systems. There are over 100 cancer types. They are named based on the part of the body they originate from.

3.3.1 Major types of Cancers

- **Carcinoma** - cancer that begins in the skin or in tissues that line or cover internal organs. There are a number of subtypes of carcinoma, including adenocarcinoma, basal cell carcinoma, squamous cell carcinoma, and transitional cell carcinoma.
- **Sarcoma** - cancer that begins in bone, cartilage, fat, muscle, blood vessels, or other connective or supportive tissue.
- **Leukemia** - cancer that starts in blood-forming tissue such as the bone marrow and causes large numbers of abnormal blood cells to be produced and enter the blood.
- **Lymphoma and myeloma** - cancers that begin in the cells of the immune system.
- **Central nervous system cancers** - cancers that begin in the tissues of the brain and spinal cord.

3.3.2 What happens in normal cell growth and development?

The human body is made up of millions of tiny living cells. The body tissues grow by increasing the number of cells. One cell divides into 2, two into 4 and so on. Cell division occurs more rapidly in infant and children and slows when adulthood is reached. Cells at this stage only replace worn out cells such as from illness or injury. Some of these cells specialize for specific functions such as the sperm cells, hair cells and so on. When more cells are needed, cells double up for up to 50 or 60 times. The cells then die. Normal cells possess the following characteristics.

1. Reproduce themselves exactly
2. Stop reproducing at the right time
3. Stick together in the right place
4. Self-destruct if they are damaged
5. Become specialized or 'mature'

3.3.3 What happens to cancerous cells?

Cells grow out of control. They continue to reproduce after the 50 or 60 time mark. They grow abnormal cells and can even invade other cells. This is called metastasis. Cells become cancer cells because of DNA (deoxyribonucleic acid) damage. DNA is in every cell and it directs all its actions. In a normal cell, when DNA is damaged the cell either repairs the damage or dies. In cancer cells, the damaged DNA is not repaired, but the cell doesn't die like it should. Instead, the cell goes on making new cells that the body doesn't need. These new cells all have the same damaged DNA as the first abnormal cell does. Cancer cells possess these characteristics.

1. Cancer cells do not stop reproducing
2. Cancer cells do not obey signals from other cells
3. Cancer cells do not stick together
4. Cancer cells do not specialize, but stay immature

Table 8: Differentiation of normal cells from cancer cells

	Normal Cell	Cancer Cell
Structure	Have DNA in their genes and chromosomes that function normally.	Develop an aberrant DNA or gene structure or acquire abnormal numbers of chromosomes.
	Divide in an orderly way to produce more cells only when the body needs them.	Continue to be created without control or order. Excess cells form a mass of tissue called a tumor.
Energy	Derive most of their energy using oxygen.	Derive most of their energy in the absence of oxygen.
Blood vessels	Have a built-in blood vessel system.	Lack a built-in blood vessel system. They require more of certain amino acids to grow.
Growth factors	Operate at a normal metabolic level and reproduce themselves at a regulated pace.	Are overactive and overproduce themselves, thus requiring more nutrients
Functions	Have enzymes and hormones that behave in a balanced manner	Have either overactive or underactive enzymes and hormones
Tumor types	Benign: Are not cancerous. Do not invade nearby tissues or spread to other parts of the body. Can be removed and are not a threat to life.	Malignant: Are cancerous. Can invade and damage nearby tissues and organs and can break away and enter the bloodstream to form new tumors in other parts of the body, a process called metastasis.

3.3.4 Risk factors for Cancer

- tobacco use
- being overweight or obese
- unhealthy diet with low fruit and vegetable intake
- lack of physical activity
- alcohol use
- sexually transmitted HPV-infection
- urban air pollution
- indoor smoke from household use of solid fuels.

3.4 Animal based diets versus Plant based Diets

3.4.1 Plant-based diet

A plant based diet is defined as a dietary pattern that primarily uses nutrient-dense plant foods while minimizing the consumption of processed foods, oils, and animal foods (including dairy products and eggs). It encourages lots of vegetables (cooked or raw), fruits, beans, peas, lentils, soybeans, seeds, and nuts (in smaller amounts) and is generally low in fat.

A plant-based diet is sometimes referred to as vegetarian or vegan. However these do not necessarily mean the same. A vegetarian or vegan adopted diet may or may not be healthy. Hence, the need to define these terms including a “plant-based” diet helps restrict the use of animal products in different ways.

Vegan (or total vegetarian):

This excludes all animal products, especially meat, sea food, poultry, eggs, and dairy products. It does not require consumption of whole foods or restrict fat or refined sugar.

Raw food, vegan: Have same exclusions as veganism as well as the exclusion of all foods cooked at temperatures greater than 118°F.

Vegetarian

Lacto-vegetarian: Excludes eggs, meat, seafood, and poultry and includes milk products.

Ovo-vegetarian: Excludes meat, seafood, poultry, and dairy products and includes eggs.

Several compounding evidence have confirmed the benefits of a meat restricted diet in different groups of people. Notable weight loss and or weight related measures such as BMI and obesity showed better results in vegetarians, than their meat eating and meat eating vegetarian counterparts. Other results found lower rates of heart disease, high blood pressure and diabetes. A study suggested vegetarian diet for weight management. Vegetarians were found to be slimmer than their meat eating counterparts. They also found that vegetarians consumed more magnesium, potassium, iron, thiamin, riboflavin, folate, vitamins and lower fat.

In spite of the myriad of health benefits attributed to plant based diets, concerns still abound about the possibility of deficiencies arising from such a dietary regimen. However it has also been confirmed that those on a plant based diet hardly lack essential nutrients. Some of these concerns include:

Protein deficiency

Those on a plant based diet are not at risk of protein deficiency. Essential amino acids, which are the building blocks of protein, can only be obtained in the food we eat such as meat, dairy, eggs and even many plant foods. To obtain adequate amounts, a good combination of plant based foods eaten. Therefore a well-balanced plant based food will provide these essential amino acids, hence protein.

Iron bioavailability

This is lower in plant based foods than in animal based foods. Iron can be found in foods such as oat, cabbage, kidney beans, tomato juice. In spite of their lower bioavailability, hardly any cases of iron -deficiency anemia is found in plant-based eaters.

Vitamin B₁₂ deficiency

This may arise in those following a plant based diet. Those on this diet are advised to supplement with B₁₂ or take foods fortified with this vitamin, for example fortified soymilk.

Vitamin D deficiency

This can be found in both groups-plant based and animal based eaters. Consumption of fortified soymilk and cereals usually meet the requirements. Supplementation is recommended for those at risk of low bone density.

Fatty acid deficiency

Essential fatty acids are fatty acids humans must ingest since our bodies cannot synthesize them. Deficiency manifests as skin, hair and nail abnormalities. Vegans, who generally are more likely to be deficient in omega-3 fatty acids, are advised to consume foods such as ground flax seeds, walnuts and canola oil.

A well balanced, planned and coordinated plant-based diet, considering its limitations above still confers benefits to its adherents.

3.4.2 Animal based diet

An animal based diet is the opposite. This primarily consists of meat, fish, sea foods, dairy and dairy products and eggs and does not restrict processed foods. It may also include vegetables, fruits and nuts occasionally. Animal products usually contain saturated fats, cholesterol, trans fats, arachidonic acids in chicken and eggs and hormones. Animal products though considered most times as complete proteins and high on other nutrients such as iron, still contain high levels of saturated fats and deadly bacteria.

Several studies also have correlated increasing blood cholesterol with animal-based food protein. Even saturated fats and dietary cholesterol were also found to raise blood cholesterol unlike plant based foods.

Animal based foods have also been found to increase the risk of diseases such as cancer, gallstones, diabetes and obesity. Epidemiologic evidence indicates that high consumption of red meat and processed meats increases the risk of colorectal cancer.

Red meat and processed meats contain more saturated fat and Trans fat than other animal products, which therefore makes them poorer food choices. Red meat also has high haem/heme content. Haem is an iron-carrying protein, and it has been shown to have destructive effects on the cells lining our digestive tract.

Red meats are not the only culprits in disease causation. Excess consumption of eggs and poultry with skin has been shown to increase the risk of recurrence of prostate cancer after initial diagnosis.

Cow's milk is the perfect food for the rapidly growing calf, but foods that promote rapid growth promote cancer. Consuming dairy protein on a regular basis elevates blood levels of insulin-like growth factor (IGF-1). IGF-1 is known to stimulate the growth of both normal and cancer cells, and there is a strong and consistent association between serum IGF-1 concentrations and prostate cancer risk.

To achieve optimal health, we require a significant exposure to a full symphony of antioxidants and phytochemicals in unprocessed plant matter. Minimizing or removing animal products from the diet leaves more calories that can be derived from plant foods. Also, since animal products contain no fiber, they remain in the digestive tract longer than plant foods, slowing digestive transit time and allowing heightened exposure to toxic compounds.

ITQs

List the risk factor for cancer

ITAs

- tobacco use
- being overweight or obese
- unhealthy diet with low fruit and vegetable intake
- lack of physical activity
- alcohol use
- sexually transmitted HPV-infection
- urban air pollution
- in door smoke from household use of solid fuels

Unit 4 BODY pH AND HEALTH

Introduction

Man is primarily made up of the elements of the air and the soil. For those in doubt, let's look at the evidence from over 2000 years ago, when God created man on the sixth day....*"And the LORD God formed man of the **Dust of the Ground**, and **breathed into his nostrils the breath of life** : and man became a living soul."* (Genesis 2:7). The elements of the air; oxygen, nitrogen, carbon, hydrogen and elements of the ground; calcium, potassium, magnesium, silver, gold, etc which God used in building man are still the same elements essential for maintaining a balanced state of the body today. Simply put, sickness and disease are responses of our body to exposure of what we eat, drink, breathe in that deprive us of these elements. The need to regulate the internal system to avoid disease has become expedient. This unit teaches about how a disturbed body pH can lead to disease and how the body can be restored back to health by maintaining an acid-alkaline balance.

Specific Objectives to:

1. Define pH
2. List the functions of pH in organs, fluids and membranes of the body
3. State the importance of pH
4. Discuss how acid-alkaline imbalance affects health
5. Enumerate risk factors for an acidic body
6. State ill-health conditions associated with an acid-alkaline imbalance
7. List acid-forming and alkaline forming foods
8. Discuss how to measure the acidity and alkalinity of a substance

4.1 What is pH?

pH means potential for hydrogen (Sorensen, 1909). It is used to indicate the concentration of hydrogen ions in a fluid or solution. It is measured on a scale of 0 – 14. The greater the hydrogen (H) ions, i.e. lower reading on scale the greater the acidity of a substance; also the lower the hydrogen ions, i.e. higher reading on scale, the greater its alkalinity. An acid substance gives off H ions, while an alkali accepts hydrogen ions.

4.2 Functions of pH in organs, fluids and membranes of the body

Table 9: Functions of pH in organs

Organ, fluid, membrane	pH	Function of pH
Skin	4 - 6.5	Barrier protection from microbes
Urine	4.6 - 8	Limit overgrowth of microbes
Gastric	1.35 – 3.5	Break down protein

Bile	7.6 – 8.8	Neutralize stomach acid, aid in digestion
Pancreatic fluid	8.8	Neutralize stomach acid aid in digestion
Vaginal fluid	< 4.7	Limit overgrowth of opportunistic microbes
Cerebrospinal fluid	7.3	Bathes the exterior of the brain
Intracellular fluid	6.0 – 7.2	Due to acid production in cells
Serum venous, Serum arterial	7.35 & 7.4	Tightly regulated

4.3 Importance of pH

Life on earth depends on appropriate levels of pH in and around living organisms and cells. The ocean's pH dropping from 8.2 to 8.1 has led to a loss of ocean life. For maximum usage of minerals the soil needs to maintain a pH of between 6 and 7. An acidic soil less than 6 leads to reduced calcium and magnesium, and soil pH above 7 may result in chemically unavailable iron, manganese, copper and zinc- and ultimately a mineral deficiency in food grown. The agricultural revolution has brought about a loss of food quality. There has been a decrease in potassium and magnesium and an increase in sodium, saturated fats, simple sugars and chloride. This results in metabolic acidosis which increases with age, leading to many degenerative diseases.

4.4 How acid-alkaline imbalance affects health

Majority of the body's processes begin at the cellular level. For the cell to function properly it requires a proper balance of nutrients and oxygen from the blood stream and remove wastes. These exchanges of substances require a slightly alkaline environment to run optimally. Since a slightly alkaline state is required, if the body becomes acidic, these processes become impaired. The body is forced to borrow minerals—including calcium, sodium, potassium and magnesium—from vital organs and bones to buffer (neutralize) the acid and safely removes it from the body. If this goes on unchecked for a long time it sets the body in motion for disease. Blood pH is slightly alkaline at 7.4. Any value below or above this spells disease.

4.5 Risk Factors for an acidic body

The following factors or nutritional habits can create an acidic internal environment (blood) which ultimately decreases the body's ability to absorb minerals and other nutrients, decreases the energy production in the cells, decreases its ability to repair damaged cells, decrease its ability to detoxify heavy metals, makes tumor cells thrive, and make it more susceptible to fatigue and illness. They include:

- ◇ High protein diet in the form of meats, dairy and eggs
- ◇ Low vegetable and fruit diet
- ◇ Use of acid-forming drugs
- ◇ Eating processed food and certain beverages like coffee and cola

- ◇ Use of artificial sweeteners in the form of NutraSweet, Splenda or equal(aspartame)
- ◇ Lack of exercise and fresh air

4.6 Ill health conditions associated with an acid-alkaline imbalance

- Cardiovascular damage, including the constriction of blood vessels and the reduction of oxygen.
- Weight gain, obesity and diabetes.
- Bladder and kidney conditions, including kidney stones.
- Immune deficiency.
- Acceleration of free radical damage, possibly contributing to cancerous mutations.
- Hormone concerns.
- Premature aging.
- Osteoporosis; weak, brittle bones, hip fractures and bone spurs.
- Joint pain, aching muscles and lactic acid buildup.
- Low energy and chronic fatigue.
- Slow digestion and elimination.
- Yeast/fungal overgrowth
- Inability to adequately assimilate minerals and nutrients

4.7 Acid-forming and alkaline forming foods

Foods are either acid or alkaline in nature. However, they may have opposing effects on the body when ingested, digested and assimilated. This table outlines these acid and alkaline foods according to their acid or alkaline forming ability.

Table 10:Acid-forming and alkaline forming foods

Alkaline fruits	Alkaline nuts	Acidic vegetables	Alkaline cereal grains	Acid flesh foods	Alkaline vegetables
Apples, avocados, apricots, bananas, berries, citrus, dates, guavas, lemons, lime, mangoes, melon, oranges, paw-paw, pears, pineapple, apricot, cantaloupe	Almonds, fresh coconut	Artichokes, dried beans, lentils, chickpeas	Corn (1 st 24 hours), millet, soy	All meat, shellfish	Cabbage, onions, beans, beets, broccoli, carrots, celery, cauliflower, cucumber, eggplant, garlic, lettuce, mushrooms, okra, peppers, potatoes, sorrel, spinach
Alkaline dairy	Acid nuts	Other alkaline products	Acid cereal grains	Other acid products	Neutral products
Acidophilus	Roasted	Honey,	Flour	All alcoholic	Refined sugar,

culture, yoghurt, whey, kefir	nuts, peanuts	alfalfa sprouts, ginger, blackstrap molasses, raisins	products, corn flakes, cakes, breads, doughnuts, noodles, oatmeal, white rice, pies/pastries	beverages, coffee, soda, drugs and aspirin jams, flavorings, mayonnaise, preservatives, vinegar,	oils
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**this table gives only a snap shot of foods. Other foods exist that fall into the various categories*

4.8 How to measure the acidity and alkalinity of a substance

The concentration of H ions is written as a power of 10, for instance 10^{-7} . To indicate the substance's pH value, the base 10 is removed and the minus sign above it. The number that is left indicates the pH value on the pH scale. A value of 7 is neutral, a pH below 7 is acidic and a pH above 7 is alkaline. The measurement of body pH can be done by testing the saliva or urine using color-calibrated pH test strips. The steps to be taken are;

- Tear off a strip of pH paper
- Place the paper in direct contact with urine at mid-stream or pour in a cup or collect a saliva sample in a spoon or cup and dip the strip.
- Immediately compare color on strip with colour-coded chart provided
- Repeat 3 times daily for 30 days

Simple Recipe for acid-alkaline balance: Eat acid and alkaline foods in the ratio **40%:60%** to maintain health and to restore health eat acid and alkaline foods in the ratio **20%:80%**

4.8.1 Nutrition Guide

Eat a variety of vegetable and fruits every day. These provide us with a wide spectrum of antioxidants which protect the body cells from free radicals

Diets low in total and saturated fat, high in plant foods, especially green and yellow vegetables and citrus fruits, low in alcohol and salt pickled, smoked and salt preserved foods have been shown to lower the risk of the major cancers in the world.

ITQs

ITAs

TMA:

Summarize Fruits, Cereals, and Vegetables; Counsels on Diet and Food pp309-335 (500 words).

List Acid-forming and alkaline forming foods

Module 4 Ecology of human disease

Introduction

In this module, principles of disease causation, theories of disease, infectious disease and chronic disease are discussed. Also, the environment and its components, issues on environmental sanitation, pollution and personal hygiene are discussed.

Specific objective at the end of the module students will be able to:

1. Describe the principles of disease causation
2. Explain the theories of disease
3. Differentiate between chronic and infectious disease
4. State the components of the environment
5. Explain the effect of pollution
6. Discuss environmental and personal hygiene

Unit 1 Principles of disease causation

Specific objective to:

- Define disease
- Explain the different theories of disease causation
- Define infectious disease with examples
- Define chronic diseases with examples

What is a disease? It is a disorder in the structure or function of an organism resulting from various causes such as an infection, environmental factor, inflammation or genetic defect. It is a condition where the body or mind is prevented from functioning normally and it is characterized by signs and symptoms that are identifiable.

What is epidemiology? Epidemiology is the study of how health-related states (including diseases) or events in specified populations occur; the causes, the frequency, pattern with which they occur, risk factors and the control of such events. It is also the application of study to the control of health problems.

What is clinical epidemiology? Clinical epidemiology extends the principles of epidemiology to clinical practice. It incorporates the location, evaluation and application of the best evidence to patient care by clinicians as well as the generation of high quality research evidence by clinical researchers.

1.1 Theories of disease causation

- **Germ theory:** this theory states that many diseases are caused by the presence and actions of specific micro-organisms within the body. There is one single specific cause of every disease. This refers to one to one relationship between the causative agent and disease, it explains the origin of infectious-communicable diseases.
- **Theory of epidemiological triangle:** this theory illustrates the relationships among an agent, a host and the environment. This theory explains that everyone exposed to

disease agent did not contract the disease. This means it is not only the causative agent that is responsible for disease but there are another factors also, related to man and environment which contribute to disease.

- **Multifactorial causation theory:** this theory explains that diseases are not caused by a single factor but multiple factors. This theory therefore exists because the epidemiological theory is not applicable to non-infectious diseases like coronary artery diseases, mental illness, lung cancer etc. This theory helps to understand the various associated causative factors, which suggests preventive and plan measures to control the disease. Many of these diseases are caused are caused by life style factors and human behavior and can be called diseases of affluence. The epidemiology is a multifactorial causation. Multifactorial causation offers multiple approaches for the prevention or control of disease.
- **Web of causation:** considers all the predisposing factors and their interrelationship with each other. It is more suited to chronic diseases where agent is not known. This model considers that fact that a diseases may be caused as a result of a chain of preceding predisposing factors. It explains that diseases cannot be controlled except all the multiple factor which caused the disease are removed or controlled
- **Devers epidemiological model/ socio-environmental model:** this theory is much concerned about the disease itself, rather it identifies the main factors that make and keep people healthy. This model identifies four factors: human biology, lifestyle, environment and health system. All these factors influence health status positively or negatively.
 - Human biology include genetic inheritance, complex physiological systems, factors related to maturation and ageing.
 - Life style factors include daily living activities, customs, traditions, health habits etc.
 - Environmental factors include physical, biological, social and spiritual components.
 - Health care system factors include availability, accessibility, adequacy and use of health care services at all levels

1.2 Infectious Diseases

What are infectious diseases? Infectious diseases are disorders caused by micro- organisms — such as bacteria, viruses, fungi or parasites. Many organisms live in and on our bodies. They're normally harmless or even helpful, but under certain conditions, some organisms may cause disease. Some infectious diseases can be passed from person to person.

Common infectious diseases

- Cholera
- Hepatitis A
- Hepatitis B
- Hepatitis C

- HIV/AIDS
- Influenza
- Malaria
- Pneumonia
- Tuberculosis
- Typhoid

1.2.1 How to prevent infectious diseases

- Regular hand washing
- Vaccination
- Isolation of persons with symptoms or signs of infectious diseases
- Hygienic food preparation
- Hygienic food consumption
- Drinking of potable water
- Prescribed use of Antibiotics
- Disinfect the 'hot zones' in your residence.
- Don't share personal items.

1.3 Chronic Diseases

What are chronic diseases? Chronic diseases are diseases that persist over a long period of time, they are generally progressive diseases, they are usually caused by life style practices such as such as unhealthy diet, physical inactivity, smoking etc.

Examples of chronic diseases

- Alzheimer's disease
- Arthritis
- Asthma
- Cancer
- Cystic fibrosis
- Diabetes
- Osteoporosis
- Cardiovascular diseases

1.3.1 How to prevent chronic diseases

Avoid the use of tobacco

Avoid drinking alcohol

Maintain a healthy weight

Be involved in regular physical activities

Maintain a healthy diet

ITQs

1. What is infectious disease?
2. List five examples of infectious disease

ITAS

1. Infectious diseases are disorders caused by micro- organisms — such as bacteria, viruses, fungi or parasites
2. Cholera, Hepatitis ,HIV/AIDS, Influenza, Malaria

6

Unit 2 The Environment and Health

Introduction

Every organism in earth has a lot of things in its surrounding such other organisms, water, air, land etc. A collection of all these things is what is referred to as the environment. The word environment is derived from the French word “**environ**” which means to “encompass” or “encircle”. The environment is a broad concept and it encompasses all living and non-living things on earth.

The World Health Organization (WHO) defines an environment, as it relates to health, as “all the physical, chemical, and biological factors external to a person and all the related behaviors”. Our health and well-being are determined by physical, chemical and microbiological factors in the environment we live and work which can have effects on our health, both physically and mentally. Also, there is a direct interaction between the environment and our thoughts, actions and feelings. Though the environment sustains life, it can also cause diseases. Globalization and technology have been major instruments man as used in the degradation of the environment. The effects of such acts are manifested through diseases such as asthma, diarrhea, malaria, etc. Also, the risks of some diseases such as cancer, heart disease, asthma are increased by environmental hazards which make the health and survival of man depend solely on their ability to adjust to their environment.

Environmental health is the branch of public health that is concerned with all aspects of the natural and built environment that may affect human health. This field deals with those aspects of the human health and disease that are determined by factors in the environment. It also refers to the theory and practice of assessing and controlling factors in the environment

that can potentially affect health. The quality of the environment is deteriorating, thus causing growing concerns. Efforts are being made to stop the widespread abuse of the environment through joint collaboration by organizations and individuals. The environment is a naturally given capital with limits. Man should learn to use the resources judiciously and handle it like a gift which it really is from God. Environmental health is a field which is very essential to the existence of human lives because it deals with identifying and addressing (prevent and control) the impacts of human health and the environment.

Specific Objectives to:

1. Define the environments
2. Define some term such as personal hygiene, human waste disposal, vector control, solid waste disposal, food hygiene and occupational hygiene.
3. Explain environmental health
4. State the components of the environments

2.1 Definition of terms

Fig 11: Definition of terms

	TERMS	MEANINGS
1	Personal hygiene	Hygiene of body and clothing
2	Water supply	Adequacy, safety (chemical, bacteriological, physical) of water for domestic, drinking and recreational use
3	Human waste disposal	Proper excreta disposal and liquid waste management
4	Solid waste management	Proper application of storage, collection, disposal of waste. Waste production and recycling
5	Vector control	Control of mammals (such as rats) and arthropods (insects such as flies and other creatures such as mites) that transmit disease
6	Food hygiene	Food safety and wholesomeness in its production, storage, preparation, distribution and sale, until consumption
7	Healthful housing	Physiological needs, protection against disease and accidents, psychological and social comforts in residential and recreational areas
8	Institutional hygiene	Communal hygiene in schools, prisons, health facilities, refugee camps, detention homes and settlement areas

9	Water pollution	Sources, characteristics, impact and mitigation
10	Occupational hygiene	Hygiene and safety in the workplace

2.2 COMPONENTS OF THE ENVIRONMENT

1. Physical - This component comprises of the soil, air, water bodies, the sun, galaxy, trees and all objects which can be seen in the environment. This component accounts for a large percentage of the diseases and illness man gets infected with through the environment.
2. Biological – As the name implies, this component is a collection of the various flora (plants), microbes (micro-organisms) and fauna (animals) and that are found in our surroundings.
3. Social - The social environment is a projection of the traditions that man has grown with, lived in, and the community with whom the individual interacts.
4. Spiritual – This component is a link between different social, religious and personal practices. It is mostly overlooked but it is an important component of the environment just like the other three. Cases of religious activities and practices have been recorded to have direct effect on health.

TQs

1. What is an environment?
2. Define environmental health?
3. List the components of the environment?

TAs

1. An environment, as it relates to health, as “all the physical, chemical, and biological factors external to a person and all the related behaviors
2. Environmental health is the branch of public health that is concerned with all aspects of the natural and built environment that may affect human health.
3. Physical, Biological. Social and spiritual

3. ENVIRONMENTAL FACTORS DETERMINING HEALTH

Introduction

Individual factors or a combination of two or more have been proven to act directly on health. Such factors which are found in the environment include environmental sanitation, air pollution, and water quality.

Specific objective to:

1. Discuss environmental factors that determine health such as environmental sanitation, air pollution, water quality, solid waste and vector control
2. Explain environmental interventions

3.1 ENVIRONMENTAL SANITATION

This is a hygienic means of promoting good health through prevention of human contact with the hazards of wastes. Also, it refers to the provision of facilities and services for proper waste disposal. Many diseases have direct link to sanitation. For development to be achieved, it is imperative that good hygiene alongside proper sanitation will be practiced.

3.2 AIR POLLUTION

This is when particles and gases or harmful materials are found in the earth atmosphere. This is a very dangerous situation because it disturbs the normal balance in the air and also causes diseases. The atmosphere consists of gases which are essential to the normal existence of all living things. Indoor smoke from solid fuels, toxic hazards and global environmental change as well as unsustainable patterns of development and industrialization are contributory factors to air pollution, traffic injury and other forms of urban environmental degradation. Carbon monoxide (CO), nitrogen oxides, ammonium, sulphur oxides are few of the gases that pollute the atmosphere. Sources of emission of air pollutants are not limited to wastes, motor vehicle fumes, manufacturing facilities and burning. Poor air quality is linked to premature death, cancer, and long-term damage to respiratory and cardiovascular systems. Decreasing air pollution is an important step in creating a healthy environment.

3.3 WATER QUALITY

Surface and ground water quality applies to both drinking water and recreational waters. Contamination by infectious agents or chemicals can cause mild to severe illness. Protecting water sources and minimizing exposure to contaminated water sources are important parts of environmental health.

Water intended for human consumption should be both safe and wholesome. This has been defined as water that is;

1. Free from pathogen agents
2. Free from harmful chemical substances
3. Pleasant to the taste, ie free from color and odor
4. Usable for domestic purposes

The basic physiological requirements for drinking water have been estimated at about 2 litres per head per day (4-6 sachet of water daily).

The uses of water include:

1. Domestic use, which includes drinking, cooking, washing and bathing, flushing of toilets, gardening, etc.
2. Public purposes including recreation, cleaning streets.
3. Industrial purposes including processing and cooling
4. Agricultural purposes including irrigation
5. Power production from hydropower and stem power
6. Carrying away waste from all manner of establishments and institutions.

There are three main sources of water: rain, surface water (reservoir, rivers, streams, tanks, ponds and lakes) and ground water (shallow wells, deep wells, springs and boreholes).

Pure uncontaminated water does not occur in nature. It contains impurities of various kinds natural and man-made. Natural impurities comprises dissolved gases (e.g nitrogen, carbon dioxide, hydrogen sulphide, etc. which may be picked up during rainfall), and dissolved minerals(e.g salts of calcium, magnesium, sodium, etc.) which are natural constituents of water following its contact with soil; and suspended impurities (e.g clay, sand, slit, and mud), and microscopic organisms. The man-made impurities occurs as a result of human activities-industrialization and urbanization.

The sources of pollution resulting from these are:

1. Sewage, which contains decomposable organic matter and pathogenic agents.
2. Industrial and trade wastes, which contain toxic agents ranging from metal salts to complex synthetic organic chemicals
3. Agricultural pollutants, which comprise fertilizers and pesticides.

4. Physical pollutants, including heat (thermal pollution) and radioactive substances.

Poor water quality is linked to water-related diseases such as typhoid and paratyphoid fever and rotavirus diarrhea in infants, cholera, dysentery, schistosomiasis, cardiovascular disease and premature death, if left untreated.

3.4 SOLID WASTES

The term “solid waste” include garbage (food wastes), rubbish (plastics, paper, wood, metals, throw-away containers, and glass), demolition products (bricks, masonry, pipes) sewage treatment residue (sludge and solids from the coarse screening of domestic sewage), dead animals, manure and other discarded materials. Solid waste, if allowed to accumulate, is a health hazard because:

1. It decomposes and favor fly breeding
2. It attracts rodents and vermin
3. The pathogens which may be present in the solid waste may be conveyed back to man’s food through flies and dust.
4. There is a possibility of water and soil pollution.
5. Heaps of refuse present an unsightly appearance and nuisance from bad odors.

In order to prevent the health hazards which solid wastes present, consideration should be given to the proper storage of refuse, while awaiting collection. Provision of suitable dust bins and public bins in bigger municipalities.

Methods of refuse disposal include:

1. Dumping: refuse is dumped in low lying areas partly as a method of reclamation of land but mainly as a method of disposal of dry refuse.
2. Controlled tipping: it differs from ordinary dumping in that the material is placed in a trench or other prepared area, adequately compacted, and covered with earth at the end of the working day.
3. Incineration: refuse can be disposed of hygienically by burning or incineration.

4. Composting: it is a process of nature whereby organic matter breaks down under bacterial action resulting in the formation of relatively stable humus-like material, called the compost which has considerable manure value for the soil.

3.5 EXCRETA DISPOSAL

Human excreta are sources of infection. They are also important causes of environmental pollution. Every society has a responsibility for its safe removal and disposal so that it does not constitute a threat to public health. The health hazards of improper excreta disposal are:

1. Soil pollution
2. Water pollution
3. Contamination of foods
4. Propagation of flies

The resulting diseases are typhoid and paratyphoid fever, dysenteries, diarrhea, cholera, hookworm disease, ascariasis, viral hepatitis and other similar intestinal infections and parasites infestations. These diseases are only a burden on the community in terms of sickness, mortality and a low expectation of life, but a basic deterrent to social and economic progress. Proper disposal of human excreta, therefore, is a fundamental environmental health service without which there cannot be any improvement in the state of community health.

Methods of excreta disposal include: use of pit latrines or ventilated improved pit latrines (VIP latrines) aqua-privy, septic tank, water seal latrines and chemicals toilets.

3.6 VECTORS OF PUBLIC HEALTH IMPORTANCE

Vectors are invertebrates or arthropods which may transmit disease either through ingestion, injection or contact.

Table 12: Vector-borne diseases

S/N	Vector	Disease Transmitted
1	Mosquito	Malaria, filaria, viral encephalitis, viral, fever,(eg dengue fever, west Nile), viral hemorrhagic fevers(e.g yellow fever, denuge hemorrhagic fever).
2	Housefly	Typhoid and paratyphoid fever, diarrhea, dysentery, cholera, gastro-enteritis, conjunctivitis, trachoma, anthrax, amoebiasis,

		etc.
3	Tsetse fly	Sleeping sickness (trypanosomiasis)
4	Rat flea	Bubonic plague, endemic typhus
5	Black fly	Onchocerciasis
6	Ticks	Tick, typhus, viral encephalitis, viral fever, viral hemorrhagic fever
7	Itch-mite	Scabies
8	Cyclops	Guinea-worm disease, fish tapeworm
9	Cockroaches	Enteric pathogen

The general principles of vectors control are:

Environmental control: This includes elimination of breeding places (sources reduction); filling and drainage operation; carefully planned water management; provision of piped water supply; proper disposal of refuse and other wastes; cleanliness in and around houses, etc.

Chemical control: This involves the use of a wide range of insecticides belonging to the organochlorine, organophosphorus and carbamate group of compounds.

Biological control: This involve the use of other biological agents (e.g bacteria, fungi, nematodes, protozoa and viruses) for the control of vectors/insects. For example, the use of larvivorous fish especially *Gambusia* for mosquito control. Fungi of the genus *Coelomocytes* are also known to be pathogenic to mosquitoes.

Genetic control: This involves the use of technique such as sterile male technique, cytoplasmic incompatibility and chromosomal translocations for the control of vectors such as mosquito.

Other newer methods being sought for pest control include insect growth regulators, chemosterilants and sex attractants or pheromones.

3.7 ENVIRONMENTAL INTERVENTIONS

This is an important aspect that can help in promoting good health through eradication of factors that can cause diseases the environment. Coordinated action is central to surveillance so that thus empowering public health educators. In order to increase quality of life and years of healthy life, it is very important to maintain a healthy environment. Globally, nearly 25 percent of all deaths and the total disease burden can be attributed to environmental factors.

Different strategies could be used in intervening such as

1. Health Education: this is the use of education in supporting behavioral changes. This will enable people to have ideas on how to protect their own health or that of their children or other community members from infectious disease. Therefore, the health of the people is in their own hands. An education system that delivers a high rate of literacy in the population, particularly in women, which is strongly associated with reduced morbidity and mortality rates among their children. BBC in Ogun State, RBM , global project
2. Direct attack on the source of infection.
3. Isolation of infection source
4. Resistance to infection in the human host.

TQs

1. List environmental factors that determine health?
2. State the environmental interventions?
3. Mention three vectors and the disease transmitted by this vectors?

TAs

1. Environmental sanitation, air pollution, and water quality
2. Health education, direct attack on the source of infection, isolation of infection source, and resistance in the human host.
3. Mosquito- malaria, itch-mite- Scabies; cockroaches-Enteric pathogens, Tsetse fly- sleeping sickness.

Unit 4 PERSONAL HYGIENE

Introduction

Practicing good hygiene is one of the most effective ways we can adopt to protect ourselves and others from illnesses. Personal hygiene is only about washing your body but especially, your hands. Hygiene means being considerate of others while coughing or sneezing, cleaning things that you touch if you are unwell, putting items such as tissues (that may have germs) into a bin, and using protection (like gloves or condoms) when you might be at risk of catching an infection. Personal hygiene, such as bathing, is very much dependent on the culture in which you live.

In some cultures, it is expected that you will wash your body at least every day and use deodorants to prevent body odor. Other cultures have different expectations.

Specific Objective to:

1. State causes of body odor
2. Discuss personal hygiene for women
3. Discuss personal hygiene for men
4. Travelling hygiene

4.1Body

odor

Body odors are caused by a number of factors including:

- Chemicals in sweat, including pheromones, which are made by the body and sexually attract (or repel) other people.
- Wastes excreted through the skin, such as metabolized alcohol.
- The actions of bacteria that live on the skin and feed on dead skin cells and sweat.
- Unwashed clothes, such as underwear and socks.

4.2 Hand washing

Most infections, especially colds and gastroenteritis, are caught when we put our unwashed hands, which have germs on them, to our mouth. Some infections are caught when other people's dirty hands touch the food we eat. Hands and wrists should be washed with clean soap and water, using a brush if your fingernails are dirty. Dry your hands with something clean, such as paper towels or hot air dryers. You should always wash your hands:

- After using the toilet
- Before making or eating food
- After handling dogs or other animals
- If you have been around someone who is coughing or has a cold.

4.3Personal hygiene for women

The vagina is able to clean itself no special care is needed, other than washing the external genitals. Do not put anything like douches into the vagina, as the delicate skin can be damaged. Here are some personal hygiene suggestions for women:

- **Menstruation** - wash your body, including your genital area, in the same way as you always do. Change tampons and sanitary napkins regularly, at least four to five times a day. Always wash your hands before and after handling a tampon or pad.
- **Cystitis** - is an infection of the bladder. This is a common condition for sexually active young women. Urinating after sexual intercourse can help to flush out any bacteria that may be in the urethra and bladder.
- **Thrush** - some soaps and detergents can irritate the skin of the vagina, and make thrush infections more likely. Some people find that they often get thrush when they use antibiotics. Use mild soap and non-perfumed toilet paper. Avoid tight, synthetic underwear. Try cotton underwear, and change regularly. There is medical treatment for thrush, so talk to your doctor or pharmacist.

4 Personal hygiene for men

A build-up of secretions called *smegma* can form under the foreskin of uncircumcised men. If you are uncircumcised, gently pull back the foreskin when you have a shower and clean with water. You can use soap if you like, but make sure you rinse it off well.

Bad breath

Good dental hygiene includes regular brushing and flossing. Bad breath can be caused by diseases of the teeth, gums and mouth, such as infections. Most people have bad breath first thing in the morning because saliva is not made while you're asleep. Some foods that can cause bad breath include garlic and onion. Mouth washes, mouth sprays and flavored chewing gum can make your breath smell better for a while, but if you have a health problem in your mouth, you need to see your dentist.

4.5 Travelling hygiene

When travelling overseas, take special care if you're not sure whether the water is safe. Suggestions include:

- Drink only bottled water.

- Don't use tap water to clean your teeth.
- When you wash your hands, make sure they are totally dry before you touch any food.
- Don't wash fruit or vegetables in unsafe water.
- If you have no other water source, make sure the water is boiled before you drink it by holding it at a rolling boil for one minute.
- Make sure any dishes, cups or other utensils are totally dry after they are washed.

ITQs

1. State the causes of body odor
2. State some of the causes of bad breath

ITAs

1. Chemicals in sweat, including pheromones, which are made by the body and sexually attract (or repel) other people, Wastes excreted through the skin, such as metabolized alcohol, The actions of bacteria that live on the skin and feed on dead skin cells and sweat. And unwashed clothes, such as underwear and socks.
2. Bad breath can be caused by diseases of the teeth, gums and mouth, such as infections.

SAQs

1. What are infectious diseases?
2. List 5 common infectious disease around us and describe them
3. List 5 ways to prevent infectious diseases
4. What are chronic diseases?
5. List 5 chronic diseases and describe each of them
6. List 5 ways of taking care of the environment
7. List 5 ways of taking care of the body
8. List 5 disease prevention techniques

MODULE – 5 Substance Abuse and Mental Health

Introduction

This module focuses on substance abuse and mental health, including sport health and physical activity.

General Objective for the Module at the end of the module student will be able to

1. Discuss the nervous system and substance abuse.

2. Explain the dynamics of substance abuse
3. Discuss drug with abuse potentials
4. Explain sport health and physical activity
5. Discuss physical activity, physical exercise and recreation as instrument of socialization and politics

UNIT 1 **Substance Abuse**

Introduction:

From ancient times, the use of mind-altering substances has been known. Various categories of substances have been known to originate from various parts of the world associated with different cultural groups known to have powerful effects on the mind. For instance, heroine and other opiates are substances most widely available in the Far East and certain parts of South America. For many years china has been regarded as the leading producer and user of opium, the plant source of heroine, morphine, codeine and other semi-synthetic varieties of the plant extract. Similarly, Cocaine derived from the coca-plant indigenous to South America is also widely used all around the world. Currently, drug abuse remains a world-wide public health problem of immense proportion and broad impact requiring a concerted effort among all nation states of the world in order to adequately meet the challenge it pose to most communities. Drug abuse has been implicated in the global HIV/AIDS epidemic as an important transmission mode for the virus because of the role played in injection use transmission for heroine users and the impairment of judgment produced when under the influence these substances.

Specific objectives to:

1. Define substance abuse
2. Discuss the dynamics of substance abuse

Substance abuse is a term which describes a serious conditioned-behaviour problem emanating from the use of centrally-acting or psychoactive substances. It is considered as the excessive and continuous use of mind-altering substances, usually by self-administration, for the purpose of altering mood of the individual without due consideration of any medically or socially acceptable pattern. (Atulomah, 1992) This phenomenon can be seen to involve some physical-psychologic mechanisms in the user which tend to accentuate the habit.

Definition of Terms

Medicine: This is a drug that is used to treat, prevent and diagnose illness. Medicines can be over-the-counter or prescription drugs.

Over-the-counter drug: This is the drug that is approved for legal purchase and used without a prescription from a doctor. They are often self-prescribed and self-administered for the relief of symptoms of self-diagnosed illness e.g. paracetamol, panadol, multivitamins, blood tonic, etc.

Prescription drug: This is a drug that can be legally obtained only from a licensed health professional and dispensed by a registered pharmacist.

Drug: This is any substance which is harmful and creates a habit. It is a chemical or substance that is taken to produce a physiological (mood), psychological (mind), and physical (behavior) changes in the body.

Drug Misuse: This is the inappropriate use of drugs including prescribed or non-prescribed medicines.

Drug or substance Abuse: This is the continuous use of drugs or substance usually by self-administration in a manner that deviates from the approved medical prescription despite the physical, social, medical and psychological harm.

Drug Addiction: This is a state of periodic or chronic intoxication produced by repeated consumption of drug. It is also referred to as continuous use of drug/substance despite the physical, psychological and social harm. Its characteristics include:

An overpowering desire or need (compulsion) to continue taking the drug and to obtain it by means.

A tendency to increase the dose.

A psychic (psychological) and generally, a physical dependence on the effects of the drug.

The Dynamic of Substance Abuse

In drug abuse, two physical and a psychological processes operate in a vicious circle to reinforce each other; first tolerance and then physical and psychological dependence (Atulomah, 1992). Tolerance to drugs may be considered as a diminished response produced

in the body as a result of some biochemical desensitization following repeated administration of centrally-acting drugs in which increased amounts are required to produce effects of equal magnitudes. Thus, tolerance describes what takes place in a person who begins to use any substance with abuse potentials. Certain drugs are capable of producing tachyphylaxis which is described as rapidly developed tolerance. Furthermore, the mechanism of addiction also include physical dependence, which describes a state of adaptive change which develops in the central nervous system of mammals allowing normal functioning only in the presence of the substance, on withdrawal of such substance produces a severe and life-threatening physical reaction due to the disturbed adaptive balance. Psychological dependence on the other hand is characterized by an overwhelming desire to continue taking the substance even when the habitual consumption has long ended.

In the process of dependence, four patterns of use are identified which may serve as important cues to the user of such substance that something is wrong. The first pattern is experimentation, in which substances with abuse potential are taken for a number of reasons by particularly adolescents which may range from satisfying curiosity in recreational entertainment settings. However, at the initial stage of experimentation, continued use of the substance becomes elective based on initial experience. The second and third patterns follow in quick successions depending on the type of substance consumed; these include social and episodic use respectively. Beyond this level representing the threshold when it is very likely that the individual may stop with minimal harm, is the more serious and destructive pattern of use involving the persistent use of excessive amounts of the substance finally completing the cycle of addiction.

It is worthy of note that the choice of an individual to make one or more drugs the way of life for extended period of time is a response to some unmet inner need and this is strongly related to the extent of emotional disturbance or inadequacy that the individual is attempting to cover or make up for. Drugs with addictive potentials may on the short term provide an easy escape from an individual's difficulties or provide the excitement that is lacking in one's life, however, the physical transformation through which the body is passing is no better to cope with the difficulties than at the beginning of the drug experience. This is the basis of withdrawal syndrome. With compulsive use of drugs as in the stage of addiction or dependency, the cellular change particularly of the central nervous system which characterizes addiction is complete. The user of such dangerous drugs enters into a phase of an emotional and senseless repeated use of the substance to avoid the anxiety and other life-

threatening reactions that would appear if the compulsive act is not sustained. It is interesting to note that the need for ever increasing amounts of the drug which is caused by tolerance, to maintain the expected psycho-neurogenic pleasurable effects, as well as the fear of the withdrawal symptoms, play very important role in strongly reinforcing dependence. The pleasurable effects experienced provide positive reinforcement or reward as the case is, for continued use. In all situations, if the drug use is continued, tolerance to the euphoric 'drug high' effects develops and consequently more drug must be used more frequently to achieve the same effects which apparently is unattainable except at the risk of an overdose and death.

ITQs

1. What is substance abuse?
2. _____ is characterized by an overwhelming desire to continue taking the substance even when the habitual consumption has long ended.
3. The first pattern is _____

ITAs

1. Substance abuse is a term which describes a serious conditioned-behavior problem emanating from the use of centrally-acting or psychoactive substances. It is considered as the excessive and continuous use of mind-altering substances, usually by self-administration, for the purpose of altering mood of the individual without due consideration of any medically or socially acceptable pattern.
2. Psychological dependence
3. Experimentation

UNIT 2 Drugs with Abuse Potentials

Characteristically, drugs which act on the central nervous system produce varying degrees of dependence. These drugs may produce depressant or stimulant effects. Such substances listed as depressants include hypno-sedatives such as barbiturates, benzodiazepines, opiates such as heroine, morphine and alcoholic beverages. These are known to produce varying degrees of drowsiness and sleep. On the other hand, the stimulants includes Ecstasy, a drug of abuse popularly used for entertainment is actually an amphetamine derivative. Others include cocaine, Lysergic acid diethylamide (LSD) and cannabis (marijuana). These drugs generally produce a wide range of effects such as euphoria and psychosis with gross distortion of time perception of reality. A number of these

substances are extremely addictive producing addiction within few days of administering them and so the best is to avoid taking them altogether.

We are to use our minds to the fullest potentials for which God created it for the acquisition of knowledge, reasoning, making informed decisions, caring, being creative and attaining self-actualization and whatever that may mean to each person. As students, it is very important not to interfere with the functions of the brain and the mind in the way of the use of psychomimetic agents or performance-enhancing drugs as it is the characteristic practice of modern day students. These practices carry high risk of very poor outcomes that would rob you of true success and satisfaction. Young people should advocate a drug free body environment setting their minds at what their energies can achieve.

The use alcoholic drinks are fast becoming a problem in all societies and at all age groups worldwide. Alcohol is intoxicating and affects the mind in such a way that judgment is seriously impaired. Drunkenness has become a problem today and this is now being seen among secondary school and university students. Alcohol damages the organs of the body particularly the liver, stomach and diminishes nervous responsiveness and cognitive performance. In addition, it beclouds judgment and predisposes an individual to unprepared sexual encounter with high risk of susceptibility to HIV infection. As university students, who are potential leaders of tomorrow, you need clear mindedness to pursue goals for mastery of your chosen carrier to its final successful conclusion; this is self-actualization and maturity.

ITQs:

1. Which particular organ is damage by alcohol?
2. Drugs which act on the central nervous system may produce _____or _____effects
3. Drugs that produce drowsiness and sleep are_____?

ITAs

1. Liver
2. Depressant or stimulant
3. Depressant

TMA's

1. Explain why young people abuse drug.
2. Describe the stages of substance abuse

UNIT 3 Sport Health and Physical Activity

Introduction

Studies have shown that participation and playing sports helps both young teen/teenagers, adult and old physically, socially, and mentally. Physically active persons have a self-worth image and improve emotion. Playing on a sports was linked to higher life satisfaction. Most often teenagers who are playing on team sports are more satisfied with their life and feel healthier. They have a sense of belonging and acceptance which invariably help their Sociological and psychological build up. It improves life satisfaction and self-rated health concurrently. Physical activity/exercise is increasingly recognized as an effective treatment for mild clinical depression and anxiety apart from sports induced stress that itself can also be reduced.

Academic enhancement has also been linked with participation in sports, since participation may enhance school connectedness, social support, social integration, multi-cultural blending force, hand bonding among friends and teammates, and peer infusions and influences, creating an atmosphere of achievement both physically emotionally and academically.

Specific Objective to:

1. Discuss the incidence of physical inactivity and it attending consequences
2. Explain sport induced stress and negativity
3. Enumerate the benefits of sports and physical exercise
4. State the typology of physical activity

3.1 Incidence of Physical inactivity and attending consequences

1992, the American Heart Association described physical inactivity as an independent risk factor for cardiovascular diseases among young adults. This means that regardless of smoking status, family history, and the presence of other related diseases, if someone is in-active, the risk of developing cardiovascular diseases is higher than that of an active person with similar characteristics. Relative risk of developing coronary heart diseases associated with physical inactivity, is approximately 1.8, and that those who are 'inactive' are almost twice as likely to develop cardio-vascular disease due to hypokinetic, that is, a state of physical in activities. This is a tendency in which there is little or no exercises, leading a sedentary life, and spending a lot of time in bed or sitting. There appears to be a close relationship between physical activity and the incidences of cardio-vascular disease. Persons who expended 71 to 143 kilocalories of energy per day with a strong history of participation in PE had a 22% reduction in overall mortality, whereas those who expended 143 to 214 kilocalories per day as a result of PA had a 27% reduction in their mortality.

Physical in-activity leads to obesity among school boys and girls, men and women. Physical in- activity is a major cause of overweight in the modern society. Muscle tone will be poor and posture and stance ungainly, poorly developed abdominal muscles and facial tissue, with a protuberant abdomen when standing and Lordosis

Hypo-Kinetic which is lack of physical activity in a girl's childhood may be related to the chronic low back pain, common among new (young) mothers. Hypo-kinetic diseases are diseases related to inactivity, such as low back pain low abdominal tone and it increases menstrual pain in ladies.

3.2 Sports Induced Stress and Negativity

In as much as participation and involvement in the physical activities help reduce stress, the mental act of placing too much emphasis on winning alone do create stress. The stress is induced by pressure and expectation which may in turn lead to fatigue – known specifically as athletic burnout – or even depression. In as much as we prepare young players for coping with stress that comes from defeat and performance anxiety in the adult world. The negative effect of sports may not account for its cancellation as the positivity outweigh the negativity.

Winning at all cost that can lead to an unhealthy view of competition that foster feelings of aggression in adolescents. Accident during play that causes sport injuries commonly experience negative emotions such as boredom, depression, frustration, hostility and a sense of uncertainty. However apart from the above ill health challenges, benefit of participation and involvement out weight the negative effects. Exploring the positive benefit of participating include

Physical activity/exercise is increasingly recognized as an effective treatment for mild clinical depression and anxiety apart from sports induced stress that itself can also be reduced, advantages of sports include: Health, Economic, Emotional, Mental, Social and Psychological. Health advantage of participation in active Physical exercises include:

- Enhancement of bone mineralization during adolescent and young adulthood and during older adult life,
- Development of muscle and increase joint strengthening
- It may help balance and gait, which reduces the risk of fall and associated hip fractures at older age.
- Regular moderate activity/exercise has a major role in reducing the risk of colon cancer, with risk reduced by 40% to 50%.
- In addition, physical Exercise appears to confer some Health benefit on reducing breast cancer risk. There are new researches pointing to other benefits of vigorous activity/exercise in reducing prostate cancer risks, lung cancer risk, and independent of smoking status.

Other Health benefit usage include

- Weight control
- Obesity prevention
- Problem-solving skills
- Improved strength, and body image
- Self-efficacy by having more confidence
- Improve self esteem
- Academic achievement by increased cognitive ability and functioning

And sports can lead to reduced rates of:

- Juvenile arrests
- Teen pregnancies
- School dropout
- Increase quality sleep
- Reduce drug

3.2.1 Social and Emotional Benefit of Physical Activities/Physical Education

In addition to these social and emotional benefit of physical activities and exercise, health benefits of sports benefits of Physical activities accrues to both the participant and the society. This is because sports bring about intangible benefits to the school and community as a whole. “Sports also create important opportunities for students to contribute to the school community, which may cultivate an increased commitment to, or identification with, school and school values.

A closer look of these benefit could be explored by the teachers to help build or confer Social competence enhancement and acceptance to participants. Hence looking closer at some of these benefits the school administrators can factor these into their decisions regarding school-based sports programs.

3.2.2 Therapeutic use of Sports and Physical Exercise Physical activity

Participation in sports and recreational activities are essential behaviours for the prevention of more certain diseases, promotion of health and the maintenance of functional independence. These benefits include the following:

1. Reduction in the occurrence of back injuries and reduced menstrual pain
2. Moderate intensity exercise program will not adversely affect the immune system and may have a beneficial effect on the interleukin-2/natural killer cell system

A physician may recommend an exercise stress test to:

- Diagnose coronary artery disease
- Diagnose a possible heart-related cause of symptoms such as chest pain, shortness of breath or lightheadedness;
- Determine a safe level of exercise;
- Check the effectiveness of procedures done to improve coronary artery circulation in patients with coronary artery disease; and
- Predict risk of dangerous heart-related conditions such as a heart attack.

3.3 Typology of Physical activity

Owing to the importance of PE in health promotion and development, the United State Department of Health and Human Service, on Physical Activity and Health USDHHS

(1990) targeted PE as one of the national health priorities for the year 2000. The table below is a typology of physical activities and exercises that have been calibrated and tested to likely produce certain effects on the body before such health benefits can be achieved through intensity, rate, rhythm and frequency of continuity. All these are essential ingredients of using this typology of physical activity. If any of these above is done there's is a presumption or assumption that participation in any of these or more could confer the full benefits of participation in physical activity.

Table 13: Typology of Physical activity and time required

Typology of Physical Exercise	Minimum Time required	Maximum Time required
Washing and waxing a car for 35-40 minutes	35 minutes	40 minutes
Washing windows or floor for 35-40 minutes	35 minutes	40 minutes
Playing volleyball	30 minutes	45 minutes
Playing touch football (not competition)	30 minutes	45 minutes
Gardening/hoe	30 minutes	45 minutes
Wheeling self in wheel chair	30 minutes	40 minutes
Brisk Walking 1.75km	35 minutes (20 min\miles)	40 minutes (20 min\miles)
Basketball (shooting baskets)	30 minutes	40 minutes
Bicycling 5 miles=>8.045km	30 minutes	50 minutes
Pushing a stroller/water truck over 50m	10 minutes	20 minutes
Cutting grass/raking leaves	30 minutes	or more
Walking 1.2km=>1.931km	30 minutes (15 min/miles)	40 minutes
Basket-ball (playing a game)	15-20 minutes	30 minutes
Bicycling 4 miles=>6.43km	15 minutes	30 minutes
Jump rope/Skipping	15 minutes (skipping)	or more
Running 1.5mile=>2.41km/Jogging	15 minutes (10min/mile)	25 minutes (10 min/miles)
Shoveling sand	15 minutes	15 minutes or more

Stair-walking/climbing	15 minutes	Five times a day or 15 minutes
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Source: computed from U.S. Department of Health and Human Service, (1996) on Physical Activity and Health

ITQs

1. Mention five typology of physical activity
2. Mention five health benefit of physical activity

ITAs

1. Bicycling, Brisk walking, Jump rope/skipping, gardening, shoveling sand.
2. Weight control, improve self-esteem, problem-solving skills, increase quality sleep, strength and body image

UNIT 4 PHYSICAL ACTIVITY, PHYSICAL EXERCISE, FITNESS ACTIVITIES AND RECREATION AS INSTRUMENT OF SOCIALIZATION AND POLITICS

Specific objective to:

1. Discuss physical activity, physical exercise, fitness activities and recreation as instrument of socialization
2. Explain Interrelating Group Dynamics with Physical Education and Recreation

PHYSICAL ACTIVITY, PHYSICAL EXERCISE, FITNESS ACTIVITIES AND RECREATION AS INSTRUMENT OF SOCIALIZATION AND POLITICS

The sociological aspects of participation in Physical exercise, recreation and physical activities meanings and their implications on the society's physiological, emotional wellness of citizens is the foregoing discourse. Especially as an integral part of education and the contribution to the socialization of people through participation in recreation and physical activities.

In contemporary times sociology has been viewed and defined. It has been related to the arts, social and pure sciences. Happily enough, the core points of all the views center on the fact that sociology is a scientific study of human Beings in their relation to one another. Sociology focuses on the fact of human togetherness. It studies the patterned regularities of social interactions as they exist everywhere in the world. It must be added that the above is meant to give a frame of reference upon which to act, since sociology is seen as a scientific study of human interaction or social behavior.

It is the process of mutual influence between a person and his fellow men a process that result in an acceptance of, and adaptation to, the patterns of social behavior. It is the function of the society to socialize the youth by helping them to acquire social experiences, social habits and social relationships. It is equally worthy to note that the individual youth (on whom physical

activities has the greatest influence) or any person at all, ceases to be an individual. The self as it relates to others in the society is now integrated into it

Sports as a socializing agency can further be looked at from the point of views of its relative goals that:

1. The society is acting upon the individual and or
2. The society acting on the individuals responding to societal norms, creed or set down rules, culture or tradition.

Physical education, in its ramifications influence socialization and where found to be, to see if it acts as a tool to affect this process of socialization reducing the political polarity in many ways. As it helps to specifically, acquire social experiences, social habit and relationship. Its interest is to develop the social and political phases of personality, attitude and values through the means of games, sports, and related activities. In its board sense therefore physical education in this contest is used or referred to or shall include sports (competitive, and recreational) play, games and sports.

Sports politics as being used as the process of mutual influence between a person and his fellow men, class of people and tribes, race creed and religion, a Nation and allied boundaries, a continent and other continents as a process that result in an acceptance of, and adaptation to, the patterns of political acceptability to resolve conflict or tie a relationship, celebrate and vocalize superiority. It is equally worthy to note that the individual youth (on whom physical activities has the greatest influence) or any person at all, ceases to be an individual. The self as it relates to others in the society is mow integrated into it, socially and politically. Further to the above on socialization, it could be looked at from the point of views of:

1. The society acting upon the individual and or
2. The society acting on the individuals responding to societal norms, creed or set down rules, culture or tradition.
3. All these are bounding social behavior that is the function of the society to socialize the youth by helping them to acquire social experiences, social habits, social relationships, political tolerance and establishment of bilateral trade, union and organization. The Society develop the social phases of personality, attitude and values that are carried into the International games like all African games, ECOWAS games, UEFA and EUROPEAN games, and of course Olympic games have used this process of socialization in many ways to advance Economic stability, scientific interexchange, exploration, war and peace.

International exchange of culture and religion has been fostered by sports. A Nigerian athletes that is opportuned to travel out dose so not without bringing back some of the other land's way of life. Ordinarily, it may be the other land's dress, either in a small way or to a large extent, it has effected some cultural change and interrogation. Prior to now, Nigerians engage in traditional dance only. But now, the social awareness has drifted to the "Rock" and "Soul" dance steps and the adulteration of the "Juju" dance steps.

4.1 Interrelating Group Dynamics with Physical Education and Recreation

The social group proper which shall be main focus point is defined as “an aggregate of individuals which definite relations exist between the individuals comprising it and each individual is conscious of the group itself and its symbols”. Further, it needs be added that a social group has at least a rudimentary structure and organization including rules, rituals, norms and ethics and having a psychological basis in the consciousness of the members. So, a family, village inhabitants, trade unions, Nations, political parties and members of all team sports any answer to the name of a social group.

Before a group can function well to build a society, it has to fulfill a certain dimensional implications of

1. Cohesion
2. Permeability
3. Stability
4. Density
5. Potency
6. Polarization.
7. The question of how does physical exercise help to get integrated into a unified society is answered in the fact that physical activities and exercise are carried out in small social groups proper. These small groups characteristically agree with the definition of social group. The above presupposes sports and games as a giant factor in building an integrated society (through building integrated groups) and whereas, “an integrated social group is one in which there is a great deal of social interaction within the group and people are bound together by such organizational bonds as common goals and purposes”. In a well-integrated social group, each individual would tend to accept every individual in the group as close personal associate.

The group dimensional values are found in physical activities and exercise or rather that physical education enhances the propagation of these group dimensions especially if the group members participate in sports and games thus:

- (i) Group cohesiveness is enhanced through sports, physical educational activities which create in the minds of people the “We” feeling rather than the “they” feeling. It is common to see members of a team, especially a winning team “Nourishing their pride and vanities. They boast of their superiority, exalt in their divinities and look with contempt at outsiders”. These attitudes when taken to the “external world” help to a large extent, in socializing the individual. There is pride in what the state or community or society does. The idea of patriotism is developed and citizenship is enhanced.
- (ii) Team sport encourages internal cohesiveness in their play periods. The team members play with understanding and the idea of give and take is there in these groups. If these are transferred into the society, there is positive socializing taking place. Because of the impersonal nature of their relationship, they can do the same in the community at large.
- (iii) Group Potency is another realm of group dimension. This implies that the members identify themselves with the goings on of the society. This is a true team sports. A soccer star wants to be identified as such equally; a tennis player will

like to play tennis or nothing at all. This goes with all the other games even in athletics where individuals want to show off. If these are looked at as means of group potency, then one can see that physical education will help in this direction. Citizens will want to be known as patriotic citizens who owe allegiance to self, others and the state.

- (iv) A fourth dimension which is group polarization, this implies that groups have a common bond and are working towards the same goal or aim. Without mincing words, it is known fact that physical education has set goals and ideas.

ITQs

- The process of mutual influence between a person and his fellow men a process that result in an _____, and _____, the patterns of social behavior.
- Team sport encourages internal _____ in their play periods.

ITAs

- Acceptance of, and adaptation to.
- Cohesiveness.

TMA's

1 .Summarized Outdoor Life and Physical Activity; Counsels on health E.G white pp.163-202 (500 words)

2Summarized Stimulant and Narcotics. The Ministry of healing E.G White pp.326-338. (500 words)

SAQs:

- Discuss physical activity, physical exercise, fitness activities and recreation as instrument of socialization

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APPENDIX

SELF HELP EXERCISES

SECTION A

- 1) Outline the levels of organization of a biological system and explain each level of organization
- 2) Identify the two types of organisms and explain them.
- 3) Describe the Nervous system
- 4) Identify and explain the two sub-divisions of the Nervous system
- 5) Identify and explain three functions of the Nervous system
- 6) Explain how the heart functions
- 7) Outline the functions of the kidney
- 8) What are the components found in blood
- 9) Describe the immune system
- 10) Describe the process of digestion
- 11) Explain the process of reproduction
- 12) Outline the functions of the endocrine system

SECTION B

- 1) What are infectious diseases?
- 2) List 5 common infectious disease around us and describe them
- 3) List 5 ways to prevent infectious diseases
- 4) What are chronic diseases?
- 5) List 5 chronic diseases and describe each of them
- 6) List 5 ways of taking care of the environment
- 7) List 5 ways of taking care of the body
- 8) List 5 disease prevention techniques

SECTION C

1. Which of the following is true of the heart
 - a) The right ventricle receives blood from the left atrium
 - b) The left atrium receives deoxygenated blood from the lungs
 - c) The left ventricle (the strongest chamber) pumps oxygen-rich blood to the rest of the body. ✓
 - d) The right atrium receives blood from the veins and pumps it to the left atrium

2. The _____ is the outermost covering of the heart wall
- a) Epicardium ✓
 - b) Exocardium
 - c) Endocardium
 - d) Myocardium
3. Which of these is NOT one of the four valves that regulates blood flow throughout the heart
- a) Tricuspid Valve
 - b) Pulmonary Valve
 - c) Diastolic valve ✓
 - d) Aortic valve
4. The cardiac cycle is of _____ major phases
- a) Three
 - b) Four
 - c) Six
 - d) Two ✓
5. The _____ phase of the cardiac cycle is the period of active contraction
- a) Systolic ✓
 - b) Dilation
 - c) Diastolic
 - d) Arterial
6. This organ is responsible for filtering blood, removing waste and controlling the balance of body fluid.
- a) Heart
 - b) Kidney ✓
 - c) Brain
 - d) Lungs
7. The _____ run along the surface of the heart and provide oxygen-rich blood to the heart muscle.
- a) Valves
 - b) Coronary veins
 - c) Coronary arteries ✓
 - d) Pulmonary arteries
8. _____ is a muscular organ that conducts food to the stomach
- a) Spleen
 - b) Pharynx
 - c) Appendix
 - d) Oesophagus ✓

9. The _____ located in the lower central part of the brain, it is the main link between the endocrine and nervous systems.
- a) Hypothalamus ✓
 - b) Thalamus
 - c) Thyroid
 - d) Parathyroid
10. Which of these is true of a disease
- a) It is a disorder in the structure and function of an organism ✓
 - b) It depicts the regular function of an organism
 - c) It is characterized by happiness
 - d) It is a condition where the body functions normally