

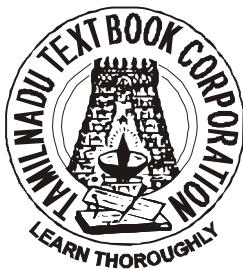
NURSING

Theory

Vocational Education
HIGHER SECONDARY - FIRST YEAR

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Untouchability is a sin
Untouchability is a crime
Untouchability is inhuman



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FOREWORD

The development of the text book “Nursing” resulted from the combined efforts of many talented professional, committed to excellence. Special recognition and due acknowledgement is hereby made to the Director of School Education and the Joint Director of School Education Chennai.

Nursing is a major component of the health care delivery system and nurses make up the largest employment group within the system.

Nursing services are necessary for every patient seeking care of various types including primary, secondary, tertiary and restorative. As nursing is an important part of health care delivery system, the nurses need to have a sound knowledge about nursing as a profession and common professional activities.

With the present introduction of Vocational courses such as nursing in the academic stream as one of the options, it is believed that it will contribute towards the basic nursing care of individuals, families and community for health and happiness. It will also be a foundation course for future diploma and degree programmes in Nursing.

In this edition a new chapter on “Bio Medical Waste Management” have been added in view of the fact that these knowledge will be essential for the students to learn before entering into the professional course. The subject contents has been developed, refined and reconstructed at several points as per the current perspectives.

Dr. Mrs.P.Mangala Gowri.

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1. NURSE AND NURSING AS A PROFESSION

INTRODUCTION TO HEALTH

Health is a highly desirable state for all human being. Health is an individual perception; it has many meaning and views differently to different people. A state of health directly influences his or her daily choice, independence, individuality and life style, therefore health is an integral aspect of an individual identity.

Wellness is the condition in which an individual functions at optional level. Health is integrated every aspect of a person's life including physical status, emotional well-being, social relationships intellectual functioning and spiritual condition.

DEFINITION OF HEALTH: World health organization (WHO) defines: "Health is state of complete physical, mental and social wellbeing, not merely the absence of disease or infirmity".

Illness is the inability of an individual's adaptive response to maintain physical and emotional balances that subsequently result in an impairment of functional abilities.

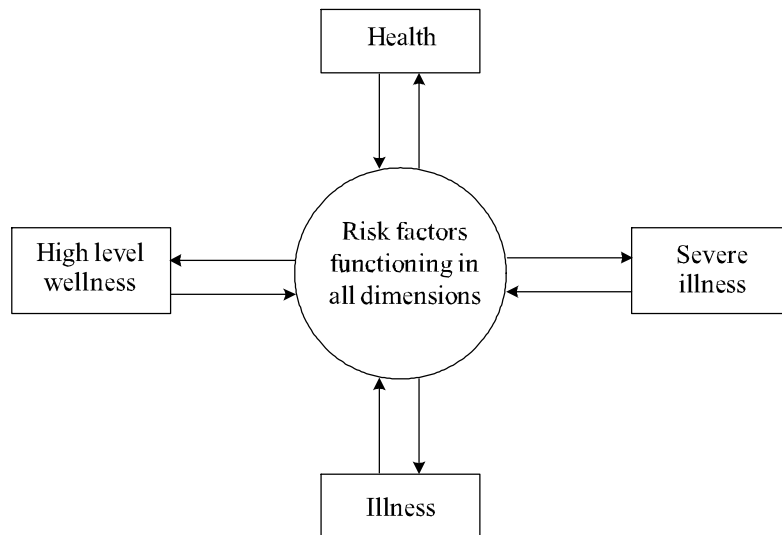
There are two major classification of illness acute and chronic. It is important for health workers to understand certain concept.

CONCEPTS OF HEALTH

- (1) Health means wellness, the opposite of illness.
- (2) Health is positive state of well-being that is felt physically mentally, socially and spiritually.
- (3) Health is a way of life acquiring knowledge of body function and how to keep fit and will to cultivate healthy habits including diet and exercise.
- (4) Health is related to a person's self realization relationships with others and the feeling of going a worthwhile contribution to the society.
- (5) Health is an individual responsibility and if a person makes no effort to be healthy, no one can provide him with health.
- (6) Health is a positive quality of life which helps us to live life to its fullest and serve our fellow – men to the best of our ability.

HEALTH AND ILLNESS CONTINUUM

Health is a dynamic state that fluctuates as a person adapts to changes in the internal and external environments to maintain a state of wellbeing. As health and illness are relative qualities existing in varying degrees, it is more accurate to consider health and illness in terms of a scale or continuum, rather than a absolute state.



Health – illness continuum

HISTORY OF NURSING

The history of nursing spans from the history of human kind. For as long as there has been life, there has been the need to provide care and comfort to those suffering from illness and injury.

From the dawn of civilization, evidence prevails to support the premise that nurturing has been essential to the preservation of life. Survival of the human race, therefore, is in inextricably intertwined with the development of nursing.

Nursing has been called the oldest of the arts and the youngest of the profession. The word nurse evolved from the Latin word *nutricius*, which means nourishing.

The roots of medicine and nursing are intertwining and found in mythology, ancient eastern and western cultures and religion.

Nursing is defined by various authors at various times. Henderson says “nursing is primarily assisting the individuals (sick or well) in the performances of those activities, contributing or its recovery (or to a peaceful death) that he would perform unaided, if he had the necessary strength, will or knowledge.

The International Council Of Nurses defines “Nursing is to assist the individual, sick or well in the performance of those activities contributing to health or to its recovery (or to peaceful death) that he would perform unaided if he had the necessary strength, will or knowledge. And to do this in such a way as to help in gain independence as rapidly as possible”.

Nursing, besides being a honourable profession, is one of the oldest art and an essential modern occupation. Nursing is one of the greatest of humanitarian services and all people whether ill or well, rich or poor, literate or illiterate, young or old, at work or at play, in or out of hospital, are in some way or other, directly or indirectly closely associated with it.

Nursing has its own body of knowledge scientifically based and humanitarianism that promises expanded benefits to people and society. It assists the individual or family to achieve their potential for self-direction for health.

Nursing is not only an applied science; it is also an art, which provides skillful care for the sick in appropriate relationship with the patient, family, physician and with others who have related responsibilities.

It is concerned equally with the prevention of illness and the conservation of health. Skillful nursing care embraces the whole person, body, mind and soul, his physical, mental, social and spiritual well-being (holistic approach)

In its broadest sense, nursing covers not only the care of the sick, the aged, the helpless and the handicapped, but also cares for the promotion of health and prevention of illness.

The arts of nursing had its birth in the earliest home where a mother cared for the well being of the rest members of the family. It is this mother care that through the ages developed into a skilled art and a well-organized science.

It will be interesting to know and understand the vast changes that nursing has passed through, in order to meet the needs of a changing civilization.

A study of the development of nursing will throw light on some of the problems of the past, how they have been solved and how nursing has progressed rapidly despite various hindrances

The paternal and maternal instinct in a human being is the main source of the nursing impulse, and is found in the hearts of people of all ages. A mother's care for her sick child always found expression in such acts to alleviate pain and help the child to get better.

In a society, the noblest forms of humanitarianism are showing mercy, love and kindness to those in physical or mental distress. When this impulse or motive is re-enforced by religious philosophies and beliefs, it inspires people to live a life of service and of self-sacrifice for the sake of others.

Along with this spirit, special training and experience has made nursing an ideal and useful profession.

Pre-historic Nursing

Myths, songs and other findings of the archaeologists throw some light on prehistoric man's care for this sick. In the prehistoric era, it was believed that illness was caused by evil spirits within the body.

In order to get rid of the evil spirit, the body had to be ill-treated. This was done by starving, beating, and administering nauseous medicines, beating of drums, magic rites and ceremonies and by causing sudden fright. Sometimes holes were made in the affected parts of the body to allow the evil spirit to escape.

Besides this, there were also many other ways of treating illness. Primitive man's skill in fighting disease has haven us many medical and surgical treatments such as massage fomentations, trephining, bone setting, hot and cold baths, etc. The doctor cum nurse in such cases was the medicine man or the witch doctor or the priest physician.

Nursing in early civilizations

Egypt: The Egyptians thought medicine to be of divine origin. One of the world's oldest medical records, dating back to 1600 B.C. comes from Egypt. Sources of medical history, description of diseases and their treatment, surgery and drugs used are found in the "Hieroglyphic writings" on papyrus from the temples of ancient Egypt and from the Pyramids.

Temple took the places of hospitals and the doctor cum nurse was the priest. It is probable that high-ranking women who become the priestesses in the temples played the role of nurses. Mothers and daughters nursed the sick at home.

An outstanding priest physician was **Imhotep**. Because of his great love and kindness to his patients and of his success in healing, he was elevated to the rank of a deity.

Embalming and bandaging of mummies led to the study of anatomy of the body and the study of various herbs and drugs in preservation of the same. The Egyptians recognized about 250 diseases and discovered suitable drugs and surgery for their treatment.

The sacred books were strictly followed by the priest-physicians. He was taken task, if he deviated from the teaching of these books and if his patient dies.

Even though Egypt had made much progress in medicine and nursing, it soon declined for no dissection was permitted and also no experiments in medicines were to be made. This together with the advent of the Romans led to its decline.

Greece: Medicine was closely connected with religion in Greece as in India. According to Greek mythology, Apollo the Sun God was their God of healing. **Asclepius, the son of Apollo**, was the Greek God of medicine.

The Greeks prayed to Apollo and Asclepius, and the goddess of health. **Hugiea** the daughter of Apollo for magical cures for their illnesses. Temples, where people came to worship were also places for the treatment of the sick and the priest physician was in charge of them.

These temples were situated in a healthy location, in a cheerful and charming country-side with plenty of fresh air.

In Greece, the emphasis was a positive health, in beauty and perfection – not sickness and misery. The young of Athens were taught to give their body's exquisite care.

It was in Greece that personal hygiene developed to degree that never previously or subsequently approached. Much emphasis was given to personal cleanliness, exercise and dietetics rather than to matters of environmental sanitation.

Hippocrates, 100 BC known as "**Father of Scientific Medicine**" had a foundation to start with. He found that health and prevention of disease depends on certain laws of nature. He also established **Ethical code of conduct** for all who practiced medicine.

Parts of his code are being used by medical students today and it forms the base of the 'Nightingale's pledge'. He separated medicine from religion for the first time in history. With the spreading of Greek's influence in other countries, the Greeks introduced establishments that may be considered as modern city hospitals.

They also established scientific methods of diagnosis and systematic methods of recording.

Rome: The Romans are best known for advances in public health. Rome had proper sanitation, drainage and sewage system, public baths and a type of public dispensary.

The Roman noble women cared for the sick. With the advent of Christianity, deacons and deaconesses performed the duties of nurses. **Galen**, a Greek physician who lived in Rome about 100 BC, performed numerous experiments on animals to learn about anatomy and disease.

Hebrews: The writings of Hebrews in the Old Testament speak about laws and principles of sanitation in accordance with modern bacteriology. They mention about selection of food, sanitation, segregation of the sick, disinfection and midwifery.

China: The Chinese were well advanced in medicine and surgery. They had good knowledge of internal organs and knew about the circulation of the blood. They practiced dissection. They also practiced vaccination and physiotherapy. Liver for anemia, seaweed for thyroid were administered.

The sick were prayed for in halls of healing. Intestinal infection was prevented by drinking of tea. Much importance was given to cleanliness and hygiene.

India: In India, we had the Ayurvedic system of medicine, which can be traced back to about 3000 BC. Ayurveda stressed on hygiene, prevention of sickness, inoculation against small pox, sanitation, lavatories, good ventilation, kitchen, construction of hospitals, cultivation of medicinal plants and suitable building for housing animals.

Atreya was the first great physician and teacher of Ayurveda. He lived about 800 B.C. During 700 – 600 B.C. Sushruta Samhita is written by the great surgeon Sushruta, who says “the physician, the patient, the drugs and the nurse are four feet of the medicine, upon which the cure depends”.

He then explains how cash may be a true ‘Pada’ (Foot). The nurse is a pada when she is kindhearted, strong, trustworthy and mindful of the physician’s orders.

The nurse is one who attends the patient; is cool headed and pleasant in his demeanor; does not speak ill of any body; is strong and attentive to the requirements of the sick and strictly follows the instructions of the physicians.

The great physician Charaka has written the Charaka Samhita in which he explains details of the manner in which drugs should be prepared or compounded for administration.

According to him, resourcefulness, devotedness to the patient waited upon, and purity of mind and body are the qualification of the attending nurse. The Charaka Samhita states that attendants on the sick should have good behavior and should be distinguished for purity and cleanliness of habits.

Nursing treatments prescribed are baths, enema to evacuate the bowels, emetics to produce vomiting, vaginal and urethral infusion (introducing a fluid under pressure), venesection (reducing of blood volume by opening the vein), gargles, massages, rubbing or pressing the limbs etc.

A nurse is expected to assist the patient to walk or move about. She/He must know how to make clean beds. She should be skilled in compounding drugs and ever willing to do any work that her profession demands of her.

700 – 600 B.C. – **Thiruvalluvar** in his songs speaks highly of medicine. He describes medical care as consisting of patients, doctors and nurses.

264 B.C. – King Ashoka made a great stride in the care of the sick, both human beings and animals. He not only founded a large number of hospitals for the sick but also made provision for the education and training of women for that purpose.

Monastery Universities were founded and became famous for their medical schools. The ethical standards of conduct demanded from those who attended upon the sick were of an exceptionally high order.

The nursing of patients seems to have been devoted primarily to men, a great deal of unrewarded work. The qualities expected of nursing attendants were good behavior, purity, cleverness, at kindness and skill.

Early Christian era: Nursing in Pre-Christian times, religious beliefs had great bearing on the attitude towards the sick and the mode of caring for the sick and suffering.

Christianity believed that one should render services of love to humanity without any reward. It was equal to one's sincere love of God. This principle was absorbed in nursing and helped to improve the status of a nurse. Some of the examples of such women are as follows:

Phoebe: She was the first deaconesses. She was intelligent and educated and the best nurse who could care for the sick in their homes. She can be compared to a modern public health nurse.

Fabiola: She was a young, beautiful and attractive woman. She was the daughter of a great Roman Noble. She converted her palace into a hospital and it was the first Christian hospital in Rome. She collected the poor and sick from the streets and cared for them herself, in her place.

Paula: Paula was a friend of Fabiola. She devoted herself for the services of the sick. She built a hospital for strangers, pilgrims, and travelers and for the sick. She constructed a monastery in Bethlehem. They gave good nursing care for the sick.

Marcella: Marcella was a wealthy woman. Since women of high rank had much freedom in Rome, she was able to lead a group of such women and induce them in works of charity.

During the middle ages, monks and nuns devoted their life to the care and services of the poor and sick. The monasteries became the places of education, medical care and nursing. The following monks and the nuns devoted their life and services for the poor and the sick.

- | | |
|---|--|
| (1) St. Dominic (1170-1221), | (2) St. Francis of Assisi 1182 – 1226. |
| (3) St. Elizabeth of Hungary 1207 – 1231. | (4) St. Catherine Sienna 1347 – 1380. |

The women who assisted in the work of clergy in the church were known as deaconesses. They were matured women, who did teaching, preaching and caring for the sick at the home.

New thoughts and new ideas were introduced in the early Christian era. Even though many religious were fatalistic in their necessary evil, Christianity introduced a new aspect on the subject, thus transforming nursing to a higher level and raising it to a professional standing.

This new aspect that of "altruism" was the highest motive given to mankind. It taught that one's sincere love for God and a desire to be like him, would be the chief motive for one's selfless and sacrificial service to mankind without any hope of reward.

This inspired many godly men and women to step forward in the service of the sick, the suffering and the needy. They opened their homes to the sick and in need. Such homes were called "Diakonia". During the time of the persecution of the Christians, people turned to the Bishop of the Church for help.

This necessitated the building of homes cum hospitals where the strangers, the orphans the aged, the sick and the lepers were cared for

These homes cum hospitals were known as Xenodochia. One such outstanding hospital was founded at Casearia by St. Basil in 370 A.D.

The Christian church preserved records and from that time till today we have a continuous record of the history of nursing.

Many rich and noble women launched out in groups and organizations in the service of the sick and the suffering and used their wealth for this cause. Monasteries came into being and became a heaven for those who needed help and care. Two notable names of people belonging to this era are worth mentioning.

Celsius, a Greek, studied anatomy and knew how to do surgical operations for cataracts and hernias.

Galen practiced dissection on animals and studied the anatomy and physiology of the heart and circulation, the respiratory and nervous system. His writings together with his translations of Hippocrates were considered to be the chief medical authority by the Arabs.

Middle ages: Monks and nuns dedicated to the cause of human suffering worked as doctors and nurses. They were skilled in the use of home remedies. They got scientific knowledge in the care of the sick from the books in the monasteries. They did the groundwork for the development of universities.

In the later middle ages, many social problems presented themselves with disintegration of the protective units like monasteries, guilds and feudalism and resulting in redistribution of population.

Late in the 12th and 13th centuries nursing became differentiated from medicine and surgery. Medicine went into a period of advancement while nursing declined. At such time many noteworthy men and women came out to serve the sick.

During the medieval period plague and pestilence were thought to be due to supernatural rather than natural causes. Religious expeditions like the crusades led to founding of secular as well as military hospitals.

Quarantine was instituted to check spreading of epidemics like plague. Social problems were solved to a great extent. The needs of abandoned children were met in hospital, leading to the founding of crèches. People had an indifferent attitude towards sanitation and hygiene.

The Dark Ages was marked by superstition, mysticism, persecution of free thinkers and religious wars. Use of talisman and incantations for healing the sick became quite common.

The dawn of modern nursing: From the late 1700s through 1853, the manner in which the sick were cared, remain essentially unchanged. In Europe the dawn of nursing was underway.

The Deaconess Institute of Kaiserswerth, Germany was established in 1836 by Pastor Theodore Fliedner, to train the Deaconesses to care for the sick and the provision of social influence through out the world.

Florence Nightingale:

Every one who had studied about Miss Florence Nightingale knows of her devotion to the services to the poor and the sick and is also aware of what she did for humanity and to raise the status of nursing profession.

Florence Nightingale was born in a wealthy English family, on 12th May 1820. As she grew off, she became interested in people and in politics. She had great desire to become a nurse though her parents were not keen on her becoming one.

- (1) She was dissatisfied with the dealt routine lifestyle of the upper class women of their days. She had an active mind and an interest in her surroundings beyond household and social events.
- (2) She had received a classical education equal to that of men of her day. This education provided her with an understanding of the circumstances of the world in which she lived.
- (3) She became aware of the inadequate care being provided in hospitals, when she accompanied her mother on visits to the ill. What Nightingale saw in the hospitals intrigued her and made her want to become more involved.



In 1846, in spite of concerns of parents and friends Nightingale began to visit and care for the sick in her community. In addition, she visited hospitals in England and throughout Europe. Out of her experiences she recognized that nurses required knowledge, training and discipline, if they were too effective.

Nightingale learned about the school at Kaiserwerth and in 1850, she was admitted to the training program. The three years of training she received were rigorous but helped her clarify what was lacking in the current training of English nurses. After her training, in 1853 she was appointed as Superintendent of the Institution for the Care of the Sick Gentlewomen in London.

She had an opportunity to give her best service to the wounded soldiers in the Crimean War in 1854. Florence Nightingale and her nurses attended thousands of wounded and dying soldiers. Every night Florence Nightingale walked about with a lamp in her hand to help the suffering soldiers. At this time she helped them to write letters to their families and last messages for those who were dying. She was rightly known as “The Lady with the Lamp”.

Nightingale and a small band of untrained nurses went to the British hospitals at Scutari in Turkey. She found that the patients were laid on the floor in bloody uniforms. Equipments and facilities were not present adequately. With great compassion, she set about the task of organizing and cleaning the hospital and provided care to the wounded soldiers.

Through her efforts and the help of others, Nightingale introduced numerous improvements in the military hospital. Her efforts were largely responsible for dramatic reductions (42% to 2%) in the wartime death rate of British Soldiers.

She also founded the first training school for nurses (St. Thomas Hospital, London, 1860).

Throughout the publication of countless articles and papers, she shared her ideas about nursing and nursing education. Miss Nightingale was the first to mention Holism (treating the whole patient) in nursing and the first who stated that a unique body of knowledge is required to practice professional nursing.

After the war, she worked to bring about better health conditions in the British army. Nightingale was the founder of modern nursing education. She established the Army Medical School at the Fort Pitt. Despite her ill health she worked for the development of nursing services without taking sufficient rest.

Florence founded a training school for nurses in 1860 at St. Thomas Hospital London. The funds, which were raised by the British people for her service in the Crimean War, were used for this training school. She was very much interested in improving the conditions of the army in India also. She planned a complete public health program, which was practiced in all hospitals and in the fields of nursing. She died peacefully in her sleep at the age of 90 (13th May 1910).

In recognition of her meritorious help to mankind she was offered the Order of Merit in 1907. She was the first lady recipient for such an honour.

DEFINITION OF NURSING AND NURSE:

Nursing: “Is the process of recognizing understanding and meeting the health needs of any person or society and is based upon a constantly changing body of scientific knowledge”.

Nurse: “Nurse is a person who is specially qualified knowledge of the manner in which drugs should be prepaid or compounded for administration cleverness, devotedness to the patient waited upon and party”.

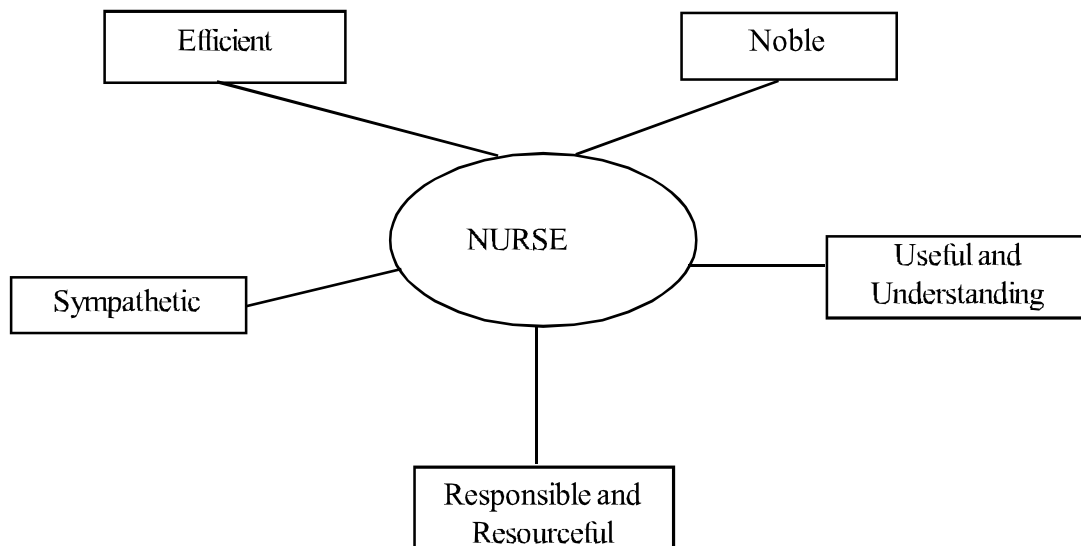
A professional nurse recognizes the individual worth in every person and wants to help each to the very best of her ability. She has pride in her profession and a desire to improve her knowledge and skill she maintains a high ethical standard in all phases of her work.

QUALITIES OF NURSE

- 1) **Love:** With all its other attendant qualities like mercy, kindness, gentleness, patience and understanding are important quality in a successful nurse.
- 2) **Willingness and self sacrifice:** These two qualities are complimentary to each other. Because situation, a nurse sacrifices her time, comfort and even material benefits.

- 3) **Self discipline:** The real purpose of discipline is not to impose rules and regulation upon with experience and understanding but to become a self disciplined person.
- 4) **A caring attitude:** A caring attitude usually comes with being able to express a sense of spiritual love. This kind of love can be expressed in any language in the world.
- 5) **Courage:** In times of confusion, calamity or catastrophe the nurse manages her work with compassion and is ready to meet any problem with courage.
- 6) **Loyalty and Honesty:** Her relationship with client is marked by at most loyalty and honesty.
- 7) **Poise:** Poise should be understood by all nurses and control of her emotions, mental thoughts and actions.
- 8) **Willingness to learn:** A nurse learns to live in harmony with patients, doctors and other members of the health team and tries to help them in times of need.
- 9) **Resourcefulness:** In critical circumstances she uses her wisdom and knowledge and performs her duties to the best of her ability with whatever means that are at her disposal.
- 10) **Cleanliness:** A nurse is always clean and neat personally and in her work. She must be tidy and demand high standard of cleanliness from those whom she is associated with her profession.

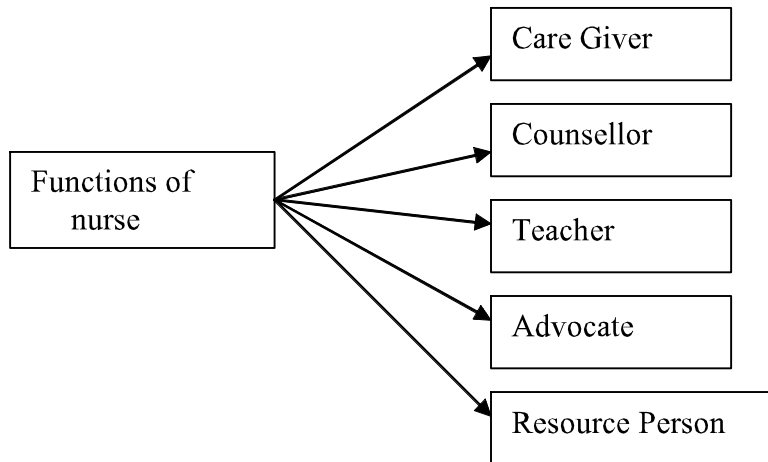
Qualities and characteristics of a professional nurse



FUNCTIONS OF NURSE

- 1) **Care giver:** In the role of caregiver, the nurse provides direct care when patients are unable to meet their own needs.
- 2) **Counselor:** The counselor facilitates patient action and does not tell patients what to do but assist patients to make their own decisions.

- 3) **Teacher:** Teaching is an intrinsic part of nursing. Teaching by nurses can be formal, informal, intentional or incidental.
- 4) **Patient Advocate:** A patient advocate is a person who speaks up for or acts on behalf of the involved in establishing goals.
- 5) **Resource Person:** The nurse functions as resource person by providing skilled intervention and information. Nurse must consider the patient's strengths and access to resources, including physical, intellectual, economic, social and environmental.



FUNDAMENTAL RULES FOR NURSING:

- (1) The nurse should wear the uniform and respect it (Don't sit on the patient's cot).
- (2) Be obedient to your superior Head nurses. Show them proper respect.
- (3) Do not pass on personal information except to the right person.
- (4) Always be neat and clean in appearance.
- (5) Be disciplined in your use of time; keep up punctuality, cleanliness and order.
- (6) Maintain a good relationship and co-operation with co-workers in the hospital.
- (7) Use the medicine in proper way and keep it safely.
- (8) Don't talk about the patient and about the hospital in common place.
- (9) Have respect for the spiritual beliefs of the patient.
- (10) Don't get any gift or money from the patient. Codes of ethics are used to guide professional behavior but it can also be used in other ways. In the nursing profession the code helps teachers to know what must be taught in the education of the nurse.

CODE OF ETHICS IN NURSING

The Oxford dictionary defines ethics as "a science of human duty in its widest extent".

The chambers describes it as "the science of morals, that branch of philosophy which is concerned with human character and conduct".

Webster defines it as “the morals concerned with or relating to what is right and wrong in matters of human behavior”.

A code is needed to educate and orient members of the profession to distinguish desirable from the undesirable behaviors, to regulate relationships with co-workers and clients, and to guide the public in understanding professional conduct”.

A group of nurses stated, “Ethics is knowledge and attitudes that determine man’s relationship to himself, to others and to the society”.

Ethics is a science that endeavors to interpret the highest standards of written or unwritten principles or doctrines or morals of human duty, human character and conduct of human behavior and human relationships in day-to-day life.

Ethics in nursing is a particular code of behaviors, characters, conducts and relationship unique only to the nursing personnel.

Nursing ethics is “a system of principles governing the conduct of a nurse, her relationship to the patient and his family her associates and society at large”.

As a guidelines to all those in the nursing profession, the Grand Council of the International Council of Nurses held at Sao Paulo, Brazil on July 10, 1953, adopted, viewed and revised in the year 1964.

CODE OF ETHICS AS APPLIED TO NURSING

The codes of ethics are as follows:

- (1) The nurse provides services with respect for human dignity irrespective of social or economic status, personal attributes, or the nature of health problems.
- (2) The fundamental responsibility of the nurse is threefold; to conserve life, to alleviate suffering and to promote health.
- (3) The nurse shall maintain at all time the highest standards of nursing care and of professional conduct.
- (4) The nurse must not only be well prepared to practice but shall maintain knowledge and skills at a consistently high level.
- (5) The religious beliefs of a patient shall be respected.
- (6) Nurses hold in confidence all personal information entrusted to them.
- (7) Nurses recognize not only the responsibilities but the limitations of their professional functions not to recommend or give medical treatment without medical orders except in emergencies, and report such action to a physician as soon as possible.
- (8) The nurse is under an obligation to carry out the physician’s orders intelligently and loyally and to refuse to participate in unethical procedures;
- (9) The nurse assumes responsibility and accountability for individual nursing judgments and actions.

- (10) The nurse sustains confidence in the physician and other members of the health team; incompetence or unethical conduct of associates should be exposed but only to the proper authority.
- (11) The nurse safeguards the patients and the public when health care and safety are affected by the incompetent, unethical or illegal practice of any person.
- (12) The nurse co-operates with the health team and maintains harmonious relationships with members of other professions and with nursing colleagues.
- (13) The nurse adheres to standards of personal ethics, which reflect credit upon the profession.
- (14) In personal conduct nurses should not knowingly disregard the accepted pattern of behaviors of the community in which they live and work.
- (15) The nurse participates and shares responsibility with other citizens and other health professions in promoting force to meet the health needs of the public – local, state, national and international.

Requests poured in from many quarters of the nursing world to review and revise this code against and representation for this purpose was made through several national councils.

In accordance with these requests the Professional Service Committee of the ICN selected a sub-committee for the revisions of the code. The final revised code was submitted to the ICN Council of National Representatives in Mexico in May 1973 at the 15th Quadrennial congress.

The Sub-committee on the Code of Ethics tried to concentrate their attention on the most vital aspects of nursing and built their revised ethical code around five major headings.

Nurses and People : Nurse's responsibility is to those people who require nursing care. A person's values customs and religious beliefs must be respected. Personal information must be held in confidence or shared only with judgments.

Nurses and Practice: The nurse is responsible for giving the best care possible at all times and under all circumstances and maintaining a high standard of practice.

Nurses and society: The code states the responsibility of the nurse for positive promotion health of the society by initiating and supporting action to meet the health and social needs.

Nurses and Co-Workers: The nurse is the members of the health team which is made up of all those who serve to meet the health needs of people. Nurses are expected to cooperate and to work well with nursing colleagues, the other members of the health team and members of other health professions.

Nurses and the Profession: The code points out very clearly the role of the nurse as a leader and an active participator in professional activities by setting up and carrying out desirable standards of nursing practice and nursing education.

THE FLORENCE NIGHTINGALE PLEDGE

The modified Hippocratic Oath arranged by Mrs. Lystra E. Gretter and her committee for the Farrand Training School for Nurses, Detroit is called the Florence Nightingale Pledge as a token of esteem for the Founder of Modern Nursing.

The pledge is taken by all the nurses who have completed the training program before entering to their practice.

“I solemnly pledge myself before God and in presence of this assembly to practice my profession with dedication.”

“I will serve mankind with love and compassion, recognizing their dignity and rights irrespective of color, caste, creed, religion and nationality”

“I will endeavour to maintain up-to-date knowledge and skill to uphold standard of nursing care to individual, family and community in all settings and in all aspects of holistic care as a member of the health care team.”

“I will hold in confidence personal matters of my clients committed to my care and help them to develop confidence in care rendered by me.”

“I will refrain from any activity that will harm my personal and professional dignity as a Nurse”

“I will actively support my profession and strive towards its advancement.”

“I will fulfill my responsibilities as a citizen and encourage change towards better health.”

DEFINITION OF HOSPITAL

The word ‘hospital’ is derived from the Latin word “hospitalis” – for a guest in French “hospes – a host, a guest”.

“The hospital is an integral part of a social and medical organization, the function of which is to provide for the population, complete health care, both ‘curative and preventive’ and whose out-patient services reach out to the family and its environment; the hospital is also a centre for the training of health workers and bio-social research” (WHO Expert Committee on Organization of Medical Care, 1957.

Today, hospital means an institution in which sick or injured persons are treated as well as healthy persons are helped to promote and maintain an optimum level of well-being and prevent diseases.

A modern hospital is an institution, which possesses adequate accommodation and well qualified and experienced personnel to provide services of curative, restorative, preventive and promotive character of the highest quality possible to all people regardless of race, colour, creed or economic status. It conducts educational and training programmes for the health personnel, particularly required for patient care and hospital services. It also conducts research assisting the advancement of medical services, hospital services and programmes of health education.

TYPES OF HOSPITALS

- (1) Government Hospitals including Medical College, District and Taluk Hospitals.
- (2) Railway hospital
- (3) Military hospital.
- (4) Private company hospital
- (5) Christian (Mission) hospitals

The word hospital is derived from the word hope which means a guest. In the hospital the variety of people of all age’s casts and creed with varying degrees of illness are treated.

THE FUNCTIONS OF THE HOSPITALS

The main aim of a hospital is patient care and comfort and the nurse has much to contribute is not only doing her functions but also in coordinating the activities of the health team. Such as care of the sick and injured, diagnosis, treatment and rehabilitative services.

Many hospitals conduct, education of doctors; nurses, technicians etc.

- (1) Some hospitals do research work.
- (2) There are various departments in a hospital like medical, nursing, pharmacy, and dietary.
- (3) Every hospital and its departments have own policies and rules, which Govern their various activities
- (4) Many hospitals conduct conferences, seminars and workshops to disseminate new information to all health professionals.
- (5) Conduct health promotional activities like awareness program on National Programme etc.
- (6) Conduct outreach services like ambulance service for emergency care.

SUMMARY

- (1) From the dawn of civilization, evidence prevails that nurturing has been essential to the preservation of life.
- (2) Survival of the human race is inextricably intertwined with the development of nursing.
- (3) Nursing is the oldest of the arts and the youngest of the profession.
- (4) Egypt had made much progress in medicine. Nursing and medicine was closely connected with religion in Greece and India.
- (5) Hippocrates, “Father of scientific Medicine” had a medical foundation to start with.
- (6) The Romans were best known for advances in Public Health.
- (7) India had the Ayurvedic system of medicine, which stressed on hygiene, prevention of sickness, inoculation against small pox, sanitation, laboratories, good ventilation and construction of hospitals.
- (8) Christianity believed that one should render services of love to humanity without any reward. This principle was absorbed in nursing and helped to improve the status of a nurse. Phoebe, Fabiola, Paula and Marcella devoted themselves for the services of sick.
- (9) During middle ages, monks and nuns dedicated themselves caring of sick.
- (10) The Dark Age was marked by superstition, mysticism and persecutions of free thinkers.
- (11) Florence Nightingale “The Lady with the Lamp” underwent training at the School of Kaiser worth. She and her nurses attended thousands of wounded and dying soldiers in Crimean war in 1854.
- (12) Florence Nightingale founded a training school for nurse in 1860 at St. Thomas Hospital London.
- (13) In 1854, the Govt. of India sanctioned a training school for midwives in Madras.

- (14) Code of Ethics in Nursing governs the conduct of a nurse, her relationship to the patient and his family, her associates and society.
- (15) A professional nurse should have kindness, gentleness, patience, willing to serve and be honest. She should be reliable, resourceful, courageous, cooperative and considerate.

QUESTIONS

PART A — ANSWER IN ONE OR TWO WORDS: (One mark)

- 1) Expand WHO
- 2) Who is the Greek God of medicine?
- 3) When was Florence Nightingale born?
- 4) Who were best known for the advances in public health?
- 5) Who is the father of surgery of ancient India?
- 6) Who was the first physician and teacher of Ayurveda?
- 7) What is Xenodochia?
- 8) Who founded the first Christian hospital?
- 9) Who had good knowledge about internal organs and circulation of blood?
- 10) What are the books written by Charaka?

PART B — MULTIPLE CHOICE QUESTIONS: (One mark)

- 1) The name of Ancient Greek the sun God was the God of healing is,
a) Apollo b) Asclepius c) Hugia d) Galen
- 2) During early civilization an outstanding priest physician in Egypt was
a) Asclepius b) Hugia c) Galen d) Imhotep
- 3) The name of a Greek physician learnt about anatomy and disease by doing experiments on animal is, .
a) Asclepius b) Hugia c) Galen d) Imhotep
- 4) The founder of modern nursing is
a) Fabiola b) Pheobe c) Paula d) Nightingale
- 5) The father of scientific medicine is
a) Hippocrates b) Charaka c) Sushrusa d) Nightingale
- 6) The first deaconess who cared for the sick at their home can be compared to a modern public health nurse.
a) Fabiola b) Pheobe c) Paula d) Nightingale

- 7) The period was marked by superstition and mysticism.
 a) early Christian era b) dark ages c) ancient period d) modern period.
- 8) The Florence Nightingale started the first school of Nursing at
 a) Crimean b) Kaiserwerth c) Turkey d) London
- 9) The word 'hospital' is derived from the Latin word
 a) Hospes b) Hospitalis c) Nutrius d) All of the above
- 10) The ICN has published the following
 a) Code of Ethics b) Code of Conduct c) Standards d) All of the above.
- 11) The Government of India sanctioned a training school for midwives in Madras in the year of
 a) 1860 b) 1853 c) 1854 d) 1850
- 12) The name of a Greek studied the anatomy and knew how to do surgical operations, for cataract and hernias.
 a) Hippocrates b) Celsius c) Gallen d) Charaka.
- 13) In early Christian era, the homes cum hospitals were known as
 a) Diakonia b) Orphanage c) Xenodochia d) None of the above.
- 14) The song consist of medical care by doctors and nurses in India during 700-600 BC was written by
 a) King Ashoka b) Charaka c) Thiruvalluar d) Atreys.
- 15) The first great physician and teacher of Ayurveda was
 a) Sushruta b) Atreys c) Charaka d) Ashoka.
- 16) The Greek God of medicine is
 a) Apollo b) Asclepius c) Hugiaea d) Galen.
- 17) The Florence Nightingale pledge modified from Hippocrates oath by
 a) Fabiola b) Paula c) Sr. Catherine d) Mrs. Lystra E. Gretter.
- 18) Florence nightingale was born on
 a) 12th May 1820 b) 15th May 1820 c) 15th March 1820 d) 15th May 1826
- 19) In early civilization, the following people practiced vaccination and physiotherapy.
 a) Egyptian b) Chinese c) Greeks d) Romans
- 20) The use of Talisman and incineration for healing the sick is during
 a) Middle ages b) dark ages c) Early Christian era. d) Modern era.

PART C — WRITE SHORT NOTES ON: (5 marks)

- 1) Functions of Nurse.
- 2) Qualities of Nurse.
- 3) Functions of hospital
- 4) Florence Nightingale pledge
- 5) Fundamental rules of nursing.

PART D — WRITE IN DETAIL: (10 marks)

- 1) Code of ethics in nursing
- 2) Florence Nightingale.
- 3) Define health. Explain health illness continuum

PART E — WRITE ESSAY: (20 marks)

- 1) Explain nursing in ancient civilization?
- 2) Describe the progress in nursing during early Christian era?
- 3) Explain about the development of modern nursing?
- 4) Describe in detail the development of nursing in India?



2. ANATOMY AND PHYSIOLOGY

DEFINITION OF ANATOMY AND PHYSIOLOGY

Anatomy : It is the study of the structure of the human body.

Physiology : It is the study of the functions of the human body.

The body as a whole:

The body is wonderfully made, like a complex, perfect machine. Each part is specially constructed to carry out its own function, and to work as a whole with the other parts.

Look at a person standing with arms at the sides, palms turning forward, this is called the ‘**anatomical position**’. The body is seen to consist of the head, neck, trunk, upper limbs (the arms) and lower limbs (the legs).

ANATOMICAL POSITION

When a person standing upright with the head facing forward, arms by the sides and the palms of the hands facing forward and feet together is said to be anatomical position

THE FOLLOWING TERMS ARE USED IN ANATOMY:

- 1) SUPERIOR - higher
- 2) INFERIOR - lower.
- 3) ANTERIOR - nearer the front of the body.
- 4) POSTERIOR - nearer the back of the body
- 5) MEDIAL - nearer to the mid-line.
- 6) LATERAL - to the side.
- 7) PROXIMAL - nearer to the head or source.
- 8) DISTAL - distant from the head or source.
- 9) EXTERNAL - outside, or away from the trunk centre.
- 10) INTERNAL - inside, or nearer to the trunk centre.
- 11) SUPERFICIAL - nearer the body surface.
- 12) DEEP - inside, away from the body surface.

The body has a strong frame work of bones called the **skeleton**. The skeleton is covered by muscles and other soft tissues and by skin on the outside.

Cavities of the body and their contents:

Some body parts form spaces called **cavities**, in which important internal organs are protected.

- 1) The **cranial cavity or skull** – contains the brain.

2) The **thoracic cavity or chest** contains:

- (a) The lungs
- (b) The air passages – trachea and bronchial tubes.
- (c) The esophagus or food pipe, which lies behind the trachea.
- (d) The heart.
- (e) The great blood vessels and the thoracic duct (the largest lymphatic vessel).

3) The **abdominal cavity**, which is separated from the thoracic cavity by a dome – shaped muscle called the diaphragm. It contains:

- (a) The stomach
- (b) The small intestines.
- (c) The large intestine or bowel
- (d) The liver.
- (e) The spleen
- (f) The kidneys.
- (g) The ureters
- (i) The pancreas.

4) The **pelvic cavity**, which contains:

- (a) The reproductive organs
- (b) The bladder when empty (when full it rises into the abdominal cavity)
- (c) The rectum.

CELLS AND TISSUES

All living things, including the human body, are made up of living cells. The cell is the structural and the functional unit of the human body.

Just as many kinds of materials may be used in the construction of a large building, in the same way many different kinds of cells are found in the body.

Structure of a Cell: A cell has the following parts:

- (a) Cell membrane, the outer covering.
- (b) Protoplasm, the main substance of the cell.
- (c) Nucleus, which controls activities of the cell

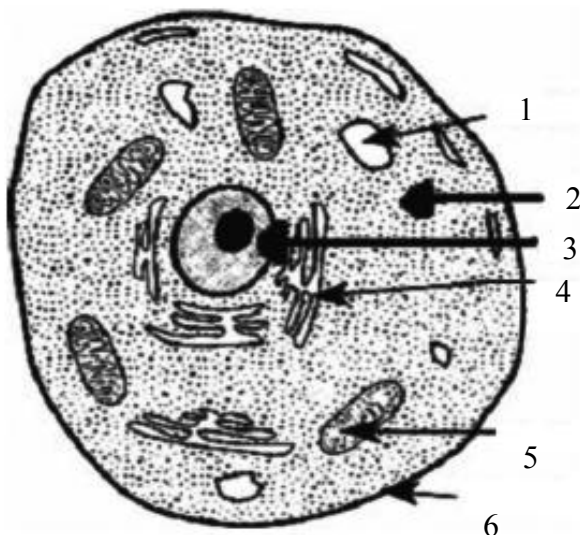


Fig.2.1 Structure of the Cell

- 1) Vacuole
- 2) Cytoplasm
- 3) Nucleus
- 4) Endoplasmic reticulum
- 5) Mitochondrion
- 6) Cell membrane

Functions of cells: By functions we mean the activities

- (a) Digestion - intake of the nutrients.
- (b) Excretion - elimination of wastes.
- (c) Respiration - taking and using oxygen, and giving out carbon dioxide.
- (d) Growth and repair - increases the size of the cell and replacement of worn out cell.
- (e) Some cells move about, and some have special functions.
- (f) Reproduction is by each cell simply dividing into two.

TISSUES

Tissues are materials made up of groups of similar cells. Cells are of various types, and tissues vary according to the types of cells in their structure. There are four main types of tissue in the human body.

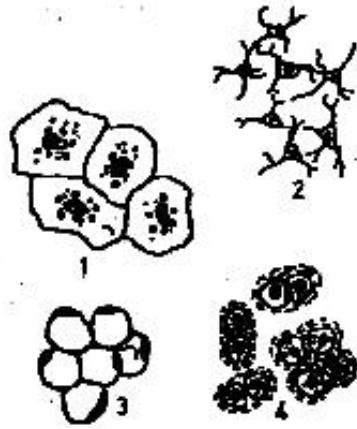


Fig. 2.2 Various kinds of cells

1) Epithelial cells (2) Connective tissue (3) Fatty tissue (4) Cartilage

- (1) **Epithelial** - which forms coverings like the skin, lining membranes and glands connective, which helps to support and bind parts together, holding them in place.
- (2) There are several types of **connective tissue** including bone, cartilage, ligaments, fatty and elastic tissue, also blood and lymph (the fluid tissues).
- (3) **Muscular** – this tissue has the power of contraction, which causes movement.
- (4) **Nervous** – conducts nerve impulses.

ORGANS AND SYSTEMS:

Tissues are jointed in larger units called **organs**, such as the heart, lungs, brain, liver. Each organ is made up of types of tissue, which enable it to do its special work.

A **system** is a group of organs, which together carry out one of the essential functions of the body. There are nine systems listed below. All of these systems work harmoniously together in a healthy body.

| S.No. | Systems of the body | Functions |
|-------|---------------------|--|
| 1. | Skeletal System | Support, movement and protection |
| 2. | Muscular System | Movements and production of heat. |
| 3. | Nervous System | Control of body activities. |
| 4. | Circular System | Transport of food and oxygen, waste products. etc. |
| 5. | Respiratory System | Taking in of oxygen and giving off carbon-di-oxide. |
| 6. | Digestive System | Taking in food, breaking it down into nutrients for use by body cells. |
| 7. | Excretory System | Removal of waste matter from the body |
| 8. | Endocrine | Production of hormones, which influence the activity of cells. |
| 9. | Reproductive System | Enables new individuals to be born. |

(I) MUSCULO-SKELETAL SYSTEM

The skeleton is the bony framework of the body. The human skeleton is wonderfully made in such a way, that it can support the body in the erect position and enable the body to move freely.

Structure and Functions of the Skeleton: The skeleton is composed of **206 separate bones** in the adult, and the cartilages and ligaments, which help to unite the bones at the joints.

The Parts of the Skeleton are:

- (1) Skull, made up of 29 bones in all (including middle ear bones and the hyoid).
- (2) Spine or Vertebral column made up of 26 Separate bones.
- (3) Thorax or Chest made up of 25 (12 pairs of ribs and the breast bone)
- (4) Upper limbs, each 32 bones.
- (5) Lower limbs, each 31 bones.

The total bones in our body is 206.

Types of Bones:

- (1) **Long bones** – These are in the arms, legs and fingers. They act as levers to move parts.
- (2) **Short bones** – As in the wrists and ankles.
- (3) **Flat bones** - These includes the ribs, shoulder and bones of the cranium.
- (4) **Irregular bones** – Such as the bones of the face and of the spine.

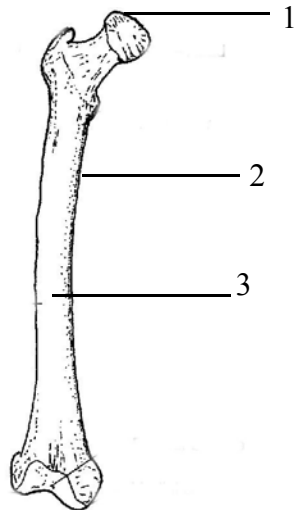


Fig.2.3 Long Bone

- 1) Hyaline Cartilage
- 2) Periosteum
- 3) Medullary Cavity

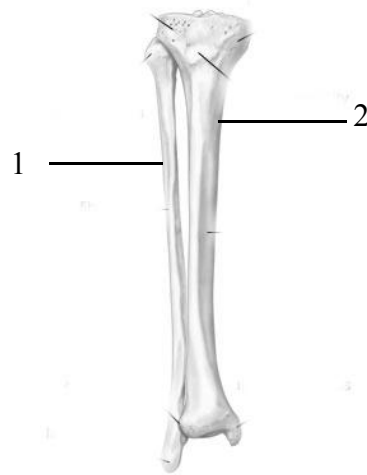


Fig 2.4a Short Bone

- 1) Fibula
- 2) Tibia

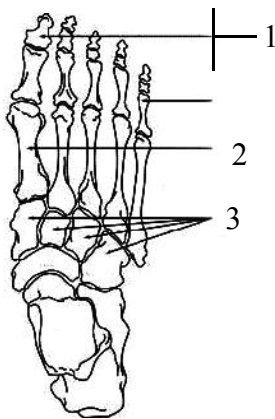


Fig 2.4b Short Bone

- 1) Phalanges
- 2) Metatarsal Bones
- 3) Tarsal Bones

Functions of the Skeleton:

- 1) Supports and gives shape to the body.
- 2) Protects internal organs.
- 3) Movements with the help of muscles.
- 4) Forms blood cells.

Structure of skeletal tissue:

- 1) **Periostium:** This is the outer covering of bones. It carries blood vessels and nerves.
- 2) **Compact Bone:** Mainly composed of calcium and phosphorus, is the hard outer layer of bone tissue.
- 3) **Cancellous Bone:** inside is a porous type of bone with many tiny spaces. It helps to make the bones light.
 - (a) **Red Marrow:** This fills the spaces in cancellous bone. Red bone marrow produces red blood cells and some white blood cells.

- (b) **Yellow Marrow:** This is mainly composed of fat cells. Yellow bone marrow fills the shaft of the long bone making them light.
 - (c) **Cartilage:** A strong plain tissue like hard rubbers is attached to some bones. Eg. The end of the nose, and of its ribs
- 4) Ligaments are made of strong fibrous tissue and they hold bones together at the joints, allowing some movement.

The Skull consists of two parts:

- 1) The cranium, which is like a box in which the brain is well protected.
- 2) The bones of the face.

The cranium is made up of eight bones as follows:

- 1) **Frontal bone:** Which forms the forehead and helps to protect the eyes.
- 2) **Parietal bone** – One at each side of the top of the skull, joined in to the middle.
- 3) **Temporal bones-** One on each side below the parietal bones. These protect the inner parts of the ears.

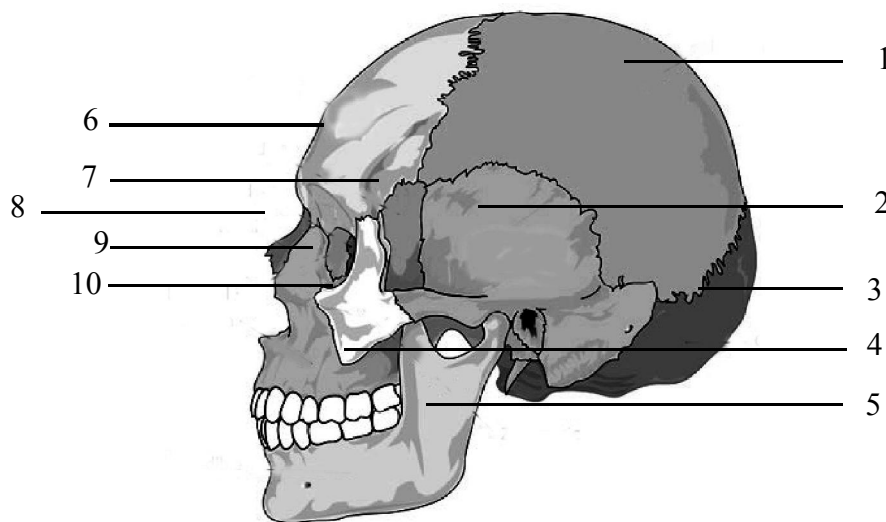


Fig 2.5 The Skull

1) Parietal Bone 2) Temporal Bone 3) Occipital Bone 4) Maxillary Bone 5) Mandible Bone 6) Frontal Bone 7) Sphenoid Bone 8) Lacrimal Bone 9) Ethmoid Bone 10) Malar Bone

- 4) **One Occipital bone:** This forms the back of the head and part of the base of the skull. It has a large opening for the spinal cord to pass through.
- 5) **One Sphenoid** – A hat shaped bone, which also forms part of the base of the skull. It has a little seat for the pituitary gland, and some holes for blood vessels and cranial nerves pass through.
- 6) **One Ethmoid** – Which forms the roof of the nose and in between the eyes. It has many small holes for the nerves of small to pass through the brain.

The Face has the following fourteen bones:

- Two **nasal bones**, which form the bridge of the nose.
- Two **lacrimal bones**, near the eyes, which contain the rear ducts.
- Two **cheek bones**.
- Two **upper jaw bones**, with upper teeth.
- Two **palate bone** which join with the upper jaw bones in forming the hard palate.
- Two **curled bone**, one in each side of wall of the nose.
- Two **vomer bones**, which rests on the palate and helps to form the nasal septum.
- One **lower jaw bone**, which consists of the horizontal part on which are the lower teeth, and two vertical parts, which meet the temporal bones. The “angle of the jaw” on each side is important. All the bones of the skull except the lower jaw are joined firmly together by fixed joints called “Sutures”.
- **Sinuses**. Some skull bones have hollow spaces called “sinuses” which connect with the nose and are filled with air. Sinuses make the skull lighter, and help in the sound of the voice. ‘Sinusitis’ is infection in these spaces. The main sinuses are the frontal ones above the eyes, and large antrum sinuses, one in each of the upper jaw bones.
- **Hyoid bones**, this is a horse shaped little bone in the upper part of the neck. The tongue muscle is attached to this bone.

The Vertebral Column

Spine or back bone is the central part of the skeleton. It supports the head and encloses the spinal cord. It consists of 33 irregular bones called “Vertebrae” but some are fused together and so these are actually 26 separate bones forming the spine.

The parts of the Vertebral Column are as follows:

- **Cervical vertebral column** in the neck region. The first two, called atlas and axis are important for nodding and turning the head.
- 12 dorsal or **thoracic vertebrae** at the back of the chest. The ribs are joined to these vertebrae.
- 5 **lumbar vertebrae** in the assist region. These are big and strong for giving support.
- 5 **sacral vertebrae** are fused together to form the sacrum, a triangular shaped bone with a hollow anteriorly. The sacrum helps to form the pelvis.
- 4 small vertebrae in the tail region are fused to form a small triangular bone called the **coccyx**. It is attached to the lower part of the sacrum.

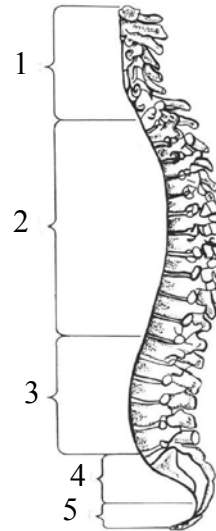
Intervertebral Discs

Between the bodies of the vertebrae there are thick pads of cartilage called discs. They allow movement in the spine, and act as shock absorbers.

The vertebrae are also joint together by ligaments and muscles attached to the back and side processes.

Fig 2.6 Vertebral Column

- 1) Cervical Region
- 2) Thoracic Region
- 3) Lumbar Region
- 4) Sacral Region
- 5) Coccygeal Region



FUNCTIONS OF THE VERTEBRAL COLUMN

- 1) Movement: Forward, backward, from side to side, also nodding and turning the head are possible because the spine is made of not one but many small bones, with discs of cartilage in between.
- 2) The spine supports the weight of the head, and of the abdominal organs.
- 3) Protection for the spinal cord, which lies within the spinal canal, and protection from injury by cushioning of the discs.
- 4) Balance in the erect position is made possible by the curves of the spine.

The Thorax: The thorax or chest is formed by the **sternum** (Breast bone) and costal cartilages in front, the ribs at the sides, and the twelve dorsal vertebral bones at the back.

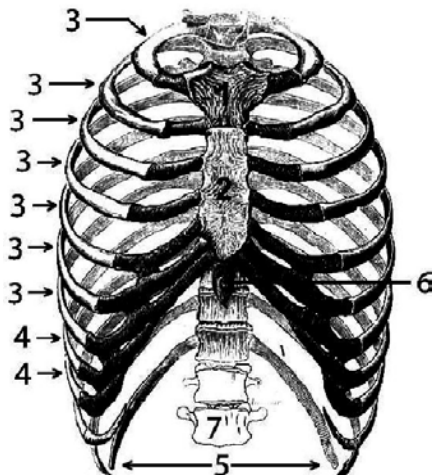


Fig 2.7 The Thorax

- 1 & 2) Sternum
- 3) True Ribs
- 4) False Ribs
- 5) Floating Ribs
- 6) Xyphisternum
- 7) Lumbar Vertebrae

The sternum is a flat bone, shaped like a dagger pointing downwards. The tip consists of a cartilage known as the xiphisternum. The upper part, like the handle is joined to the two collar bones. The costal cartilages are joined to the sides of the sternum and to the true ribs.

The ribs are twelve pairs of the long curved bones. The upper seven pairs are called true ribs. These are each attached to the sternum by its costal cartilages.

The next five pairs of ribs are called false ribs because they are joined by their cartilages to those of the ribs above and not directly to the sternum. The last two pairs are not connected to the sternum at all, and are called floating ribs.

Functions of the Thorax:

- 1) Protection for the heart, lungs, liver, stomach and spleen.
- 2) Support for the bones of the shoulder girdle and for the breast.
- 3) Important in respiration.

Bones of the Upper Limbs:

Each upper limb consists of thirty two bones.

- One **collar bone**: These together with those of the other side form the shoulder bone.
- **Shoulder girdle**.
- One **humerus**, the bone of the upper arm.
- One **radius**, the outer bone of the forearm.
- One **ulnar**, the inner bone of the forearm.
- Eight **carpal bones** of the wrist.
- Fourteen **phalanges** of the fingers.

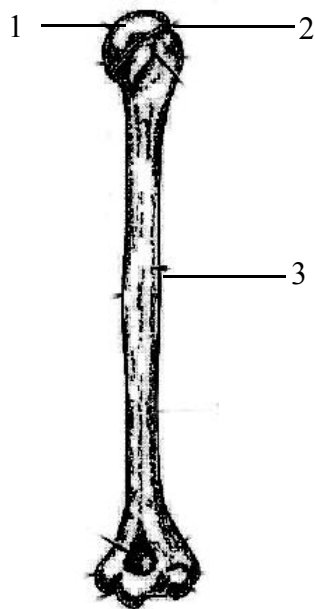


Fig 2.8a Humerus

1) Head 2) Neck 3) Shaft

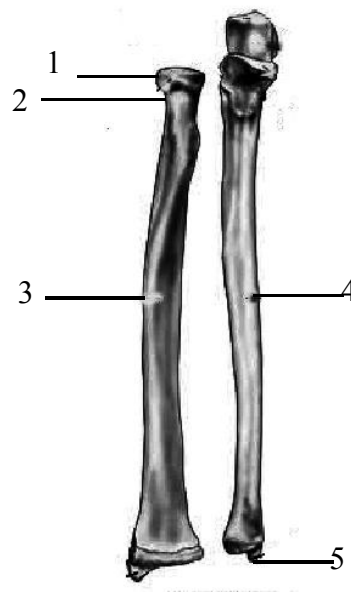


Fig 2.8b The Ulna & Radius

1) Head of the Radius 2) Neck of the Radius 3) Shaft of the Radius 4) Shaft of Ulna 5) Head of Ulna

- The **collarbone** (clavicle) on each side is a long bone with two curves. Its inner end is attached to the sternum, and outer end with the shoulder blade. The collarbone is easily felt at the lower and front part of the neck. It keeps the shoulder blade in place. When it is broken the shoulder drops forward and downwards.
- The **shoulder blade** (scapula) on each side is at the upper and outer part of the back of the thorax. It is large flat, triangular shaped bone with a ridge or spine at the back. It takes part in the shoulder joint.
- The **humerus** is a long bone with a rounded head at the shoulders and a broad lower end at the elbow joint.
- The **radius and ulnar bones** of the forearm reach from the elbow joint to the wrist.
- The wrist consists of eight **carpal bones**. These short bones are arranged in two rows, proximal and distal, with four bones in each row.
- The palm consists of five long bones called **metacarpal**, which articulate with the distal row of carpal bones and with the proximal row of **phalanges**. The phalanges are long bones. The thumb has only two phalanges while the fingers have three each.

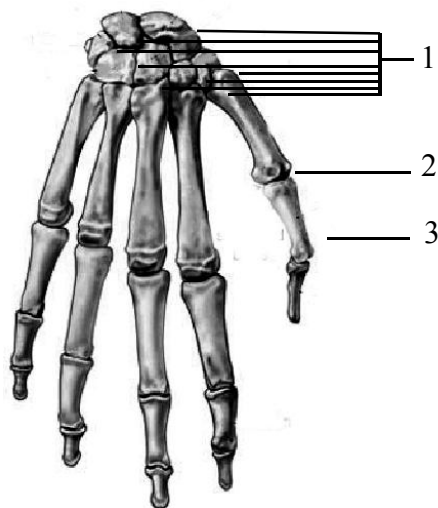


Fig 2.9 The Hand

- 1) Cartal Bones
- 2) Meta Cartal Bone
- 3) Phalanges

Bones of the Lower Limbs:

Each lower limb consists of thirty one bones:

- One **innominate** or hip bone,
- One **femur**, the thigh bone,
- One **patella** or knee cap,
- One **tibia**
- One **fibula** the lower leg bones
- One **tarsal bones** of the ankle
- Five **metatarsal bones** of the foot
- Fourteen **phalanges** of the toes

1) The Innominate Bones: One on each side, join with the sacrum to form the pelvis. Besides protecting the pelvic organs, the pelvis supports the abdomen and provides the deep sockets for the hip joints.

In the female, the true pelvis (lower part) is round so that the head, of the baby can pass through during delivery. ; In the male the true pelvis is long, narrow and heart – shaped.

The innominate bone in a child is separated into three bones, which are fused together in the adult. Therefore the bone has three parts as follows:

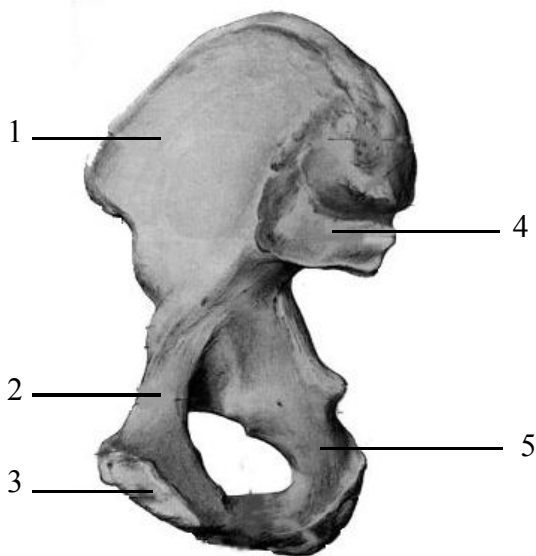


Fig 2.10 Innominate Bone

1) Ilium 2) Pubis 3) Symphysis pubis
4) Sacro-iliac Joint 5) Ischium

1) Ilium, the upper flat part, forms the false pelvis. Its upper ridge is called the iliac crest.

2) Ischium, the heavy lower part, which supports the body when sitting.

3) Pubis, the front part. The pubic bones from the joint called symphysis pubis.

- The femur (thigh bone) is the longest and strongest bone in the body.
- The patella (knee cap) is a small bone at the front of the knee joint.
- The tibia is the long bone on the inner side of the lower leg.
- The fibula is a long thin bone on the outer side of the leg.
- The tarsal bones of the ankle. These are seven short bones. The largest is the heel bone (calcaneum). The upper bone takes part in the ankle joint.
- The metatarsal bones are five long bones in front of the feet. They support the toes.
- The toe bones (phalanges) are fourteen in number. Like the finger bones, they are small long bones, two in the big toe and three in each of the other toes.

Joints: A **joint** is the point at which two or more bones meet. Bones are held together at the joints by other connective tissue such as fibrous tissue, cartilage, ligaments and tendons. Muscles are the means by which all movement in the body takes place, including the movements of bones at some of the joints.

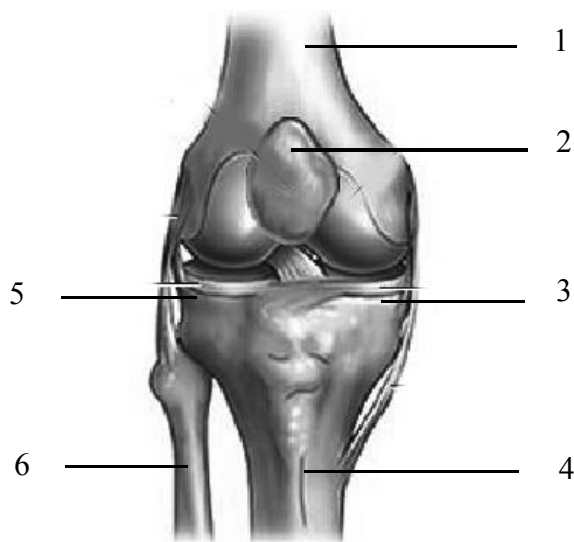


Fig 2.11 Joints

- 1) Femur
- 2) Patella
- 3) Cartilage
- 4) Tibia
- 5) Synovial Membrane
- 6) Fibula

Types of Joints:

- 1) **Fibrous joints** – in which there is no movement. Eg. The ‘sutures’ of the skull. The bones are joined together closely as though they were stitched (sutured) together
- 2) **Cartilaginous joints** – in which two bones are joined by a pad of fibrous cartilage, which allows slight movement. They are found in the vertebral column and pelvis.
- 3) **Synovial joints** – which are freely movable, are found in the limbs and jaw.
- 4) **Ball and socket joints** – the round head of one bone fits into the cavity of another bone: eg. Shoulder and hip joints.
- 5) **Hinge joint** – the only movements are flexion and extension. Eg. Elbow, knee.
- 6) **Gliding joint** – the bones glide on one another and allow fairly free movements. Eg. Wrist and ankle joint.
- 7) **Pivot joint** – turning is the only movement. Eg. The movement between the atlas and axis for turning the head.

Muscular system

The function of a muscle is to contract and to product movement. A **muscle** is made up of bundles of fibers held together. These are the red flesh of the body. There are three types of muscles:

- 1) **Voluntary muscle:** These are connected with the skeletal system, causing the joints to move. They are called voluntary because their action can be controlled by the will.
- 2) **Involuntary muscle:** Work without conscious control by the individual and are found in the internal organs.
- 3) **Cardiac muscle:** A special type found only in the heart. The fibers are striped but the muscle is not under control of the will.

Structures and Functions of Voluntary Muscles

A voluntary muscle is shaped like a spindle, and is enclosed in a protective coat called fascia.

The centre of the muscle is called the body or belly. the body in thick and become shorter and thicker when the muscle contracts.

In health the muscles are always in a state of the slight contractions, ready at all times for action. This state of readiness is called 'muscle tone'.

Fucntions are 1) Movement, 2) Maintaining posture. 3) Producing body heat.

Main Group of muscles and their actions

Many muscles are arranged in pairs, and oppose each other in action. They are often grouped according to function as follows.

- 1) Flexors-cause bending of a joint.
- 2) Extensors-straighten a joint.
- 3) Abductors-move the bone away from the midline
- 4) Adductors-move the bone towards the midline.
- 5) pronators-turn the hand palm downwards
- 6) Supinators-turn the hand palm upwards.
- 7) Levators-raise a part.
- 8) Sphincters-reduce the size of an opening.

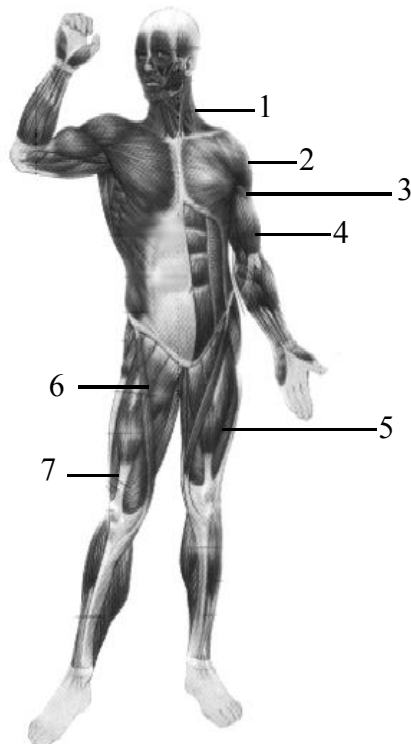


Fig 2.12 Muscles of the Body (Anterior)

- 1) Sterno-mastoid
- 2) Deltoid
- 3) Pectorails
- 4) Biceps
- 5) Quadriceps
- 6) Illio-psoas
- 7) Sartorius

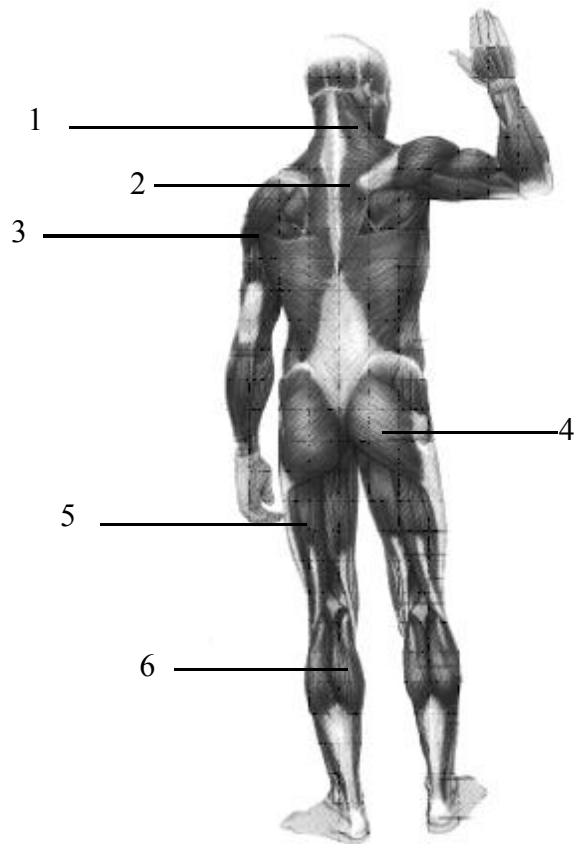


Fig 2.13 Muscles of the Body (Posterior)

- 1) Sterno-mastoid
- 2) Trapezius
- 3) Deltoid
- 4) Gluteus Maximus
- 5) Hamstrings
- 6) Gastrocnemius

Muscles of the head and neck: Sterno-mastoid, a muscle attached to the mastoid process of the temporal bone and to the sternum. This pair of the muscles when used together flex the and head. Separately they held to turn the head to one side.

Trapezius, a large diamond shaped muscle, attached to the occiput and dorsal vertebrae. It draws back the shoulders and extends the head, thus helping in good posture.

Muscles that move the upper Arm: Deltoid- a triangular muscle covering the shoulder joint, and attached to the shoulder blade, collar bone and humerus. It raises th arm outwards to shoulder level (abduction).

Pectoralis-a muscle covering the front of the chest, attached the humerus. It adducts the arm (draws the arm across the chest).

Latissimus dorsi-a-large muscle of the back, attached to the upper posterior part of the humerus. It adducts the arm, drawing it down and back.'

Muscles that move the forearm: Biceps-a muscle with two heads from the shoulder blade. It lies in front of the humerus and is attached to the radius. It flexes the elbow joint.

Triceps-a muscle with three heads from the shoulder blade and humerus. It lies along the back of the humerus and is attached to the ulna. It extends the elbow joint.

Muscles that move the thigh: Ilio - psoas muscle that passes from the front of the lumbar vertebrae and the ilium, to the femur. It flexes the hip joint.

Gluteals-muscles of the buttocks. Attached to the posterior surface of the ilium, and sacrum, and to the femur, they extend the hip joint.

Muscles that move the lower Leg: Quadriceps femoris a very strong group of four muscles, which cover the front of the thigh. Passing from the ilium and femur, they are attached to the patella and so by the patellar ligament to the tibia. They extend the knee joint.

Harmstrings-from the ischium and femur to the tibia and fibula, this muscle lies at the back of the thigh and flexes the knee joint.

Sartorius-from the iliac spine to the inner side of the tibia, this long thin muscle helps to abduct and flex both the hip and knee, as when sitting cross-legged.

Muscles of the abdominal wall: Rectus abdominis from the sternum and costal cartilages to the pubic bone, these are two straight muscles forming the front wall of the abdomen. They cause flexion of the spine, and help in defaecation and in childbirth.

Oblique muscles, external and internal. These form the side walls of the abdomen, and help in turning the trunk.

Muscles that move the Chest wall: Intercostals -situated between the ribs, these muscles elevate the ribs for breathing.

Diaphragm is a dome shaped muscle which divides the chest from the abdomen. It is attached to the sternum and lower ribs, and to the lumbar vertebrae. Its movements are essential for breathing. It flattens when contracted and thus the chest is enlarged for breathing in. It helps also by downward pressure in defaecation, passing urine, and in childbirth.

NERVOUS SYSTEM

This functions like a telephone system. With the brain as the head office, and nerves like the telephone wires communication takes place with all parts of the body. By means of numerous messages sent and received, the various tissues and organs of the body work in harmony.

The nervous system has two parts:

- 1) **Central nervous system** – made up of the brain and cranial nerves, spinal cord, and spinal nerves.
 - It controls the voluntary muscles of the head, trunk and limbs.
 - It receives messages from sense organs such as skin, eyes and ears.
- 2) **The Autonomic nervous system** – this is made up of sympathetic and parasympathetic nerves. It controls involuntary (internal) muscles and glandular secretions.

Nerve Tissue: Nerve Tissue, of which these nervous systems are composed, is soft tissue made up of nerve cells and nerve fibres. The cells massed together, as in the brain, form what is called the gray matter. The nerve fibres form 'white matter'.

Nerve fibres are each connected with their own nerve cells, forming a unit called a neurone. Messages jump across from one neurone through its fibres to the next neurone. The fibres of some neurones are very long (eg. those in the limbs) and they are grouped together as visible white nerve trunks.

Nerves are three types:

- 1) Sensory nerves, which carry messages from all parts of the body to the brain and spinal cord. They enable the body to react for its protection.
- 2) Motor nerves, which take messages from the brain and spinal cord to muscles and glands in all parts of the body. they stimulate activity.
- 3) Mixed nerves consists of both sensory and motor nerve fibres, so they carry messages in both directions.

The brain:

This is the most important part of the central nervous system. It is well protected in the cranial cavity and has the following parts.

- 1) The cerebrum or forebrain.
- 2) The cerebellum or hind brain.
- 3) The mid brain.
- 4) The brain stem – consisting of pons and medulla.

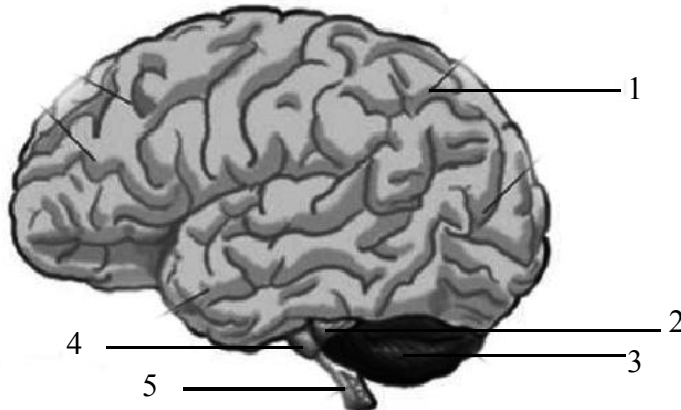


Fig 2.14 The Brain

- 1) Cerebrum
- 2) Mid Brain
- 3) Cerebellum
- 4) Ponsvaroli
- 5) Medulla Oblongata

The Cerebrum: The largest part of the brain, fills the front and top parts of the skull. It has two parts right and left. These two parts control the opposite sides of the body, so that disease or injury of the right side of the cerebrum paralyses the left side of the body, and vice versa.

Functions of Cerebrum:

- 1) **Frontal lobe:**
 - a) Motor centers controlling voluntary muscles.
 - b) Speech centre.
 - c) Mental powers such as memory, intelligence and will.
- 2) **Parietal lobe:** The sensory centers for sensations of touch, pain, heat, cold and pressure.
- 3) **Temporal lobe:** For hearing .
- 4) **Occipital lobe :** For vision (sight).

The Cerebellum: The cerebellum is situated underneath the cerebrum at the back. It is smaller than the cerebrum. It also has a right and left sides. Its activities are unconscious and not under control of the will.

Functions of the Cerebellum:

- 1) Helps to maintain balance
- 2) Helps to maintain muscle tone.
- 3) Co-ordinates the work of muscles.

The Mid Brain: This consists of two short stalks of nerve tissue attached to the lower part of the right and left sides of the cerebrum in the centre.

Functions of the Mid-Brain:

- 1) Acts as a pathway for messages to and from the cerebrum.
- 2) Contains reflex centres for vision and hearing.
- 3) Contains centers for controlling body temperature (hypothalamus), the emotions and sexual responses.

The brain stem: The Brain stem like a stalk connecting the brain, with the spinal cord, has the following parts.

1) The Pons: This part, situated below the Mid-Brain, is like a bridge connecting the two sides of the cerebellum and the mid-brain with the medulla below.

2) the medulla. This joins the pons above to the spinal cord below. It looks like the spinal cord but is a little thicker. It lies just inside the skull.

Functions of the Medulla:

- 1) Connects the brain with the spinal cord, and conveys messages. It is in the medulla that cerebral nerve fibres cross over to the opposite side.
- 2) Contain nerves centers, which control the vital functions of circulation and respiration.
- 3) Contain reflex centers of swallowing, vomiting and coughing.

Cranial Nerves:

There are **twelve pairs** of cranial nerves which come out from the brain and brain-stem. They pass through holes in the skull to the eyes, ears, face, tongue, throat, etc.

The tenth cranial nerve called **vagus**, give branches to the larynx, lungs, and heart and digestive organs. The vagus nerve functions as part of the autonomic nervous system.

The Spinal Cord:

The spinal cord is a cord of nervous tissue, the thickness of a little finger and about 12cm long. It lies inside a canal formed by the vertebrae. It connects above with the medulla where the back of the neck joins the skull and extends to the level of the first lumbar vertebrae.

Functions of the Spinal Cord:

- 1) Receives motor impulses from the frontal lobe of the cerebrum, and passes them on to muscles via the spinal nerves.
- 2) Receives sensations from the skin and other tissues and relays the message to the brain.
- 3) Reflex action. This is the quick response in the spinal cord itself. Eg. If you touch something hot, the message received in the spinal cord is immediately flashed to the muscles of the arm; before the news reaches the brain you have taken your hand away.

The meninges and cerebro spinal fluid (C.S.F.)

The brain and spinal cord are covered by three membranes called meninges.

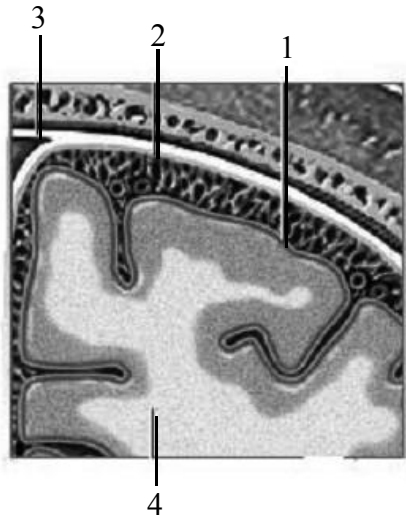


Fig 2.15 The Meninges

- 1) Pia mater
- 2) Arachnoid Mater
- 3) Duramater
- 4) Brain

1) **Duramater** is the outer, thick elastic cover. It lines the skull and spinal cord.

2) **Arachnoid**, a thin middle membrane. It is a loose covering and under is a space called ‘theca’ (sub arachnoid space) containing cerebro spinal fluid (C.S.F.)

3) **Pia mater** is closest to the nerve tissue and carries blood vessels. When these membranes get infected, the condition is known as meningitis.

Cerebro Spinal Fluid: (C.S.F.): This is a clear fluid, which circulates both inside and outside the brain and spinal cord. A little cerebrospinal fluid is sometimes removed by ‘lumbar puncture’ to help in diagnosing disease of the nervous system.

Functions of Cerebrospinal Fluid:

- It acts as a water cushion to protect the brain and spinal cord from shocks and jarring.
- It nourishes and cleanses, washing away water and toxins.

The Autonomic Nervous Systems

It is the second system of the nerves that controls the movements of the involuntary muscles and the secretion of the glands. We have no control over these nerves although they are closely connected with the central nervous system.

In the ANS there are two sets of nerves, which oppose each other in action.

Sympathetic Systems: This consists of two chains of ganglia (groups of nerve cells) one on each side of the vertebral column. The ganglia are attached by fibres to the spinal nerves.

The sympathetic nerves are stimulated by the emotions such as fear, excitement and anger. The results of the sympathetic nerve stimuli are: 1) dilated pupils 2) the heart beats quicker 3) breathing is quicker and deeper 4) the blood pressure is raised 5) digestion is slowed down 6) sweating is increased and 7) anal and urethral sphincters tighten up.

Parasympathetic System: This system is in control during normal quiet living. Certain cranial nerves (the vagus especially) have such actions as the following. 1) pupils of the eyes contract. 2) increase in saliva flows 3) digestion and peristalsis are stimulated.

THE CARDIO VASCULAR SYSTEM

The cardiovascular system is the transport system of the body. It is the means by which food, oxygen, water and other requirements are conveyed to the tissue cells, and their waste products are carried away.

The heart is important organ of the circulatory system. It is placed behind breastbone and within the thoracic cage. It is hollow muscular organ. It is enclosed in a sac known as the pericardium. It is about the size of a person's clenched fist and weighs around 300 gm in a man and 250gm in a woman.

The heart has four chambers, two atria (upper) and two ventricles lower. Valves connect the upper and lower chambers. The right and left sides of the heart are totally separated by a muscular wall and there is no communication between them.

The right side of the heart receives the deoxygenated (impure) blood collected from the different parts of the body through small and big veins, which enters the lungs. In the lungs the blood is oxygenated and carbon-di-oxide and metabolic waste are removed

The left side of the heart receives (pure) blood from the lungs and supplies it to the entire body through the major blood vessel (aorta) and its numerable branches (arteries and capillaries).

The left ventricle generates greater pressure than the right ventricle to enable the bold to be pumped throughout the body. Hence the left ventricle is more thicker and more muscular.

The coronary arteries branch out (left and right coronary arteries) from the root of the aorta near its origin from the left ventricle. Both the coronary arteries branch of into smaller vessels, which are distributed all over the surface of the heart. For efficient pumping, it is necessary for the heart to beat at a reasonable rate of 60 – 90 beats per minute, which is achieved through controlled electrical impulses (conductive system).

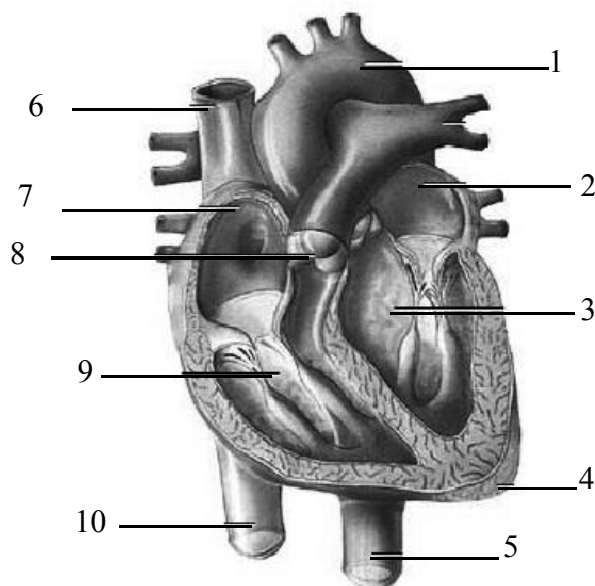


Fig 2.16 The Heart

- 1) Aorta
- 2) Left Atrium
- 3) Left Ventricle
- 4) Apex of the Heart
- 5) Aorta
- 6) Superior Venacava
- 7) Right Atrium
- 8) Semi-Lunar Valves
- 9) Right Ventricle
- 10) Inferior Venacava

Functions of Heart:

1) It draws blood back from the capillaries and veins. 2) It sends blood into the lungs where it is oxygenated. 3) It sends blood through the aorta to all the parts of the body.

The parts of the circulatory system are:

1) Blood. 2) The heart, which is the pump forcing blood into the circulation. 3) The blood vessels in which the blood travels. 4) The lymphatic system is closely connected, and can be considered a part of the circulatory system.

THE BLOOD

About 6 litres of blood continuously circulates through the heart, and blood vessels in all parts of the body. It is a sticky red fluid is slightly alkaline in reaction. It is made up of a liquid (plasma) and solids (the blood cells).

Plasma is a pale yellow fluid consisting of

Water 90%

Salts, including sodium chloride 0.9%

Proteins (albumin, globulin, fibrinogen)

Nutrients, such as glucose, fats, amino acids vitamins and minerals

Waste products such as urea and carbon dioxide

Antibodies and antioxidants for resistance to disease germs,

Hormones produced by the endocrine glands.

Substances for blood clotting and for preventing clotting of blood.

Plasma is important for the life of the tissue cells, conveying to them water and nourishment, and carrying away their waste products.

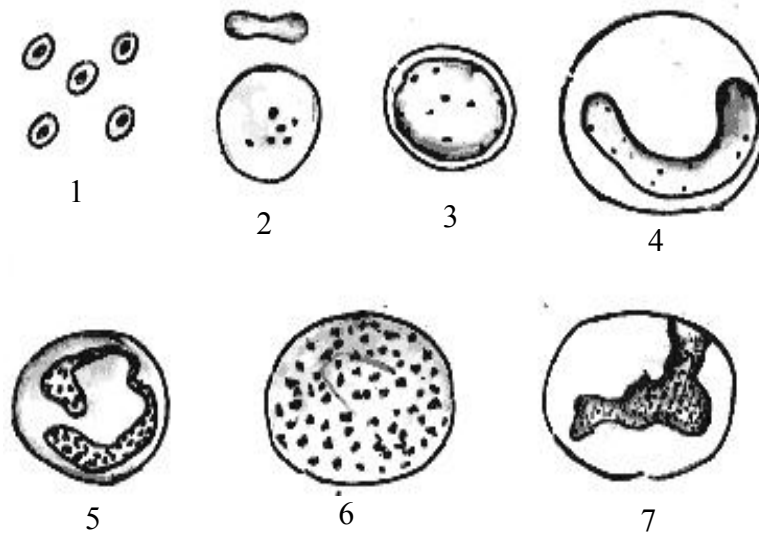


Fig 2.17 Blood Cells

- 1) Platelets 2) Red Blood Cells 3) White Blood Cells 4) Monocyte 5) Neutrophil
6) Eosinophil 7) Basophil

Blood cells (Blood corpuscles)

There are three main types

- ✧ Red blood cells or Erythrocytes
- ✧ White blood cells or Leucocytes
- ✧ Blood Platelets or Thrombocytes.

Red blood cells are formed in the bone marrow and wear out in about three months, so need replacing. They are very tiny disc with no nucleus, and are filled with haemoglobin, which is made from iron and protein. Haemoglobin gives to the blood its red colour. The normal amount of haemoglobin is 14.5- 15 gms. per 100 ml. of blood. Lack of iron to make haemoglobin is common cause of anaemia. RBC's have the important function of carrying oxygen from the lungs to the tissue cells. When united with oxygen in the lungs, the haemoglobin has a bright red colour. When the blood returns after giving up its oxygen, it is changed to a dull red colour.

White Blood cells

White blood cells help to fight infection. There are two main types.

- 1) Leucocytes are produced in the bone marrow. They can change shape and squeeze through the small blood vessel walls in order to fight germs that have entered the tissues. Many die in the fight and become "pus cells". In acute infection many more leucocytes are produced to help in the fight (leucocytosis)
- 2) Lymphocytes are produced in the spleen and lymph glands. They are less mobile but they are help to fight infection especially when it is chronic.

Blood Platelets

Blood platelets are produced in the bone marrow. They help in the clotting of blood.

Functions of Blood:

- Carries oxygen to the tissues by means of red blood cells.
- Carries food to the tissues.
- Carries away waste products from the tissues to the excretory organ.
- Carries hormones from the glands to the target tissues.
- Fights germ infection by means of the white cells and antibodies.
- Distributes heat and helps to maintain body temperature.
- Helps to maintain water balance in the body.

The Lymphatic System and Spleen:

The lymphatic system is a special type of circulatory system. It is composed of 1) The lymph. 2) The lymphatic vessels. 3) The lymph glands or nodes.

- **Lymph** is a fluid like plasma and the tissue fluid but in cases of infection it may contain bacteria. Lymph is really the tissue fluid, which finds its way into the lymphatic vessels.
- **Lymphatic Vessels:** Lymphatic start in tissue spaces between the cells and start like the veins. Inside them are the valves which help the flow of lymph towards the two largest lymphatic vessels.

- **Lymph Glands** are small bean shaped structures, situated along the course of the lymphatic. They are found mainly grouped together in the neck, axilla, and groins and in the pelvic and abdominal cavities. Lymphoid tissue is also found in the tonsils, pharynx and intestines.

Functions of Lymph:

Lymph glands help to protect the body from infection by

- 1) Filtering the lymph to prevent germs from getting into the blood stream, and fighting to overcome them.
- 2) Producing new lymphocytes for the blood.

DIGESTIVE SYSTEM

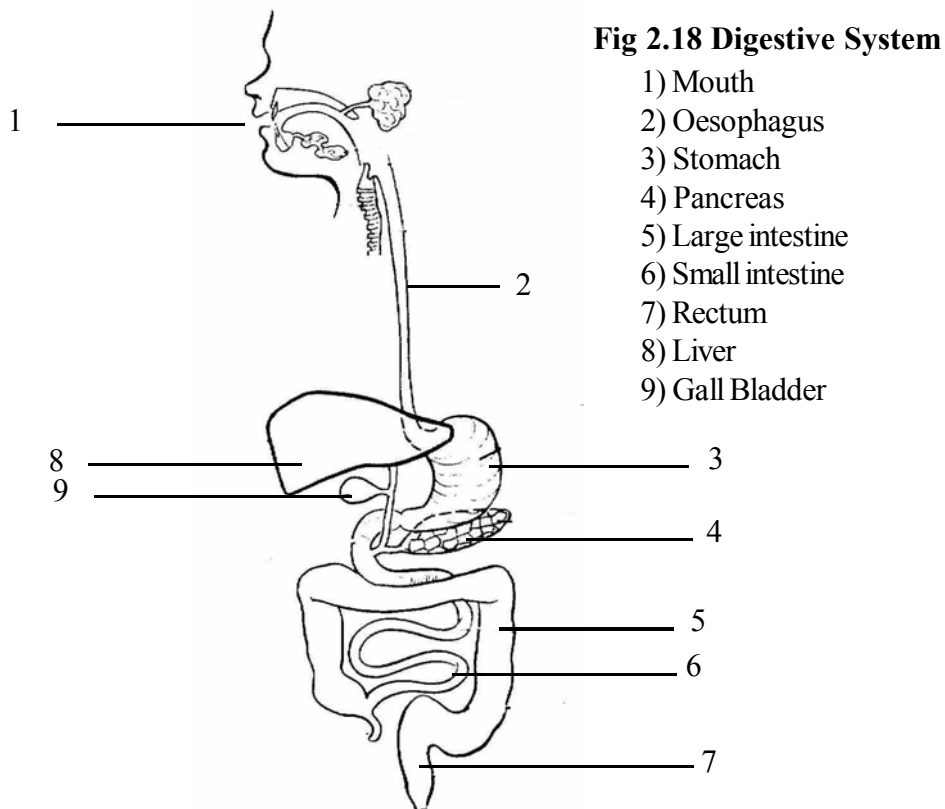
Digestion is the process by which the complex forms of food materials are broken down into simpler form of food materials suitable for absorption.

Once the food is digested, it must be transferred to the blood stream and the process by which this transfer occurs is called absorption. Digestion and absorption are two chief functions of the digestive system.

The Alimentary Canal:

The alimentary canal is a long muscular digestive tube extending through the body. It is about 750cm in length. It consists of the following parts:

- 1) The mouth.
- 2) Oesophagus
- 3) Stomach
- 4) Small intestine
- 5) Large intestine.
- 6) Rectum
- 7) Anal canal.



The gastro intestinal tract consists a tube composed of four principal layers from outside inwards:

- 1) Tunica adventitia or serous coat
- 2) Tunica media or the muscular coat.
- 3) Tunica intima or the inner lining of the blood vessel.

Functions of Digestive System:

- 1) Break down the food substances into small particles
- 2) Digestion of food substances.
- 3) Absorption of food substances.
- 4) Excretion of undigested food and toxic substances.

The alimentary canal, which is a continuous, passage way beginning at the mouth, where the food is taken in and terminating at the anus where the solid products of digestion, which are not absorbed, are expelled from the body.

The accessory organs – which are vitally necessary for the digestive process, do not happen to be the part of the alimentary canal.

Physiology of Digestion: Digestion takes place in three parts of the alimentary canal. They are: **1) Mouth** – with the help of saliva from three pairs of salivary glands, **2) Stomach** – with the help of gastric juice from the stomach wall and **3) Small intestine** – with the help of pancreatic juice from the pancreas bile juice from the liver and the intestinal juice from the small intestine.

The Mouth: The mouth is also called the oral cavity. In the mouth there are about 32 teeth. They are

- (1) Molars – 12 (2) Pre molars – 8 (3) Canines – 4 (4) Incisors – 8

The teeth help to break down the food substances into small particles. A muscular organ projects into this space is called the tongue. It helps in chewing and swallowing and is one of the principal organs of speech.

The tongue has on its surface a number of taste buds by means of which we can differentiate sensation of taste. (bitter, sweet, sour and salty)

In chewing, the teeth grind the food into pieces while the secretion of saliva moistens and lubricates the food.

Saliva is a juice secreted by three pairs of salivary glands in the mouth. they are

- 1) The parotid: located in front and below each external ear.
- 2) The sub-maxillary: located between the mandible and the muscle of the floor of the mouth.
- 3) The sub-lingual gland: located in floor of the mouth.

Salivary secretion is a reflex process, both conditioned and unconditioned reflexes are involved. A new born infant salivates when food is placed in its mouth. But the sight and smell of food does not produce any reaction.

Later by associating the sight and smell of food with its taste, the child learns that the food has certain qualities and these very qualities are after wards capable of eliciting salivary secretion.

Functions of Saliva:

- 1) It keeps the mouth moist and helps in speech.
- 2) It helps in the process of mastication of the foodstuff and in preparing it into a bolus suitable for digestion.
- 3) It dilutes hot, irritant substances and thus prevents injury to the mucous membrane.
- 4) Saliva contains two enzymes. Ptyalin and Maltase, which converts starchy food into sugars.
- 5) Saliva helps in the sensation of taste.
- 6) It helps heat loss. This is mainly found in animals. When they become hot, more saliva is secreted causing greater heat loss.
- 7) It helps in the excretion of certain substances like drugs containing mercury, lead and iodine.

Digestion in the mouth

The food is chewed; and saliva the first of the digestive juices acts on it, softens it so that it can be easily swallowed. Saliva contains two enzymes.

- (1) Ptyalin (2) Maltase.

Ptyalin splits starch into maltose and maltase converts maltose into glucose.

Oesophagus :

The oesophagus is a tube connecting the pharynx and the stomach. It conveys the food from the mouth to the stomach.

Stomach

The stomach is an enlarged section of alimentary tube. Both ends of the stomach are guarded by valves which normally permit the passage of substances in only one direction.

The proximal end is guarded by cardiac sphincter and the distal end of the stomach is guarded by pyloric sphincter.

Stomach acts as a pouch for holding large quantities of food so that frequent feeding can be avoided. The stomach mixes up the food thoroughly by its movements. It also destroys the bacteria by the high acidity.

Digestion in the Stomach

The food material after being broken down by mechanical grinding and having been converted into a bolus with the saliva reaches the stomach, which pours a large quantity of gastric juice every day.

The mechanism of production of gastric juice is a chemical or hormonal in nature. When the digested food is in contact with gastric mucosa, a chemical extract is formed. It is named as gastrin; and belongs to the group of gastro intestinal hormones. This causes the discharge of gastric juice.

The gastric juice contains mainly hydrochloric acid and enzymes.

- 1) Pepsin. 2) Rennin 3) Lipase

Functions of Hydrochloric Acid:

- 1) Kills bacteria present in the food.
- 2) Softens the connective tissues of meat.
- 3) Converts inactive form of pepsinogen into active form of pepsin.

Functions of Enzymes:

- 1) Pepsin – converts protein into peptones.
- 2) Rennin – converts the indigestible protein of milk into easily digestible one.
- 3) Lipase – converts fats into fatty acids and glycerol.

Liver

The liver is one of the largest and important organ situated on the right side of the abdomen. Bile is secreted by the liver.

Functions of Liver:

- 1) The production of bile from the pigment of broken down red blood cells.
- 2) The removal of toxins that have been absorbed from the intestine
- 3) The storage of simple sugar in the form of glycogen which is released as needed in the form of glucose.
- 4) The storage of fat soluble vitamins including A, D, E and K.
- 5) The manufacture of heparin, which prevents clotting of the blood in the blood vessels.
- 6) The formation of antibodies which acts against disease producing organisms.
- 7) The production of certain blood plasma proteins such as fibrinogen and albumin.
- 8) The removal of a waste product called urea from amino acids.

Bile Juice:

1) In the absence of bile, fats are not digested properly which results in fatty diarrhea. Thus bile is essential for digestion though it does not contain any digestive enzymes.

2) The bile is taken by the hepatic duct and is stored in the gall bladder, which is situated on the lower surface of the liver. The bile is concentrated and sent to the duodenum through the cystic duct when chyme from the stomach enters the duodenum.

3) Bile contains bile salt, bile pigment, mucin and water. The two pigments present in the bile are called Bilirubin and Bili verdin. These pigments give colour to the faeces and urine.

Due to liver damage or obstruction of the bile duct, bilirubin collects in excess quantities in blood and changes the colour of the skin and the eyes. There may be changes in the colour of the urine also. This is called jaundice.

Functions of Bile Juice:

- 1) It stimulates the functions of the proteolytic enzymes and the amylase.
- 2) It dissolves fatty acid and glycerol.
- 3) It coordinates with lipase to convert the fat into fatty acid and glycerol.
- 4) Acidic nature of food.

Pancreas

Pancreas an elongated structure lying across the posterior wall of the abdomen. It is an exocrine as well as an endocrine gland. The pancreas not only produces the pancreatic juice but also secretes hormones eg. Insulin and glucagon. It is released directly in the blood which regulates the blood glucose level. The pancreatic juice contains three enzymes. They are

- 1) Trypsin.
- 2) Amylase and
- 3) Lipase.

Besides these enzymes pancreatic juice contains large quantities of sodium bicarbonate which neutralizes the hydrochloric acid present in the gastric juice secreted by the stomach.

The Spleen: This is a dark purple organ situated in the left side of the upper abdomen, behind the stomach.

Functions of the Spleen are:

- 1) It produces new lymphocytes for the blood.
- 2) It helps to fight infection.
- 3) It destroys worn out red blood cells and removes the iron from them to be re-used.
- 4) It acts as a reservoir for Red Blood Cells, which it releases in time of need, such as a sudden haemorrhage.

Small Intestine

The small intestine is about 600cm long in adult extending from the pyloric sphincter of the stomach to intestine. The first 25cm or 30cm of the small intestine is called the duodenum followed by the jejunum and the remainder is the ileum.

Digestion in the Small Intestine:

The food in the stomach is partially digested by the gastric juice, but the small intestine is the organ in which the completion of the digestion and absorption occurs.

In the duodenum there is an opening into which lead two ducts carrying digestive juices i.e., pancreatic juice via the pancreatic duct from the pancreas and the other, bile, via bile duct from the liver.

Bile is not primarily a digestive juice because it contains no enzyme but it helps in the digestion of fats. The bile salt emulsifies fats and helps the pancreatic lipase to act and digest it easily. The pancreatic juice contains three powerful enzymes.

They are:

1) Pancreatin: converts carbohydrates into simple sugars like amylose glucose, fructose and galactose.

2) Trypsin: converts peptones into poly peptides. In the beginning trypsin is present in the form of inactive trypsinogen.

This trypsinogen is converted into active trypsin by action of enterokinase which is secreted in the small intestine.

3) Pancreatic lipase: converts fats into fatty acids and glycerol.

After pancreatic digestion, the food which is now called chyme proceeds further in the intestine. Here it comes into contact with succus entericus which is a juice produced by the small intestine. Succus entericus contains three enzymes. They are

- 1) **Pepsin:** It converts poly peptides into amino acids.
- 2) **Nucleotidase :** Converts Nucleotide, into nucleoside.
- 3) **Nucleosidase :** Converts nucleosides into pentose, purine, and pyrimidin.

It also contains three sugar – splitting enzymes called lactase, maltase and sucrase converting the respective sugars into simple sugars, mostly glucose. It also has lipase, which acts on fats and converts them into fatty acids and glycerol.

The final product of digestion of the carbohydrates is glucose while the proteins are amino acids and fats are fatty acids and glycerol.

Large Intestine

The large intestine is as the name implies has the larger diameter than the small intestine. It is about 150cm in length. The small intestine opens into the large intestine.

There is a small pouch at the beginning part of the large intestine. This pouch is called the caecum. Large intestine consists of ascending colon, transverse colon and descending colon.

Rectum and anal canal:

The descending colon of large intestine opens into last part, the rectum and anal canal. It is about 15cm to 20cm long. The rectum serves as a temporary storage area for the indigestible and non – absorbable substances.

The narrow portion of the distal part of the large intestine is called the anal canal, which leads to the outside through an opening called the anus.

Absorption of Food:

Absorption is the process by which water, minerals, vitamins and end products of digestion are absorbed through the mucosa of alimentary canal (especially the small intestines) into blood stream either directly or via lymphatic vessels.

In the stomach there is little absorption. Water, alcohol, glucose and simple salts are absorbed to certain degree. The main absorption occurs in small intestines especially in the lower (ileum) part, the upper part of the small intestine is mainly associated with the process of digestion.

The mucous membrane of small intestine is covered with minute finger like projections known as **villi**. Each villus contains arteriole, a venule, a capillary network and a lacteal (lymphatic vessel).

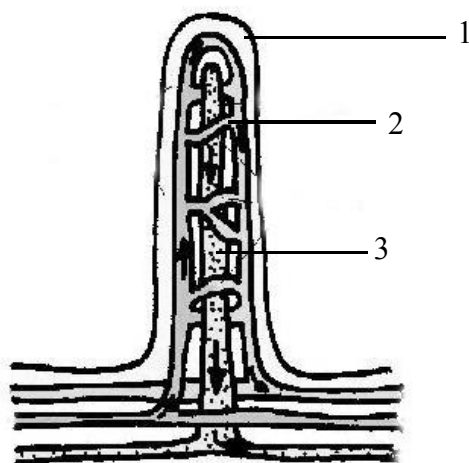


Fig 2.19 Villus

- 1) Epithelial cells
- 2) Blood vessels
- 3) Lacteal

Nutrients that diffuse through the epithelial cells which covers the villus are able to pass through the capillary walls and the lacteal enters the blood.

About 90% of all absorption takes place throughout the length of the small intestine. The other 10% occurs in the stomach and large intestine.

Both monosaccharide and amino acids are absorbed by a positive pressure gradient between the intestinal content and the blood as well as by an active process involving enzymatic reactions and transported in the blood stream to the liver via the hepatic portal system.

The excess amount of glucose is converted into glycogen and stored in the liver, when need arises glycogen is converted into glucose and is utilized by the body.

Vitamin K which is synthesized by the bacteria in the colon are absorbed from the large intestine. Large quantities of water are however absorbed from the large intestine and the fluid content of the small intestine are converted into the pasty consistency and ejected through the opening called the **anus**.

Movements of the gastro intestinal tract:

Deglutition is the process by which the masticated food is transported across the pharynx and reaches the stomach. Due to contractile movements of the stomach, the food is well mixed up with gastric juice.

After being in the stomach for 3 or 4 hours the pyloric sphincter opens pushing the food into the duodenum. The intestine shows three important types of movements. They are;

1) **Pendular Movement:** these movements are induced by contractions of the circular and longitudinal muscles of the intestine. This movement contributes to the thorough mixing of chime with the digestive juice.

2) **Segmental Movement:** this movement occurs by the contraction of the circular muscles, which produces transverse folds, dividing the intestine into short segment.

3) **Peristaltic Movement:** it is the wave like contraction of the alimentary canal, which propels the food through the gastro – intestinal tract.

RESPIRATORY SYSTEM

Respiration is the process of gaseous between an organism and its environment. In the higher animals, and man the gaseous exchange between the tissues and environment is termed as **Internal or tissue respiration**.

The exchange of gases between the body and the environment-taking place in the lungs is termed as **external respiration**. The external respiration constitutes processes of **inspiration** and **expiration**.

Inspiration is an active muscular contraction while expiration is merely a passive act of the relaxation of respiratory muscles.

Structure of respiratory system:

The respiratory system is responsible for taking in oxygen and giving off carbon-di-oxide and water. It is divided into the upper respiratory tract and lower respiratory tract.

1) **The upper respiratory tract:** Nose, Mouth, the throat, pharynx, the larynx and numerous sinus cavities in the head.

2) **The lower respiratory tract:** The trachea, the bronchi and the lungs, which contain bronchial tube bronchioles and alveoli or air sac.

The two **lungs**, which are the principal organs of the respiratory system, are situated in the upper part of the thoracic cage.

They are inert organs, i.e. they do not work by themselves, but function with the help of a muscular wall known as the **diaphragm**.

The pharynx is a tube approximately 12cm in length, which is a common opening for both digestive and respiratory system.

It connects the oral cavity to the oesophagus (food tube) and the nasal cavity to the larynx and wind pipe. The opening into the larynx is oval in shape and guarded by the leaf like epiglottis.

The **epiglottis** folds down over the opening like a trap door while food or liquid is being swallowed, it prevents the entry of foreign substances into the respiratory passage ways.

The closure of epiglottis, when we swallow, is a reflex action and can be interfered with, if one attempts to talk and swallow at the same time.

If this happens one may choke to death in the absence of immediate assistance. From the pharynx, air passes through the trachea, which is 12cm long and 1.5cm in diameter. The tract, consists of a large number of C shaped cartilage rings. The larynx or the **voice box** is at the top of the trachea. It is the vocal cords inside the box, which by its coming together and going away from one another produces different sounds.

The trachea branches at its lower end into the right and left bronchi which enters the lungs, within the lungs those passage ways repeatedly divide, forming microscopic tubes called **bronchioles**.

Each bronchiole ends with several clusters of microscopic elastic air sacs called alveoli, which are the functional units of lungs. This resembles bunch of grapes.

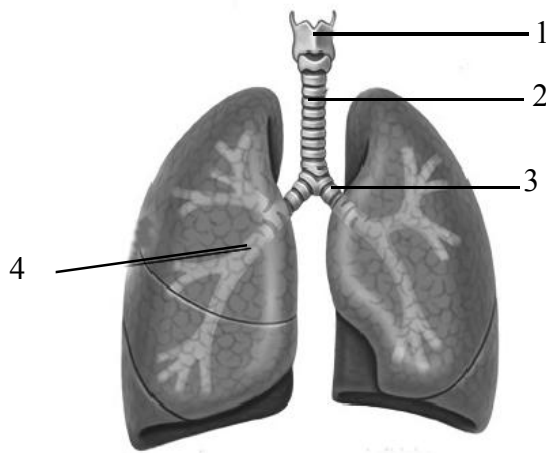


Fig 2.20 Lungs

- 1) Larynx
- 2) Trachea
- 3) Bronchus
- 4) Lung

The paired lungs lie within the large cavity of the chest, the thoracic cavity. The lungs are grayish colour and are spongy in appearance.

The right lungs have three lobes-upper, middle and lower, and the left lung has two lobes- upper and lower. The floor of the thoracic cavity is formed by a dome like muscular structure called **diaphragm**. Each lung is enclosed by two layers of membrane called **pleural membranes**.

The chest cavity is also lined with this membrane. This layer being known as the parietal pleura, while visceral pleura line the lung parenchyma.

Respiration

We breathe continuously from birth to death, day and night in health and disease.

Respiration may be defined as the mechanical process of breathing in and out, a function which involves both the respiratory system and muscles of the respiration.

The 2 phases of breathing are

1. Inhalation- during which air is drawn into lungs
2. Exhalation – which refers to the expulsion of air from the alveoli

Inhalation

The diaphragm when relaxed is a flattened dome shape structure pointing upwards to the lungs. During the process of inhalation it contracts.

It flattens, pulls down the thorax, increases the volume of the thorax, and thus decreases the atmospheric pressure in the lungs. This causes air to rush in during respiration.

Exhalation

During the processes of exhalation, the diaphragm relaxes, the thorax is pushed up, the volume decreases and the atmospheric pressure increases and air rushes out of the lungs.

The inspired air, which contains oxygen, passes down into the billions of minute air chambers or air cells known as alveoli, which have very thin walls. Around these walls are the capillaries of the pulmonary system.

It is at this point that the fresh air gives off its oxygen to the blood and takes carbon di oxide from the blood by diffusion, which is then expelled with the expired air.

Physiology of Respiration:

The respiratory center of the brain is located in the medulla, immediately above the spinal cord. From this center nerve fibers extend down into the spinal cord. From the neck part of the cord, these nerve fibers continue through the **phrenic nerve** to the diaphragm.

The diaphragm does not continue to work if it is cut off from its nerve supply. If one nerve is cut, the diaphragm of that side is paralyzed. This center is governed by variation in the chemistry of the blood.

If there is an increase in CO_2 in the blood, the cells of the respiratory center are stimulated and they in turn send impulses down the phrenic nerve to the diaphragm.

Respiratory Rate:

In adults, the respiratory rate is 14 to 18 times per minute. Children breathe more superficially and therefore have a higher respiratory rate.

Importance of respiration:

- 1) It supplies oxygen and eliminates the carbon di oxide.
- 2) It excretes volatile substances like ammonia, ketone bodies, essential oils, alcohol and water vapour, etc.,

- 3) By adjusting the amount of carbon di oxide elimination, it helps to maintain the acid base balance.
- 4) It helps to maintain the normal body temperature.
- 5) It is necessary for the maintenance of optimal oxidation-reduction process in the body.

EXCRETORY SYSTEM

During the vital activity of the human and animal body, significant amounts of organic degradation products are produced, a proportion of which is not utilized by cells.

These degradation products must be eliminated from the body. The end products of metabolism which have to be removed from the body are called **excreta**, and the organs that remove them are called **excretory organs**.

The lungs eliminated carbon-di-oxide and water vapour into the environment. The gastro intestinal tract excretes a small amount of water, bile acids, pigments, cholesterol, certain drugs (when administered into the body) salts of heavy metals (cadmium, iron, manganese) and indigestible food residues (faeces).

The skin performs its excretory function by sweat and sebaceous glands. Sweat glands excrete sweat, which contains water, salts urea, uric acid, creatinine and other compounds.

The main excretory organs are the kidneys which eliminate in the urine most of the metabolites primarily those containing nitrogen. (Urea, ammonia, creatinine).

Kidneys:

The kidney is a bean shaped organ about 5cm long, 3cm wide and 2cm thick. They are situated at both sides of the lumbar area.

The weight of the kidney is about 200-250gms. On the inner or medial border there is a notch called the **hilum** at which region the artery, the vein and the ureter connect with the kidney.

Each kidney has a pelvis, where the urine collects. The urine is drained off from the pelvis by the **ureters**. The ureters end in the urinary bladder, which can hold about 800ml of urine. The urethra carries the urine from the bladder and voids it convenient intervals.

In a longitudinal section, the kidney is seen to consist of outer cortex and inner medulla. The medulla consists of 10-18 conical or pyramidal shaped structures, known as the **renal pyramids**

The base of a renal pyramid faces towards the cortex. The pelvis the funnel shaped upper end of the ureter.

Microscopic examination of mammalian kidneys reveals that each kidney consists of about million nephron, which are the functional unit of the kidney.

The number of nephrons varies depending on species. The nephron consists of the glomerulus, the renal tubules, the collecting tubules and the associated blood vessels.

The glomerulus is a tuft of capillary vessels, which is invaginated into an epithelial cup shaped lining called the **Bowman's capsule**.

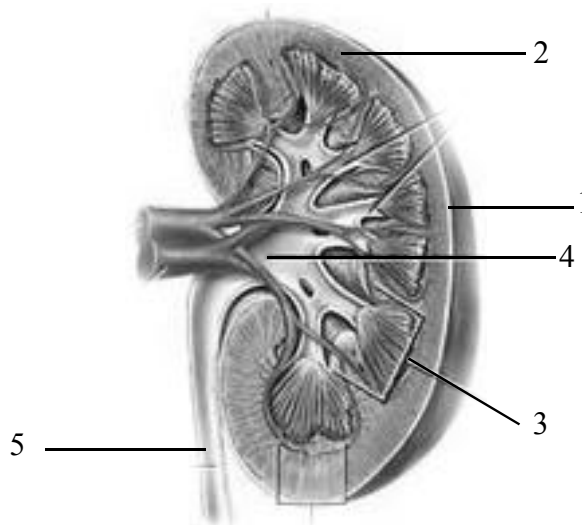
The renal artery divides into innumerable branches and the ultimate divisions of the artery form a tuft of capillaries called **glomerulus**.

The blood pressure inside the glomerulus drives out the fluid through it is opposed by the osmotic pressure. This fluid thus driven out is collected in the Bowman's capsule.

The filtrate in the capsule consists of all the constituents of blood, except the plasma proteins and the formed elements of blood. This process is known as **ultra filtration**.

Fig 2.21 Kidney

- 1) Cortex
- 2) Medulla
- 3) Pyramid
- 4) Pelvis
- 5) Ureter



The filtrate then passes to the descending ascending portion of loop (Henles Loop) and then to the convoluted tubules (proximal and distal) and finally reaches the collecting duct.

A large number of substances are reabsorbed (**reabsorption**) by the tubules, a few substance added (**secretion**) to the filtrate and the final urine is formed.

For example, water, glucose, some salts and a small fraction of urea are reabsorbed from the primary urine into the blood. Usually about 200 liters of filtrate is formed per day of which one and a half liters is sent out as urine.

Therefore, nearly 198 ½ liters of water has to be reabsorbed every day by the kidney tubules. About 80% of this re-absorption takes place in the proximal tubules and the rest is absorbed in the distal tubules, and sent back to the blood stream.

Re-absorption is carried out with the help of **anti - diuretic hormone** which is secreted in the posterior pituitary gland.

Thus each nephron is able to 'clean' or filter a very large volume of blood without causing the body to lose much of water or other essential materials.

The composition of final urine radically differs from that of the primary urine. It is devoid of glucose, amino acids, certain salts (phosphates and sodium) and has a very high urea concentration.

The urine thus formed collects into the bladder through the ureters which are long, slender, muscular tube that extend from the kidney to the lower part of the urinary bladder.

The bladder is a muscular bag which collects the urine and voids it at intervals through the urethra. When the bladder is empty, the muscular wall becomes thick and the entire organ feels firm

The organ may increase from the length of 2 or 3 inches to 5 inches or more inches.

A moderately full bladder holds about 800ml of urine. When 400ml of urine is collected in the bladder, the normal desire for micturition is felt. The process of expelling urine through the urethra is called **urination or micturition**.

The act of micturition is a reflex action. It is controlled by the action of circular muscles, continuous with those in the walls of the bladder and in the urethra.

Urine

Normal urine is faint yellow in colour, clear, with a characteristics odour. The specific gravity is 1.010 to 1.020. Normally urine is composed of Water 96% Urea 2% Salts 2%

The salts consists mainly of sodium chlorides, phosphates and sulphates. The average quantity of urine passed in 24 hours is 1.5 litres.

ENDOCRINE SYSTEM

The glands of the body may be divided into those with and external secretion (exocrine glands) and those with Internal secretion (endocrine glands).

Examples of exocrine glands are the sweat, lacrymal and mammary glands which pass their secretion along the ducts to the external surface of the body and the glands of the mouth, stomach, and intestine which pass their secretions along ducts into the alimentary tract.

The endocrine or ductless gland on the other hand have no ducts or openings to the exterior. Their secretion are passed directly into the blood stream and transmitted to the tissues.

A hormone is a chemical substance produced by the endocrine glands and their overall function is to regulate the activities of various body organs and their functions.

The main endocrine glands in the body are

- 1) Thyroid
- 2) Parathyroid
- 3) Islets of Langerhans
- 4) Adrenal gland
- 5) Pituitary gland
- 6) Sex glands.

Thyroid Gland:

The largest of the endocrine glands is the thyroid which is located in the neck region. The thyroid gland weighs 25gms in a healthy adult. It has two oval parts called the lateral lobes on either side of the trachea. These two lobes are connected by a narrow band called isthmus. The entire gland is enclosed by a connective tissue capsule. This gland produces hormone, thyroxin rich in iodine. Thyroid gets iodine from the blood stream. It is then fixed with the amino acids thyroxin compounds. Two molecules

of di iodo – thyroxin combine to form thyroxin. Thyroid stimulating hormone (TSH) produced by the anterior pituitary lobe increases the activity of thyroid gland. Whenever, the thyroxin level falls below a particular level TSH is stimulated.

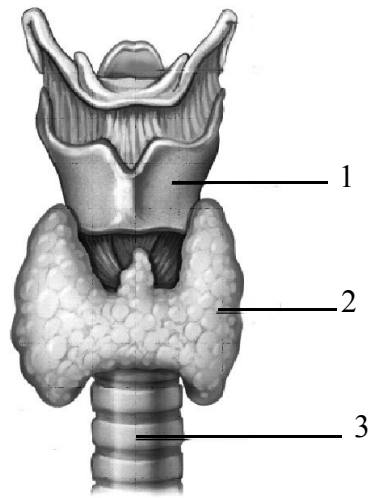


Fig 2.22 Thyroid Gland

- 1) Larynx
- 2) Thyroid gland
- 3) Trachea

Functions of Thyroxin:

- 1) Helps to regulate tissue growth and development
- 2) Increases the BMR and thus raises the body temperature
- 3) It controls the metabolism by regulating the anabolic and
- 4) Catabolic process
- 5) Stimulate the cells to break down the proteins for energy.
- 6) Decreases the break down of fats
- 7) Increases the break down of body glucose and enhances the glucose absorption.
- 8) Calcium and Phosphorous are removed from the bones and excreted in increased amounts.
- 9) Helps in the conversion of beta – carotene into vit A.

Parathyroid Gland

These are two tiny oval pair (6mm x 2mm) of glands situated at upper end and lower poles of lateral lobes of thyroid gland. It secretes the hormone parathyroxin.

Functions of Parathyroxin:

- 1) Increases the concentration of organic acid in the bone.
- 2) Increases the calcium and phosphorus solubility
- 3) Increases the reabsorption of calcium from the bones.
- 4) Increases serum calcium level
- 5) Increases phosphate excretion in the urine

- 6) Increases the reabsorption of calcium from the renal tubules
- 7) Promotes the absorption of calcium and phosphorus from the intestine.
- 8) Stimulates the process of lactation in mammary gland.

Islets of Langerhans in the pancreas:

The pancreas is both an exocrine gland secreting digestive juice through a duct into the duodenum and an endocrine gland secreting hormone into the blood stream.

It consists of head, body and tail. The head fits into the curve of duodenum. Then body and tail are directed towards the left. The pancreatic islets represent the endocrine part of the pancreas.

Most of the islets are located in the tail and only a small number in the head of the pancreas. There are two different types of cells in the islets of Langerhans. The alpha cells and beta cells are very important.

The alpha cells secrete a hormone Glucagon whereas the beta cells secrete insulin.

Functions of Glucagon:

- 1) Increases the blood glucose level
- 2) Break down the liver glycogen into glucose
- 3) Stimulates the break down of lipid in adipose tissue

Functions of Insulin:

- 1) Converts glucose into glycogen and accelerates the transport of glucose from the blood into the cells.
- 2) Decreases the blood sugar level
- 3) Build up the glycogen store in the liver.

Adrenal Gland:

The adrenal or supra renals are two small glands each one situated above a kidney. Adrenal glands consist of two different parts each of which acts as a separate gland.

The inner area is called medulla which is brown in color while the outer area is called cortex which is lighter in color

Adrenal Cortex:

It is composed of three layers. They are

- 1) Zona glomerulosa (outer layer)
- 2) Zona Fasciculata (middle layer)
- 3) Zona reticularis (inner layer)

The adrenal cortex secretes three hormones. They are:

1. Glucocorticoids: Acts as antagonists to insulin and cause increase in blood sugar

2. Minerlocorticoids: Acts on sodium and potassium and help in the conservation of sodium in the body

3. Sex Steroids: Stimulates the development of the reproductive organs in the child hood. It is responsible for development of secondary sex characteristics and reproductive function.

Adrenal Medulla

Adrenal Medulla secretes two hormones. They are adrenaline and nor – adrenaline.

Functions of Medullary hormones

- 1) Dilation of the pupils and improves the visual acuity
- 2) Increases both rate and amplitude of contraction of heart and raises the cardiac out put.
- 3) Increases both rate and amplitude of respiratory movements and causes dilation of the bronchioles
- 4) Raises the blood sugar level by means of glycogenolysis
- 5) Increases the basal metabolic rate
- 6) Dilation of the walls of intestine and the urinary bladder

The functions of adrenaline are similar to that of nor – adrenaline except in a few instances. For example, Adrenalin increases the heart rate whereas nor – adrenalin decreases heart rate.

Pituitary gland:

The pituitary gland is a small gland about the size of the cherry. It is situated at the base of the brain. It plays a peculiar role in the system of the endocrine glands.

It is referred to as the master gland of internal secretion because it controls the activities of other endocrine glands. The pituitary gland is divided into two main parts.

- 1) Anterior pituitary gland. 2) Posterior pituitary gland

The anterior pituitary gland: This part secretes a large number of hormones. Many of them stimulate other glands. Its main hormones are:

1) **Growth hormone:** it facilitates the growth of the bone and cartilage tissue. Over activity of the anterior pituitary lobe in childhood results in excessive growth and height. This condition is known as gigantism.

A decreased activity of the anterior pituitary causes a severe growth retardation leading to dwarfism.

Excessive production of growth hormone in an adult leads to excessive development of certain regions such as fingers and toes, feet, hands, nose, lower jaw, tongue, thoracic and abdominal organs. This condition is known as acromegaly.

2. Thyrotrophic stimulating hormone (TSH): this hormone stimulates the activity of the thyroid gland. Administration of this hormone causes overgrowth of thyroid tissue.

3. Adrenocorticotrophic hormone (ACTH): this hormone stimulates the cortex of the adrenal gland and increases the production of the hormones of the adrenal cortex.

4. Follicular stimulating hormone (FSH): this hormone influences the growth, development and maturation and of the ovarian follicles. In males, the hormone stimulates the formation of sperm in testes.

5. Prolactin hormone: it acts on the mammary gland and helps in the formation and flow of milk during lactation.

6. Luteinising hormone: it is required for the growth of follicle in the ovary and stimulates ovulation. In the absence of the hormone, no ovulation and production of the corpus luteum can occur. In males it stimulates the interstitial cells of testes to secrete testosterone.

The posterior lobe of the pituitary:

This lobe is just behind the anterior lobe. It produces two hormones. Oxytocin and vasopressin. Oxytocin acts on the smooth muscles especially that of the uterus and produces powerful contractions of the uterus and helps in parturition.

Vasopressin acts on the smooth muscle of the arterial system and increases the blood pressure. This hormone helps in the re absorption of water from the distal convoluted tubule. Vasopressin deficiency is the cause of diabetes Insipidus in which water is not reabsorbed. So great amounts of urine are excreted with no sugar in it. Such patients feel constantly thirsty.

The sex glands:

The sex glands including the ovaries of the female and the testis of the male are important endocrine structures. The secretions of this gland play an important part in the development of the sexual characteristics.

The male sex gland secretes hormone called testosterone and is responsible for secondary sex characteristics. The female sex gland secretes a hormone called estrogen and it stimulates the development and functioning of the female reproductive organs.

There is one other hormone produced by female sex gland and it is called progesterone. This hormone assists in the normal development of the pregnancy.

SENSE ORGANS

The organs of the special sense are specially adapted end organs for the reception of certain kinds of stimuli. The sensory impressions which are supplied by the nerves carried to the brain where sensations are interpreted for e.g.

- 1) Taste
- 2) Smell
- 3) Sight
- 4) Touch
- 5) Sound

In each case the sensory nerves are supplied with special nerve endings for collecting the stimuli for the particular sense with which each organ deals. We apparently taste with the nerve endings in the tongue, hear with those in the ear and so on, but in reality it is the brain that appreciate these sensations.

Skin

The skin forms a protective outer covering around the entire body. It consists of an outer thin layer called the **epidermis** and an inner thick layer called the **dermis**. Numerous structures such as glands, sense organs and appendages such as hair nails are embedded in the skin.

Epidermis: This is the outermost thin portion of the skin. No blood vessels are found in this layer. It derives its nutrition from lymph. Nerves are found in this layer. The epidermis consists of four layers of cells.

They are:

- 1) The Stratum Corneum
- 2) The Stratum Lucidum
- 3) Stratum Granulosum and
- 4) The Stratum Malphigi

The Stratum Corneum: The cells in this layer are thin, scale like, dead, and cornified. The corneus layer is thickened in those parts of the body such as the palm and sole of the foot. It is thinner in the lips. Hoofs, horns, nails, feathers, the scales of the fishes are all special outgrowths of this layer.

The Stratum Lucidum: This is a thin more or less transparent layer, in which the cells are indistinct.

The Stratum Granulosum: It consists of three to five layers of flattened cells, containing dark granules of irregular shape.

The Stratum Malphigi: This layer is the lowermost and broadest layer of the epidermis. It is capable of active multiplication. This layer is made up of polyhedral cells. The innermost cell of this layer contains pigment granules called **melanin** which give the skin its colour.

Dermis:

Situated below the epidermis is the thickest dermis formed mostly of connective tissue which is richly supplied with blood vessels and nerves.

The boundary line between the dermis and epidermis is neither smooth nor straight; it is rather zig zag because of the conical projection of the dermis into the epidermis.

These projections are called **dermal papillae**. This layer is tough, flexible and highly elastic.

It contains the following:

- 1) Fine elastic fibres.
- 2) Capillary blood vessels and lymphatics.
- 3) Sensory nerve endings of various types.
- 4) Hair roots or hair follicles.
- 5) Sweat glands.
- 6) Sebaceous glands and

7) Involuntary muscle fibres. These muscle fibre, called errectores pilorum are attached to the hair follicle and when these muscles contract, the hairs become vertical and 'goose-skin' is brought about.

Glands:

There are two sets of glands in the skin. They are

- 1) The Sweat glands
- 2) The sebaceous glands.

Each sweat gland consists of a long tube, which at one end opens on to the surface through the sweats pore. At the other ends, in the deeper part of the dermis, the tube forms a coiled mass with a blind end.

In the coiled portion of the sweat gland there are glandular cells, which separate water and small quantities of metabolic waste products from the blood that circulates through the capillary network associated with the gland.

The sweat passes through the sweat pore and evaporate from the surface by taking heat from the skin. The sweat glands are present in large amounts on the palms, soles, forehead and in the armpits.

The sebaceous glands are irregularly shaped sac-like glands that open into the hair follicle. The oily secretions (sebum) of the glands make the hair, water proof and protect the skin from drying effects of the atmosphere due to high temperatures and low humidity.

Sensory Nerve Endings:

Numerous sensory nerves specialized to pick up stimuli that cause; sensations of touch, pressure, pain, heat and cold are scattered in the skin.

They are connected to the brain by nerve fibres. Stimuli picked up by the sense organs are transmitted to the brain when they are interpreted to give the correct information.

Appendages:

Hair and nails are appendages of the skin formed as a result of the out growth or thickening of the epidermis.

Functions of the skin:

The skin is not merely an outer covering for the body but it serves a variety of functions.

1) Protection: The skin protects the inner parts of the body from mechanical injuries. A healthy skin also protects the body from the invasion of germs causing diseases. The nails, hoofs, and horns are also defensive appendages of the skin.

2) Excretion: Like kidneys, the skin through its sweat glands, eliminates salts, and metabolic waste products in the form of sweat.

3) Sensory function: The numerous sense organs and nerve endings hidden in the skin make it an important sensory structure that picks up different stimuli and informs the brain of such changes in the environment.

4) Production of Vitamin D: The skin contains a substance called 7-de hydro cholesterol which is converted into vitamin D by ultra – violet rays of the sun.

5) Regulation of the body temperature: By conduction, convection and radiation – a large amount of heat is lost from the body. The subcutaneous fat and hairs act as non – conductors of heat. Evaporation of sweat takes away a large amount of heat from the body.

6) Water balance: Formation and evaporation of sweat is an important factor in the regulation of water balance of the body.

7) Acid – balance equilibrium: Sweat being acid in reaction a good amount of acid is excreted through it. In acidosis, it becomes more acid and in this way helps to maintain a constant reaction in the body.

8) Secretion: Sebum which is secreted by the sebaceous glands helps to keep the skin greasy and prevents drying. Sweat is secreted by sweat gland. Milk is secreted by mammary gland. The mammary glands are the skin structures. They are the modified sebaceous glands.

9) Storage function: The subcutaneous tissue can store –

- | | |
|----------|--------------------------------------|
| a. fat | b. water |
| c. salts | d. glucose and such other substances |

Tongue

The tongue is concerned in the special sense of taste. It is a solid muscular organ of deglutition, taste, speech and helps in mastication of food. It is situated in the oral cavity. The mucous membrane of the tongue is moist and pink in health.

Tongue consist of 3 parts

Root - Attached with the hyoid bone

Body - surfaces

Apex - Touches the posterior surface of lower surfaces incisor teeth

Surfaces: Body containing dorsal surface and inferior surface. Upper surface has a velvete appearance covered by three varieties of papillae

- 1) **Circumvallate papillae** – these papillae are arranged in a “V” shape at the back of the tongue and taste buds are found numerous in the walls of the circumvallate and fungiform papillae.
- 2) **Fungi form papillae** – are distributed over the lip and sides of the tongue
- 3) **Filiform papillae** – are abundant and found over the whole surface of the tongue

Smell:

Nose is the special organ of the smell and the nasal cavities are lined by mucous membrane. The olfactory or first cranial nerve supplies the end organs of smell. The filaments of the nerve arise in the upper part of the nasal cavity is called olfactory portion of the nose and lined with highly specialized cells.

The olfactory nerves and connections

The olfactory bulb is an outlying portion of the brain is the slightly enlarged portion of the olfactory nerve tract which lies above the cribriform plate of the ethmoid bone form the olfactory bulb sensation is passed along the olfactory tract by several relaying stations until it reaches the final receiving area in the olfactory centre which is in the temporal lobe of the cerebral hemisphere where the sensation is interpreted. The sense of smell is stimulated by gases inhaled by small particle.

Organs of special sense - The ear and hearing:

The ear is the organ of hearing. The nerve supplying this special sense is the eighth cranial or auditory nerve

The ear has the following parts

- 1) External ear
- 2) Middle ear or tympanic cavity
- 3) Internal ear.

External ear consist of

- 1) Pinna or auricle - collects the sound waves
- 2) External auditory meatus - conveys the vibrations of sound

Middle ear consist of

- 1) Ear drum - communicates to the mastoid process
- 2) Eustachian tube - maintaining the pressure of air in the tympanic cavity
- 3) Auditory ossicles- are 3 small bones. They are

Malleus

Incus

This chain of bone serves to transmit the vibrations of sound from the drum to the internal ear

Stapes

Mastoid process is the part of the temporal bone lying behind the ear an air space communicates in the middle ear

Internal ear

Consists of cavities called the bony labyrinth and membranous labyrinth. Bony labyrinth consist of 3 parts

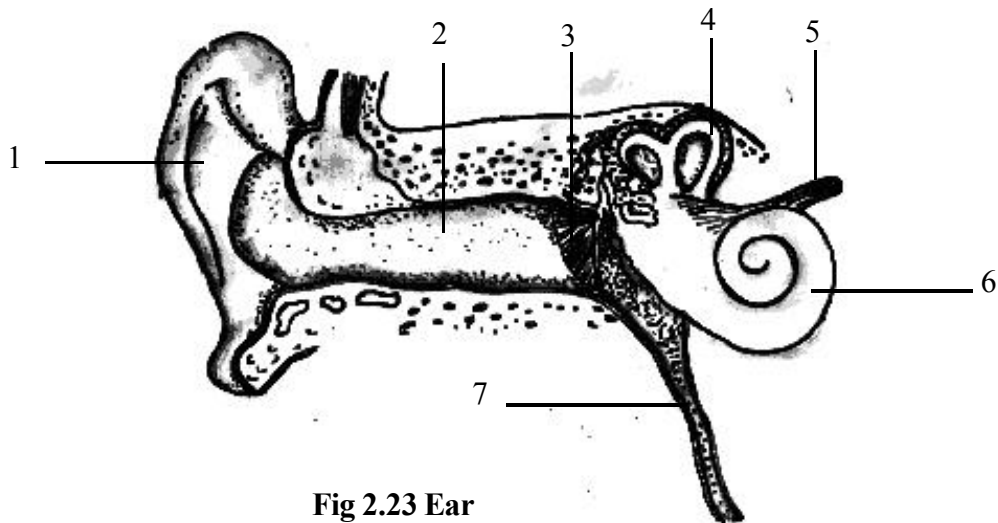


Fig 2.23 Ear

- | | | | |
|-------------------|-------------------|--------------------|-------------------------|
| 1) Pinna | 2) Auditory canal | 3) Ear drum | 4) Semi circular canals |
| 5) Auditory Nerve | 6) Cochlea | 7) Eustachian Tube | |

The vestibule

It is the central part with which all the others communicate, as doors may open out of the vestibule of a dwelling

Semi circular canals Assist the cerebellum in the control of the equilibrium

Cochlea

Spiral tube twisted resembling a snail shell. The fluid within the membranous labyrinth is endolymph and the fluid in the bony labyrinth is the perilymph. The fenestra vestibuli and the fenestra cochlea are windows directed towards the middle ear and allow the vibrations transmitted to peri and endo lymph to activate the nerve endings of the auditory nerve

Hearing: Sound waves pass along the external auditory canal cause the tympanic membrane to vibrate. The vibrations transmitted through malleus, incus and stapes. By movement of these bones, magnify the vibrations, then communicated to the vestibular fenestra to the perilymph and to the endolymph in the canal of the cochlea. This stimuli reaches the nerve endings in the organ of corti, conveyed to the brain by auditory nerve. The sensation of hearing is interpreted by the brain as a pleasant or unpleasant sound (noise or music).

Balance: The change in the position of the fluid in the semicircular canals helps in order to maintain balance of the body and this canal distributed by the vestibular nerve which conveys to the brain the

impulse generated there by alterations in the position of the fluid in these canals which have to do with the knowledge of the sense of the position of the head in relation to the body

Organs of special sense - The eye and sight:

Eye ball is spherical in shape situated in the anterior 2/3 of the orbital cavity and it is embedded in the fat of the cavity. The optic or second cranial nerve is the sensory nerve of the sight

The eye ball composed of 3 layers

- 1) Outer - Fibrous and supporting layer
- 2) Middle - Vascular
- 3) Inner - nervous layer (Retina)

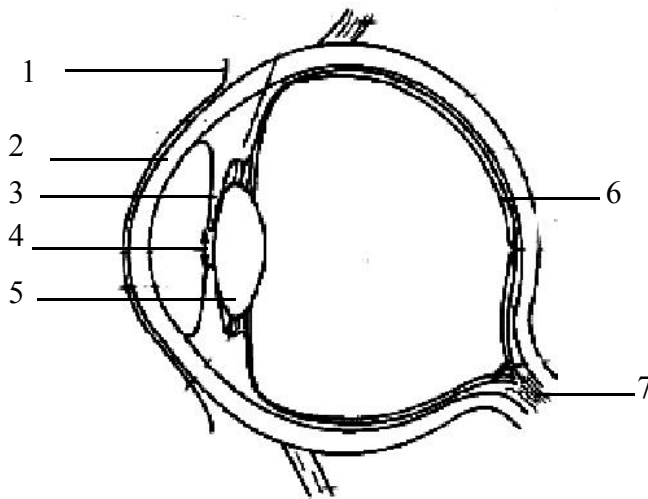


Fig 2.24 Eye

- 1) Conjunctiva
- 2) Cornea
- 3) Iris
- 4) Pupil
- 5) Lens
- 6) Retina
- 7) Optic Nerve

Fibrous layer:

Sclera: - It is opaque, white, smooth and contributes the posterior 5/6th of the eyeball. It protects the delicate structure of the eye and helps to maintain the shape of the eyeball

Cornea: - Is a transparent front portion, avascular and continuous with the sclera. It consists of several layers and it helps to focus images on to the retina

Vascular layer: -

Choroid: - It is highly vascular and pigmented layer, supplies nutrition to the outer layer of retina, absorbs the light and prevents reflection of light

Ciliary body: - It lies between the choroid and the iris and has circular muscle fibers and radiating fibers helps in maintaining the accommodation of the eye

Iris: - It is a circular, contractile and pigmented diaphragm. It is the color curtain in front of the lens and it contains 2 sets of involuntary muscle fibers, one set contract the size of the pupil & other set dilates the pupil

Pupil: - It is the dark central spot which is an opening in the iris through which light reaches the retina

Nervous layer (retina): - Composed of number of layers of fibers, nerve cells, rods and cones. The most sensitive part of the retina is the Macula lies, opposite to the centre of the pupil. At the middle side of the macula there is a circular pale area which is insensitive to light called blind spot

Sight

When an image is perceived the rays of light from the object seen, pass through the cornea, aqueous humor, lens and vitreous body to stimulate the nerve endings in the retina. The stimuli received by the retina pass along the optic tracts to the visual areas of the brain to be interpreted. Both areas receive messages from both eyes thus giving perspective and contour. One lens is provided in an ordinary camera, whereas in the eyes the crystalline lens is important in focusing the image on the retina

REPRODUCTIVE SYSTEM

The reproductive system consists of those organs whose function is to produce a new individual.

Male and female sexual reproductive organs:

The sex organs in the male and female can be divided as

1. Primary sex organs i.e. those production male and female gametes.
2. Secondary (or accessory) sex organs i.e. those concerned with carriage of gametes and other functions.

Primary sex organs in male and female:

There are a pair of testes producing spermatozoa (male gametes) while in females are a pair of ovaries producing ovum (female gamete). These primary sex organs in addition to producing male and female gametes secrete male and female hormones as well.

Accessory sex organs in the male:

1. Epididymis gland
2. Vas deferens
3. Seminal vesicles.
4. Prostate gland.
5. Urethra.
6. Penis.

Male reproductive system:

There is one pair of testes lying one in each scrotal sac. The scrotum is a bag of skin having two separate compartments.

One for each testis lying at the root of the penis. Each testis is oval shaped measures. 5x3x2 cm and weighs about 15 gm.

Each testis is covered with a layer of fibrous tissue called tunica albuginea. Many septate from this layer divide the testes into pyramidal lobules in which lie seminiferous tubules and interstitial cells.

The seminiferous tubules are concerned with process of spermatogenesis. The interstitial cells called Ludwig cells lie between the tubules and secrete the testosterone (male sex hormone).

From the lining of these tubules spermatozoa are produced by the process of cell division. The epididymis is a very fine convoluted of surviving for months.

Convoluted tube, being 4-6 meters long and joints the posterior part of the testes and vas deferens.

It stores the spermatozoa. The spermatozoa remain inactive in epididymis and are capable of surviving for months.

Vas deferens is a fibro-elastic duct 30-40cm in length and extends from epididymis to end in ejaculatory duct which is joined by seminal duct and opens in prostatic urethra.

The Seminal Vesicles are little sacs one on each side of the urethra near the base of the bladder. They receive and store the sperms brought by the vas deferens. They also add a fluid to the semen. Their ducts pass through the prostate gland to the urethra.

The prostate gland lies at the base of the urinary bladder and is covered with fibrous capsule which by a number of septa divides into many follicles. The prostate adds another fluid to the semen, which makes the sperms more active in swimming to reach the ovum. In middle and old age prostate may enlarge and cause micturition troubles.

The ejaculatory ducts lead from the seminal vesicle through the prostate gland to the urethra. In males the urethra is about 20-22 cm in length and serves the purpose of urination as well as ejaculation of semen.

The Penis is the external organ of both the urinary and reproductive systems in the male. It consists of spongy tissue with spaces for blood to rush in to make the penis hard and erect. The end of the penis is called the glans penis. It is normally covered with a loose double fold of skin (The foreskin), which can be drawn back. The foreskin can be removed by circumcision.

The urethra passes through the penis and opens at the glans penis.

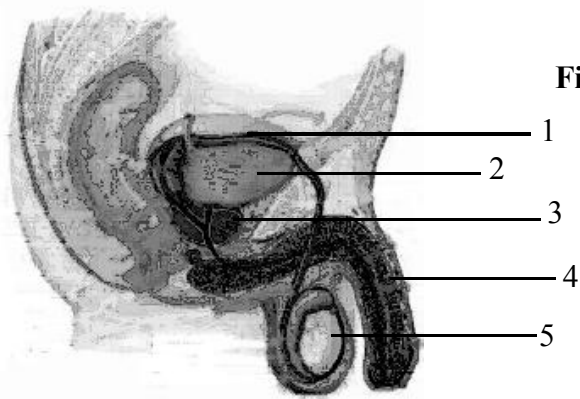


Fig 2.25 Male Reproductive system

- 1) Sperm Duct
- 2) Bladder
- 3) Prostate gland
- 4) Penis
- 5) Testis

Functions of testis:

- 1) They produce and mature the male reproductive cells called spermatozoa.
- 2) Secrete seminal fluid.
- 3) Secrete hormone testosterone directly into the blood.

Functions of hormone:

- 1) Androgens: Maintains spermatogenesis and sexual activity.
- 2) Testosterone: stimulates the development of the secondary sexual characteristics of the male such as the growth of beard, the deepening of the voice, the growth and the distribution of hair on the body, the growth and development of the accessory sex organs. Stimulate the production of sperms at puberty.

FEMALE REPRODUCTIVE ORGANS

These are divided into external organs and internal organs.

The External Organs: The Vulva

The external organs together form the vulva. They are as follows.

Mons veneris or pubic Mont: it lies over the symphysis pubis, and is covered with hair after puberty.

Labia majora or the outer lips, form the sides of the vulva.

Labia minora, or smaller lips, are within the labia majora. They are moist by gland secretions.

Clitoris a small sensitive organ with erectile tissue similar to the male penis.

Vestibule: a triangular part between he labia minora. The urethral opening is in the vestibule in front of the vaginal opening.

Vagina: It is a muscular tube lined with membrane comprised of special type of stratified epithelium, well supplied with blood vessels and nerves. It extends from the vestibule to the uterus.

Perineum: This is the area of the skin from the vaginal opening back to the anus. It covers the perineal body, which is a wedge-shaped structure between the vagina and lower part of the rectum. The muscle of the perineal body forms the main muscle of the pelvic floor. It flattens during the second stage of labour and quite often gets torn.

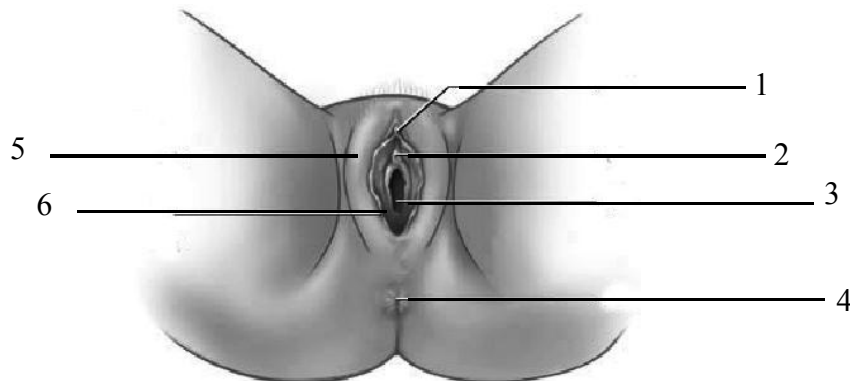


Fig 2.26 Female External Organs

1) Clitoris 2) Urethra 3) Vagina 4) Anus 5) Labia Majora 6) Labia Minora

Female reproductive internal organs:

The internal organs, which are situated in the pelvis, are as follows:

- 1) Fallopian tubes
- 2) Uterus
- 3) Vagina
- 4) Ovaries

Fallopian tubes: the fallopian tubes are two thin tubes connected to the sides of the uterus, just below the fundus. each tube is about 10 cm long, curves backwards behind the uterus and around the ovary like an arch. the outer end widens and opens into the peritoneal cavity. This opening is surrounded by finger like processes called fimbriae, one of which is connected to the ovary. The fallopian tubes have walls of muscle and are lined with ciliated epithelium and covered with peritoneum.

Functions:

These tubes act as ducts for the female gametes although they are not connected to the ovaries. The function of the tube is to collect the ovum discharged from ovary and pass it along the tube. It is sent along partly by peristaltic action of the muscles and partly by waving movements of the cilia. Fertilization of the male and female gametes normally occurs in the tubes at the ampullary portion.

Uterus: Uterus is a pear shaped muscular organ. This inside of which is hollow. It measures about 7.5 x 5x 2.5 cm and weighs about 60gm. consists of an upper portion called the body and the lower portion called the cervix. The uterus is lined by a mucus membrane known as the endometrium. The uterus has three parts:

- 1) Fundus, the upper part between the two fallopian tubes.
- 2) Body, the middle part, which has a triangular shaped cavity.

3) Cervix, the lower narrow part, which projects into the vagina below. The cervix is about 2.5 cm long, and has a central canal with two circular openings: the internal os where it joins with the body of the uterus, and the external os, which opens into the vagina.

The wall of the uterus is in three layers:

- 1) Perimetrium, the outer serous layer.
- 2) Myometrium, the muscular layer, which is thick and strong.
- 3) Endometrium, the inner lining of special epithelial tissue. The narrow cavity of the uterus has three openings: one into each fallopian tube, and one through the external os of the cervix into the vagina.

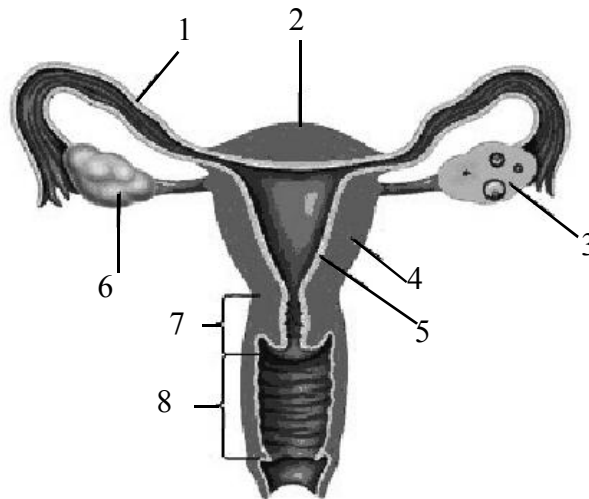


Fig 2.27 The Uterus

- | | | | |
|-----------------------|-----------|-------------------|------------------|
| 1) Fallopian tube | 2) Fundus | 3) Developing Egg | 4) Myometrium |
| 5) Body of the Uterus | 6) Ovary | 7) Cervical canal | 8) Vaginal canal |

Functions

1) Menstruation-the thickened endometrium comes away causing bleeding of torn vessels, and the resulting menstrual flow is discharged through the vagina.

- 2) Pregnancy-the uterus receives the fertilised ovum and nourishes the developing foetus.
- 3) Labour contractions of the muscular wall cause the foetus and placenta to be expelled.
- 4) Involution-the gradual return to normal size of the uterus following delivery.

Ovary:

The gonads of the females are called ovaries and the cells that they produce are known as ova or egg cells, each female has a pair of oval shaped structure about the size of a almond.

Each ovary measures 3.5x2.5 x 11.5 cm and weighs 8 -10 gms.

They are situated at the back of the abdominal cavity at the hip level. An ovary consists of the following;

1) The germinal epithelium: it is the outer part of the ovary from which the primitive graffian follicles develop.

2) Tunica albuginea: this is made up of connective tissue found under the germinal epithelium.

3) Stroma: it is the connective tissue network continuous with tunica albuginea and containing involuntary muscle fibres. It supports the ovarian tissues and carries blood vessels, lymphatic and nerves.

4) Graffian follicles: these are small islands of cells found at the peripheral part of the ovary. The female gametes called ova are produced in the graffian follicle.

When the ovum matures, the follicle in which it develops bursts. The follicle usually takes 10-14 days to rupture. This process of rupture of graffian follicle is called the “ovulation”.

5) Corpus luteum: when the follicle ruptures corpus luteum develops. In the absence of pregnancy it persists up to 27th day and degenerates on the 28th day. If pregnancy occurs it persists to about 4-5months. It secretes progesterone which is essential for the maintenance of pregnancy.

6) Interstitial cells: there are polyhedral cells found in between the follicles. These cells secrete oestrogen.

Functions:

- 1) Produce ova and expel one at approximately 28 days interval during the reproductive life.
- 2) Secrete hormones (oestrogen & progesterone). Oestrogen influence secondary sex characteristics and is responsible for the changes in the accessory organs of reproduction. The progesterone prepares the uterus for the reception of the fertilized ovum, implantation, the development of the placenta, development of the mammary glands, and inducing multiplication of the uterine muscle fibres.

The Breasts (Mammary glands)

These are accessory to the reproductive system. They are present in an, undeveloped form in the female before puberty, and also in the male. They are situated at the front of the thorax.

The fully developed female breast is circular in outline and curves outwards. In the centre is the nipple, which projects outwards and is pink in the virgin, but pigmented after the first pregnancy. It becomes erect when stimulated and a good teat for the baby.

The gland is divided into lobes by partitions of fibrous tissue. Ducts from the glandular tissue converge towards the nipple and open on its surface.

During pregnancy hormones from the pituitary and ovaries cause the breasts to increase in size and to secrete a small amount of fluid, which can be expressed from the nipples. This is in preparation for the function of lactation (milk production).

Menstrual Cycle

This means the cycle of changes that regularly take place in the lining of the uterus (endometrium) under the influence of hormones with the outward sign of menstruation or monthly period of females.

Menstruation is a function of the uterus that starts during puberty at the average age of 13. It occurs on the average every 28 days, until it stops at 45 to 50 years (the menopause).

The purpose of the menstrual cycle is to prepare the endometrium to receive the fertilized ovum. It becomes thicker, is soft and rich in blood supply. When no fertilised ovum arrives in the uterus, the endometrium breaks down and results in the menstrual flow. The endometrium bleeds for 3 to 5 days. The blood contains epithelial cells and mucus, and does not clot. The amount of fluid is normally from 30 to 180 ml. in all.

After menstruation, there is a period of repair for the endometrium, followed by a resting period and slow growth. During the middle of this resting period a new ovum is discharged from the ovary (ovulation)

The menstrual cycle contains the following phases.

Pre menstrual period, with congestion in the uterus 7 days.

Menstruation 5 days

Period of repair 6 days

Resting period with ovulation 10 days

Total 28 days

Ovulation usually takes place midway between the beginning of two menstrual periods. This is time when the woman is fertile and pregnancy may occur.

Menstruation stops during pregnancy and this is called amenorrhoea. The menstrual periods usually do not start again until breast-feeding is stopped.

Hormones and the reproductive system

Hormones are most important in the working of the reproductive organs. At puberty, hormones from the anterior pituitary gland stimulates the sex glands (ovary in the female, testes in the male) to produce their sex hormones.

The male hormones testosterone promotes the development of male characteristics.

In the female, oestrogen, promotes development of the female sex organs and tissue growth for the development of feminine features.

The anterior pituitary hormones and adrenal cortex hormones also have effect on the development of sexual characteristics both in the male and in the female.

Ovulation

The Follicle Stimulating Hormone (FSH) from the Anterior pituitary causes development of a Graafian follicle in the ovary once a month. This is like a cyst or sac of fluid protecting the ovum. At the time of ovulation, the ovum is set free as the follicle ruptures.

Immediately after ovulation, the Luteinising Hormone (LH) from the anterior pituitary gland cause the ruptured follicle to change into the Corpus Luteum (Yellow Body) which appears on the ovary following ovulation. If the ovum is not fertilized, it dies and passed out of the body in the menstrual flow. The corpus luteum also disappears with the next menstrual period.

Summary:

- The body is made like a complex perfect machine.
- Each part is specially constructed to carry out its own function.
- The body consists of the head, neck, trunk, upper limbs, and lower limbs.
- The body has a strong framework of bones called the skeleton.
- There are spaces called cavities in which important organs are protected. E.g. the cranial cavity contains the brain.
- The human body is made up of living cells.
- Each cell has cell membrane, protoplasm and nucleus.
- The functions of the cells are digestion, excretion, respiration, growth and repair and reproduction.
- Tissues are made up of groups of similar cells.
- Tissues are joined into larger units called organs.
- A system is a group of organs.
- Skeletal system, muscular system, nervous system, circulatory system, digestive system, respiratory system, excretory system, endocrine system, and reproductive system are the systems of our body.
- Nervous system has two parts: central nervous system and autonomic nervous system. The central nervous system is made up of the brain and cranial nerves, spinal cord and spinal nerves.
- The main function of circulatory system is transportation of oxygen, nutrients to tissues and carries metabolic waste products to the excretory organs.
- The lymph glands help to protect the body from infection.
- The functions of digestive system are digestion, absorption of nutrients and excretion of undigested food.
- Respiration is the process of gaseous exchange between an organism and its environment.

- The lungs, kidney and skin are the important excretory organs in our body.
- The main endocrine glands in the body are thyroid, para – thyroid, adrenal and pituitary glands.
- The endocrine glands produce a chemical substance, hormone, which regulates the activities of various organs and their functions.

QUESTIONS

PART A — WRITE IN ONE OR TWO WORDS : (One mark)

- 1) Which is the important part of the nervous system?
- 2) What is the end product of digestion?
- 3) Write the two phases of respiration?
- 4) What are the layers of skin?
- 5) List down the layers of epidermis?
- 6) What are the glands in the skin?
- 7) What are the hormones secreted by adrenal cortex?
- 8) What are the accessory sex organs in female?
- 9) Define anatomy?
- 10) How many bones are there in the body?
- 11) What are true ribs?
- 12) What are false ribs?
- 13) What are the parts of nervous system?
- 14) What constitute the central nervous system?
- 15) How many cranial nerves are there in the brain?
- 16) What are the three membranes of the brain and spinal cord?
- 17) What are the two enzymes present in saliva?
- 18) What are the pigments present in bile?
- 19) What are the enzymes present in the pancreatic juice?
- 20) What are the two chief functions of digestive system?
- 21) What are the types of nerves?
- 22) What are the types of blood vessels?
- 23) How many lobes are present in right lung?
- 24) How many bones are present in cranial cavity?
- 25) Mention the parts of the innominate bone?

PART B — MULTIPLE CHOICE QUESTIONS: (One mark)

- 1) The important part of the central nervous system is
 - a) Brian
 - b) spinal cord
 - c) nerves
 - d) all of the above.
- 2) The bigger part of the brain is
 - a) Cerebrum
 - b) cerebellum
 - c) pons
 - d) medulla oblongata
- 3) Brain and spinal cord is covered by
 - a) Meninges
 - b) pleura
 - c) peritoneum
 - d) periosteum.
- 4) Function of the frontal lobe of the brain
 - a) motor centre
 - b) speech center
 - c) mental powers
 - d) all of the above.
- 5) The end products of protein digestion are
 - a) glucose
 - b) amino acids
 - c) fatty acids
 - d) all of the above.
- 6) Bile is stored and concentrated in
 - a) liver
 - b) pancreas
 - c) stomach
 - d) intestine
- 7) The process by which the masticated food is transported across the pharynx to reach the stomach is
 - a) peristalsis
 - b) deglutition
 - c) mastication.
 - D) micturituion.
- 8) The opening of the larynx is guide by
 - a) glottis
 - b) epiglottis
 - c) cartilage
 - d) none of the above.
- 9) The nerve that controls the diaphragm is
 - a) vagus nerve
 - b) sciatic nerve
 - c) phrenic nerve
 - d) all of the above.
- 10) The tought of capillary vessels present in the bowman's capsule is
 - a) cortex
 - b) medulla
 - c) pyramid
 - d) glomerulus
- 11) Process by which complex form of food is converted into simple nutrient
 - a) digestion
 - b) absorption
 - c) assimilation
 - d) none of the above.
- 12) The finger like projections found in the mucus membrane of the intestine is
 - a) villi
 - b) esophagus
 - c) liver
 - d) gall bladder
- 13) The chemical present in most of the digestive juices is
 - a) pepsin
 - b) rennin
 - c) hydrochloric acid
 - d) trypsin.
- 14) The condition in which the skin, nails, and eyes becomes yellow is
 - a) anemia
 - b) jaundice
 - c) dwarfism
 - d) gigantism.
- 15) The process of gaseous exchange between an organism and its environment is
 - a) inspiration
 - b) internal respiration
 - c) external respiration
 - d) expiration.

- 16) The principal excretory organs of the body are
a) lungs b) kidney c) skin d) ;all of the above
- 17) The outer thin layer of the skin is
a)dermis b) epidermis c) subcutaneous tissue d) all of the above
- 18) The pigment granule which gives the skin its colour is
a) sebum b) melanin c) rennin d) all of the above
- 19) The nervous layer of eye is
a) cornea b) sclera c) iris d) retina.
- 20) The secretions of sebaceous gland is known as
a) sebum b) melanin c) rennin d) all of the above
- 21) The term superficial refers to
a) Away from the body b) nearer to the head
c) nearer to the body surface. d) none of the above.
- 22) The yellow marrow is mainly composed of
a) fat cells b) white blood cells c) red blood cells d) none of the above
- 23) The face consists of the following number of bones
a) 22 b) 12 c) 18 d) 14.
- 24) The eighth cranial nerve is
a) facial b) vagus c) accessory d) vestibule-cochlear
- 25) The function of Occipital lobe of cerebrum is
a) speech b) memory c) red blood cells d) none of the above
- 26) The group of nerve cells are called as
a) Ganglia b) neurons c) fibers d) sciatica
- 27) The coronary arteries branch out from the
a) Arch of aorta b) ascending aorta c) Root of aorta d) descending aorta
- 28) The distal end of the stomach is guarded by
a) cardiac sphincter b) internal sphincter
c) pyloric sphincter d) none of the above
- 29) The following organ is the voice box
a) pharynx b) trachea c) larynx d) glottis
- 30) The largest of the endocrine gland is
a) parathyroid b) thyroid c) adrenals d) pituitary

PART C — Write Short Notes on : (5 marks)

- 1) Enumerate the functions of the blood?
- 2) What are the functions of the heart?
- 3) What are the functions of the liver?
- 4) What are the types of the blood vessels?
- 5) What are the importance of respiration?
- 6) Enumerate the functions of parathyroid gland?
- 7) Fallopian tube.
- 8) Tongue.
- 9) Ovary.
- 10) Anterior pituitary gland.
- 11) What are the systems found in the body?
- 12) what are the functions of cell?
- 13) How will you classify joints?
- 14) Name the type of tissues with example?
- 15) State the face bones?
- 16) What are the functions of skeleton?
- 17) Name the bones of upper limb?
- 18) Write about innominate bone?
- 19) State the names of anterior muscles of the body?
- 20) Names of the posterior muscles of the body?
- 21) What are the functions of spinal cord?
- 22) What are the functions of brain?
- 23) List down the functions of spleen?
- 24) Draw the diagram of brain?
- 25) Draw the diagram of testes?
- 26) Write the functions of medullary hormones?
- 27) Draw the diagram of kidney?
- 28) What are the functions of saliva?
- 29) Draw the structure of tooth?
- 30) What are the parts of circulatory system?

PART D — WRITE IN DETAIL: (10 marks)

- 1) Draw the structure of alimentary canal?
- 2) Write in details about endocrine glands?
- 3) Define joints. Explain the various types of joints in our body?
- 4) Write in detail about heart.?
- 5) Structure and functions of kidney?
- 6) Structure and functions of skin?
- 7) Define respiration and explain the physiology of respiration?
- 8) Structure and functions of eye?
- 9) Structure and functions ear?
- 10) Write down the cavities in our body?
- 11) State the type of bones with example?
- 12) Explain the functions of blood?
- 13) Draw the diagram of gastro intestinal tract?
- 14) Discuss the structure of skeletal tissue?
- 15) Write about thyroid gland with example?

PART E — WRITE ESSAY: (20 marks)

- 1) What is digestion explain about physiology of digestion?
- 2) Draw the diagram of respiratory system and explain the phases of breathing?
- 3) Explain about pituitary gland with a neat diagram?
- 4) Describe the structure of heart and blood circulation?
- 5) Describe the structure of female reproductive system?



3. INTRODUCTION TO PSYCHOLOGY

DEFINITION OF PSYCHOLOGY AND MENTAL HEALTH

“Psychology” is a branch of science dealing with knowledge of mind and soul. It plays a vital role in taking care of the patients in nursing.

The knowledge of basic principles of psychology is significant in taking care of nurse herself and also in her interaction with the patient.

The nurses should understand that the fulfillment of basic needs as given below is imperative in achieving one’s own self actualization.

Mental health as “the adjustment of human beings to the world and to each other with maximum of effectiveness and happiness”
- **Meninger**

Mental health is an ability to maintain

- 1) An even temper
- 2) An alert intelligence
- 3) A socially considerate behavior and
- 4) A happy disposition

CHARACTERISTICS OF MENTALLY HEALTHY PERSON

- 1) He is free from internal conflict
- 2) He is well adjusted
- 3) He searches for an identify
- 4) He has a strong sense of self esteem
- 5) He knows his needs, problems and goals
- 6) He has good control over his behavior
- 7) He is productive
- 8) He face and solves the problems

IMPORTANCE OF PSYCHOLOGY IN NURSING

The study of human behavior is of great value to a nursing professional in a number of ways

- 1) It will help her to understand herself
- 2) It will help her to understand other people
- 3) It will help her to improve situations by helping other to solve their problems
- 4) It will help to understand the close relationship of body , mind and spirit

FACTORS INFLUENCING MENTAL HEALTH

1) Personal factors

- Age
- Genetics and biology
- Response to drugs
- Hardness (ability to resist illness)
- Resourcefulness
- Resilience (health response to stressful circumstances)
- Growth and development
- Physical health and health practice
- Self efficacy
- Commitment, control and challenge
- Spirituality

2) Interpersonal factors: -

- Sense of belonging
- Family support
- Social network and social support

3) Cultural factor: -

- Culture
- Gender
- Social class
- Race
- Sexual orientation
- Economic situation

LEARNING

One of the most important characteristics of human being is the capacity to learn. Learning is central to all our behavior. Our attitude & emotional expressions are also learned behavior

Learning is defined as the mental activity by means of which knowledge, skill, attitude, appreciations and ideas are acquired, resulting in modifications of behaviors

Factors influencing learning: -

It is depends upon the following factors

- 1) Nature of the learner
- 2) Nature of the learning material
- 3) Nature of the learning situations

Nature of the learner:-

- Perception - Sense organs are the gateways to acquire knowledge. Process of perception should be perfect
- Organic defects - Visual defects, hearing impairment and infections
- Fatigue - Strain, loneliness, lack of fresh air, sunlight and compulsive learning causes fatigue.
- Time of the day - There is no variation in efficiency of learning. It depends only with learner's will power
- Age & learning - The capacity of learning improves up to 23 years & declines after 40 years

Nature of learning:-

Meaningful learning easier than learning with out knowing the meaning of the learning method

- 1) **Definite goal:** - With a clear goal in mind the student works towards a definite purpose. It enhances motivation, intention to learn better learning.
- 2) **Knowledge of results or psychological feed back.** Regular and frequent review of the amount of progress being made towards the goal promotes effective leaning
- 3) **Distribution of practice board:** - Shorter practice period are more effective than longer periods this will reduces the mental fatigue
- 4) **Whole versus part method:** - Whole method should be adopted with easy unit and difficult material can be learned in small units
- 5) **Logical learning:** - Logical learning calls for an arrangement and also assimilation with ideas in minds. Students should try to grasp the meaning of text
- 6) **Rest:-** Take rest in between studies prevents mental fatigue
- 7) **Levels of anxiety:** - Avoids undue worry, anxiety & nervousness to promote better learning. Otherwise it will have an inhibiting and interfering effect
- 8) **Over learning/repetitions at regular intervals** helps to retain the material over a longer period of time

Theories of learning

- 1) Trail and error
- 2) Theory of conditioned reflexes
 - A) Classical conditioning
 - B) Operant conditioning
- 3) Cognitive learning
 - A) Insight learning
 - B) Sign learning

Trial and error: - Edward Lee Thorndike American Psychologist considered as the father of educational, psychology conducted series of experiments on trial and error method of learning by animals and found out that all learning is trial & error and he has developed certain laws of learning. They are

- Law of effect:- The response followed by a reward will be strengthened
- Law of Exercise:- There is a direct relationship between repetition and the strength of the stimulus response. Any task that is repeated shows a tendency for the strengthening of the bond Eg: Reading, writing, typing, singing, dancing, drawing learned by constant practice
- Law of readiness: Learning takes place best when a person is ready to learn

Theory of conditioned reflexes

Classical conditioning:- Ivan Pavlov a Russian physiologist, a researcher experimented on a dog. A capsule attached to a dog's salivary gland to measure the salivary flow. A bell was rung every time and meat powder was given to the dog. This was repeated several times. Later Pavlov observed that the dog salivated at the mere sound of the bell without giving meat powder. Thus the dog has been conditioned to respond. Pavlov showed, how the internal process such as learning can be studied objectively. Principles of classical conditioning used in the following areas for learning

- 1) Developing good habits
- 2) Breaking of bad habits and elimination of fear
- 3) Training of animals
- 4) Use in psychotherapy
- 5) Useful in developing favorable attitude

Operant conditioning:- Skinner experimented on a rat which was placed inside a glass box containing a lever and food tray. The rat was free to explore the box. When ever the lever in the box was pressed automatically a pellet of food was dropped on the tray. The number of times, the rat pressed on the lever was recorded. Pressing the lever was the response to be learned (the operant response) and the food was the stimulus consequences (reinforcement). Thus the rate of presses increased with rewarding of the rat with food

Cognitive learning

Learning by insight: -Gestalt psychologist concluded that the individual learns by his ability known as insight & not by trial & error method. They experiment on a Chimpanzee called sultan. Some bananas were placed inside the cage of hungry sultan, who was then given 2 sticks. Hungry sultan tried to get the bananas by extending his hands. Then he took up one of the sticks & tried to pull the bananas. The effort spent for one hour, got tired and started to play with the Sticks. Mean while one end of one stick got incidentally fastened in to the ring fixed on the end of the other stick, with the result that both the sticks were joined together. Now sultan used this joined stick to pull in the bananas & succeeded. Gestalt psychologist concluded that, sultan's sudden learning was due to insight developed from his perception of the total situation consisting of the cage, sticks & bananas as a whole

CHARACTERISTICS OF LEARNING BY INSIGHT

- 1) Insight is sudden
- 2) Insight is due to understanding
- 3) Insight alters perception
- 4) Old objects appear in new patterns and organization due to insight
- 5) Higher species of animals including man has more insight than members of lower species
- 6) Insight develops usually after some trial and error

Tolman's theory of sign learning : According to Tolamn's (1930) learning is a total process. It takes place by cognition which includes concepts like knowledge, thinking, planning, inference and purpose. The learner through his experience recognizes some cues or signs and then relationships with goals. Learning consists in the recognition of signs and their meanings in relation to goals in sign learning, a comparison was made between two group of hungry rats in a maze. In one group, each subject received food each time it ran the maze and steady improvement was noticed. In the other, each subject was given access to the maze without finding a food reward and little improvement occurred in time or error scores.

However, when food was introduced at the tenth trial, performance soon approximated that of the group which had been rewarded continually. Such sudden improvement suggests that the animals had acquired information about the maze which they did not utilize until, after the tenth day it became advantageous for them to do so. The rats had developed a cognitive map of the maze

Bandura's social cognitive theory: -Just as Tolman believed that rats gather information and form cognitive maps about their environments through exploring, Bandura believes that humans gather information about their environments and behavior of other through observations

Social cognitive learning results from watching, imitating and modeling and does not require the observer to perform any observable behavior or receive any observable reward Bandura believes that four process – attention, memory, imitation and motivation – operate during social cognitive learning

Theories of transfer of learning: As per Thorndike, the transfer of learning from one situation to another is possible because of identical common elements. For example, in learning cycling and driving a car, the transfer takes place because of the common elements like steering movements, knowledge of the rules of the road and looking ahead. In learning typewriting and piano the transfer takes place on account of the presence of common elements like the use of both hands required for pressing the keys and eye hand coordination

OBSERVATION: ATTENTION AND PERCEPTION

Definition: An expression of an opinion or judgment upon what one has observed; a remark.

Observation involves to mental activities – attention and perception

To improve observation

- 1) Full attention to each task
- 2) Avoid distraction
- 3) Observe accurately & quickly
- 4) Show interest
- 5) Have active motivation
- 6) Avoid personal bias or prejudice
- 7) Cultivate the habit of observing accurately

ATTENTION

Attention is the focusing of consciousness on a particular object or idea at a particular time to the exclusion of other objects or ideas

Types of attention: - Attention can be classified into two

- 1) Involuntary
- 2) Voluntary or habitual

Involuntary attention: - It does not require any conscious effort to attend an object. Ex

- Attention to loud sounds
- Bright lights
- Strong penetrating odours

Factors increasing attention by external factors: -

- 1) Nature of the stimulus: - More attractive stimulus catches maximum attention (Picture)
- 2) Location of the stimulus: - Stimulus in front of the eye attracts our attention
- 3) Intensity: - Loud sound, bright colors
- 4) Change in the intensity of the stimulus: - Ticking of a clock in our room may not attract our attention but when it stops our attention is attracted
- 5) Movement: - A fast moving electric sign attracts our attention
- 6) Size: - Bigger size attracts more attention
- 7) Contrast: - A single man among the many woman, a spot on a clean white dress attracts our attention
- 8) Novelty: - A new fashion dress attracts our attention
- 9) Repetition: - Repeated cry, repeated ringing of a call bell attracts our attention

Factors increasing attention by internal factors: -

- 1) Interest: - When we are motivated to a goal
- 2) Motives: - When a child is hungry he looks for a feeding bottle rather than a toy
- 3) Experience: - We attend to object with which we are familiar
- 4) Mental set: - While expecting a friend, we perceive any knocking sound as that of friend's footstep
- 5) Emotional stage: - Under stressful conditions we fail to perceive our surroundings fully

Voluntary or habitual: - There is no conscious effort of sensation. We attend to them because of our attitudes, habits, or interest. Ex: The attention that a teacher gives to her students

Span of attention: - The maximum amount of material that can be attend to in one period of attention is called span of attention

Distraction of attention: - Refers to shifting of attention from one stimulus to another.

External distraction: Noise pollution

Internal distraction: Pain headache

Division of attention:- Refers to the process of dividing our attention equally and simultaneously between two or more objects. Ex: While students reading a book may hear his favorite song

Perception : Perception is the process by which we discriminate among stimuli and interpret their meanings and appreciate their significance. Ex When we hear a sound, we are able to identify it as being produced by an aero plane

Perceptions are divided in to

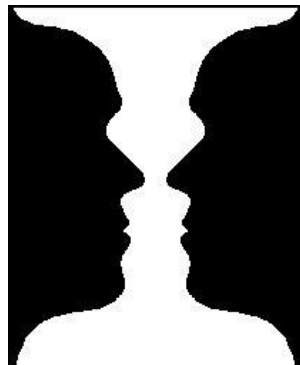
- 1) Visual perception
- 2) Auditory perception

Factors influencing perception: -

- Functioning of the sense organs
- Previous experience
- Psychological state of the individual
- Motivation
- Functioning of the brain
- Frequency of exposure
- Interest
- Behavior of the organism

Theories of laws of perceptual organization: -

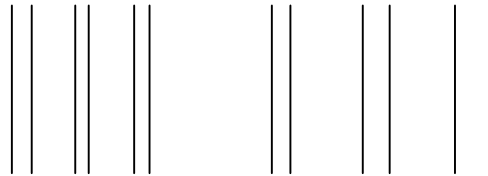
- 1) **Figure – ground relationship:** - The most fundamental process in form perception is the recognition of a figures standing out from a background. Color also helps, e.g. A black panther can be seen easily against a white ground of snow but not a polar bear. This is because the polar bear is white in color



In the above figure you see the light portion as a figure, you will see a water glass or candle holder, if you see the dark portion as a figure, you will see two faces. Either one is a figure against background

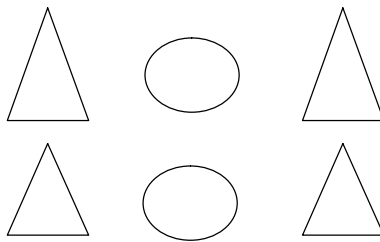
Grouping of stimuli in perceptual organization: - Stimuli are grouped into the smallest possible pattern that has meaning. Important principles of grouping are proximity, similarity, symmetry, closure and continuation

Proximity: - When objects are close to each other, the tendency is to perceive than together rather than separately. We see three sets of two lines each and not six separately lines



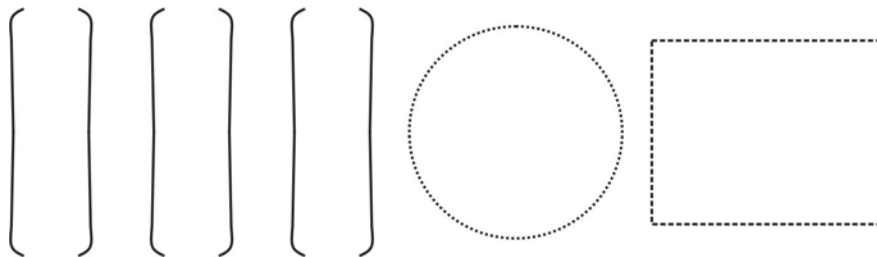
Proximity

Similarity: - Items that most closely resemble each other or perceived as units



In above figure the circles and triangles are seen as two vertical rows of triangles and one row of circles and not three horizontal rows of triangles and circles

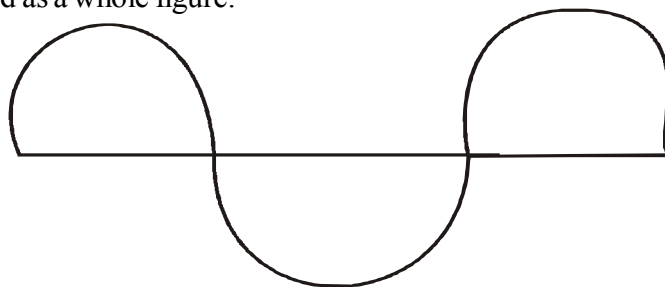
Symmetry: - Items that form symmetrical units are grouped together



We see three sets of brackets. We do not see six unconnected lines

Closure: - Items are perceived as complete units even though they may be interrupted by gaps

Continuation: - Anything which extends itself into space in the same shape, size and color without a break in perceived as a whole figure.



In figure we see a curved line and a straight line. We do not see a straight line with small semi-circles above and below it

Perceptual constancies: - Perceptual constancies refers to our tendency to perceive objects as relatively stable and unchanging despite changing information. Perceptual constancies

- 1) Space constancy
- 2) Sex constancy
- 3) Brightness and color constancy
- 4) Perception of space binocular depth cues
- 5) Visual monocular clues

Types of perceptual constancies: -

- 1) **Observer characteristics:** - Depends greatly on past experience and learning
- 2) **Depth perception:** - Is the ability to perceive space and distance accurately
- 3) **Binocular cues:** - Helps in the perception of depth by integrating and synchronizing the images of both the eyes.
- 4) **Monocular cues:** - Helps in perception of depth and distance with the image of single eye

EMOTION

The psychologist Kulpe defines emotion as “a fusion of feeling and organic sensations”. The psychologist Hoffding defines it “as a pleasure pain in association with the idea of its cause”. According to psychologist Ward, “it is the complete psychosis involving cognition, pleasure – pain and conation”. In general emotion “is a complex, not a simple elementary, mental state”.

The difference between motives and emotions are as follows:

Emotions are usually aroused by external stimuli and that emotional expression is directed toward the stimuli in the environment that arouses it.

Motives on the other hand, are more often aroused by internal stimuli and naturally directed towards certain objects in the environment. (e.g. food, water).

Most of the motivated behaviour has some affective or emotional accompaniment although we may be too pre occupied in our striving towards goal.

Motivation is focused on the goal directed activity. Emotion is focused on the subjective, affective experiences that accompany behaviour.

Emotions are expressed by language, facial expressions and gestures.

The emotional state is characterized by:

- 1) A more or less pronounced affective tone. Pleasure unpleasures – experienced in connection with some objective or situation.
- 2) A diffuse stimulation of the organic process, involving pulse, respiration, glandular secretions which is usually called the organic resonance of the emotion but according to theory of the psychologist James Lange, it is identified with emotion itself.
- 3) A narrowing and specializing of consciousness, both on the cognitive and on the curative side, the consequence of what we may call emotional disassociation.
- 4) An impulsive force.

Physiological changes in emotions:

- 1) All emotional states affect the activities of the salivary glands. The bodily effects of pain, hunger, fear and rage have all the emotions of characteristically, negative polarity. In such cases the secretion of saliva is diminished or inhibited.
- 2) There is a fair presumption that emotions of an opposite or positive, polarity will produce the opposite effect but practically no experimental evidence.
- 3) The emotional disturbances of a negative polarity (that is disagreeable) involve disturbance of the digestive functions in all its aspects.
- 4) The flow of saliva is diminished or altogether inhibited, and its chemical composition altered. The flow of gastric juices is similarly diminished or inhibited and altered chemically. The negative moments then tend to cease.
- 5) This fact suggested to psychologist Cannon, the possibility that emotional excitement might involve an increased secretion of adenines and that this adenine in the blood might have the effect of prolonging the inhibition of the activity of the digestive glands after the emotional excitement itself had disappeared.
- 6) By testing blood for adenine after a period of time of the quantity of adenine in the blood, it is greatly increased as a result of strong emotion.

The sympathetic system is responsible for the following changes:

- 1) Blood pressure and heart rate increases.
- 2) Respirations become more rapid.
- 3) The pupils of the eye dilate.
- 4) Electrical resistance of the skin decreases.
- 5) Blood sugar level increases to provide more energy.
- 6) The blood begins to clot more quickly in the case of wounds.
- 7) The mobility of the gastro intestinal tract decreases or stops entirely. Blood is diverted from the stomach and intestines and are sent to their brain and skeletal muscles.
- 8) Hairs on the skin erect causing "Goose pimples". In emotion the sympathetic system also causes epinephrine and nor – epinephrine. Nerve impulses with sympathetic system, which reach adrenal glands located on the top of the kidneys, trigger the secretion of hormones. They then get into the blood and circulate around the body.

Theories of emotion:

James theory of emotion proposes the following sequences of events in emotional state.

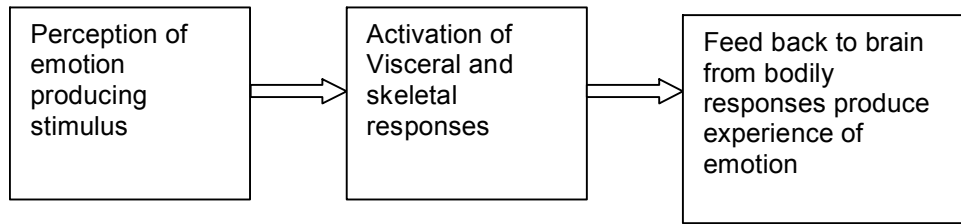
First we perceive the situation that will produce emotion. Second we react to this emotion. Third we notice our action. The perception of the reaction is the basis of the emotion as we feel and experience it.

The major objection to James Lang theory came from Cannon who pointed out

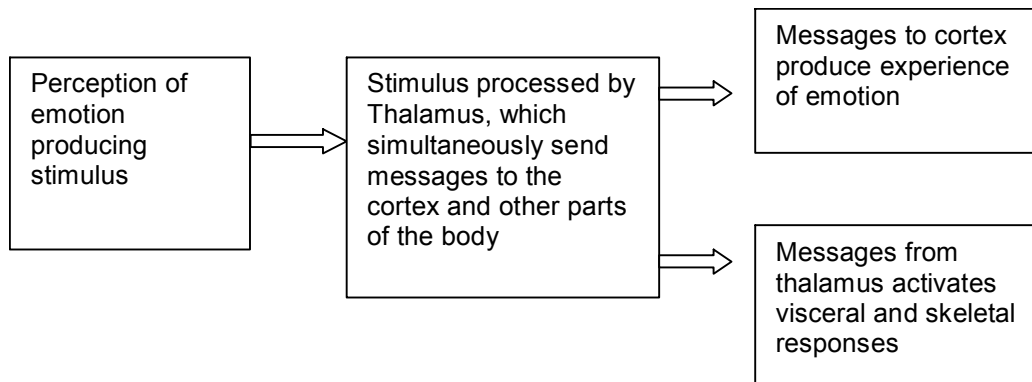
- 1) That changes do not seem to differ very much from one emotional state to another.
- 2) The internal organs are relatively intensive structures not well supplied with nerves and internal changes occur too slowly to be a source of emotional feelings.

- 3) Artificially inducing the bodily changes associated with an emotion injecting a person with adrenaline does not produce the experience of the true emotion.

James Langes Theory



Canon theory



Emotion when sufficiently intense can seriously impair the process that control organized behavior.

Emotional behavior studies in infancy and early childhood by means of direct observation. Motion pictures and recording of children’s cries indicate that the infants’ response to stimuli designated to arouse emotion are very diffuse and lacking in organization.

Emotional shocks and hurts suffered by individuals at an early age can handicap them as long as they live. Children sooner or later acquire the capacity for experiencing negative emotions such as anger, fear, and also sorrow or grief to an intense degree.

This capacity develops, before the child is mature enough to use language, to formulate his experience in words.

For a time, the infants’ expression of rage is poorly recognized. Later his anger becomes more indefinitely directed at something or some body. Changes can likewise be noted in a child’s expression of fear and his reactions to pain.

These improvements in the young child’s ability to respond in specific ways to situations that arouse him, parallel the development of his mental and motor abilities.

As the child’s intellectual and motor capacity matures, he acquires large variety of means and forms of expression such as overt and direct to more graded covert and indirect.

The habit of concealing emotion may become specially burdensome under two conditions. If a person may mask intense feeling of anger tat occurs when someone hunts his pride very sharply and then still harboring his anger may explode on another occasions because of a very trivial affront.

Again suppression of any show of emotion may be harmful in an individual for one reason or another has put a lid on any impulse to show affection and its awkward and even rude, when he happens to feel very affectionate toward some one and wishes that he could somehow show it in a spontaneous way.

The most important factors in a child's emotional development and the affection that he receives from his parents, peer group and society. This gives opportunity to develop wholesome affection for his fellow creatures.

The more genuine the parents love for the child, the more the child tends to feel free to love other people. Moreover he is likely to express all his emotions at ease.

All physiologically healthy nurses are likely to feel some affection for patients in their charge or with whom they have a chance to associate even though the children are not their own.

Affection is more important for an individual's emotional welfare promoting security. Their unloved person may suffer in connection with the development of positive attitudes and concepts concerning his own worth.

PERSONALITY

The word personality has been derived from the Latin word 'persona' which was the mask which Greek actors wore while acting. This however is not the meaning taken in the modern word personality.

This personality is not a fixed state but a dynamic totality, which is continuously changing due to interaction with the environment.

Personality is known by the conduct, behavior, activities, and movements. It is the way of responding to the environment. The way in which the individual adjusts with the external environment is personality.

Definition of personality:

In the words of **Munn**, it is characteristic integration of an individual's structure. Modes of behavior, interests, attitudes, capacities, abilities and attitudes. Behavior requires integration.

In the words of **Gordon Allport**, "personality is the dynamic organization within the individual of those psychophysical systems, that determine his unique adjustment to his environment"

The personality is the organization of the internal and external activities. It is not a collection of traits but a particular organization of them.

Personality is the total quality of behavior, attitudes, interests, capacities, aptitudes and behavior patterns, which are manifested in his relation with the environment.

An integrated personality leads to organized character. Disintegrated personality leads to disorganized character.

Abnormalities in personality hamper the organization of character. In a mental patient, both character and personality are in disorder.

The basic sources of personality development are hereditary and environment. However as a person genetic inheritance interacts with and is shaped by environmental factors, there emerges a self structure that becomes an important influence in shaping further development and behavior.

Trait and type approaches of personality:

The trait approaches to personality attempts to list a number of basic personality traits and the personality of an individual can be described by its position on a scale of units in each of these traits.

A trait is an enduring and consistent characteristic of a person that is observed in a wide variety of situations. The traits are intelligence, emotional sensitivity ascendance, submission, irritable, warm etc.

In fact Allport and Odbert have listed 17,593 words in English, which are adjectives standing for personality traits. He distinguished between surface traits and source traits.

Norman listed 5 terms extroversion, agreeableness, consciousness, and emotional stability and culture.

H.J.Eysenck speaks of three basic categories of personality.

- Extroversion – introversion.
- Neuroticism - stability.
- Psychotism - normality.

This has been ultimately reduced to stable, unstable and introversion and extroversion.

- 1) Extroverts are described as outgoing, uninhibited fond of activities, which bring them into contact with other people. Introverts have the opposite traits.
- 2) Neuroticism stability in Eysenck's model ranges from stability to high anxiety. In situations of worry, panicking, stress and over emotionality a high level activity could affect performance adversely in academic work of pupils, resulting in learning disabilities.

The type personality:

It is older than the trait approach, which depends upon modern statistical procedures. Hippocrates and Galen have associated personalities with certain kinds of body fluids called humours.

Galen has spoken of four kinds of human temperaments

- Choleric.
- Melancholic.
- Phlegmatic.
- Sanguine.

Kruehmer refers to following types of human personality based on bodily fluid. These are:

- Asthenic(thin, long) who are shy and sensitive, withdrawn.
- Pyknic (short, fat) who are jovial outgoing with fluctuating moods .
- Athletic (strong and sturdy).

The athletic and asthenic type of body build, go with what is known as schizothyme personality and the pyknic body goes with cyclothymic personality. The former is basically interested in him only and the latter extroverted.

Sheldon speaks of three types of body build.

- 1) Endomorphic (round, fat and muscular) individuals have the type of personality called viscerotonia – which implies love of leisure, desire for food and sleep.

- 2) Mesomorphic (hard muscular) have somatotypic personalities. Who exhibit persistence in behavior desire for adventure, courage and involvement in actions.
- 3) Ectomorphic (delicate and lean) have cerebrotonia which implies disciplined behavior, ready response to stimulation, lack of interest in social interaction, hypersensitivity to pain etc.

Psychological theory of personality:

Personality theories are grouped under three major heads

- 1) Psychodynamic theories.
- 2) Social learning theories.
- 3) Phenomenological theories.

Psychodynamic theories of personality:

Psychoanalytic theories of personality are referred to as psychodynamic theory. This theory attempts to understand personality in terms of mental functions may be rational, irrational, conscious or unconscious.

Freud's theory of psychoanalysis emphasizes man as dynamic system of energies and main storehouse of such energies in unconscious. The contents of the unconscious invariably exhibit conflicts. To Freud, the structure of an individual's personality consists of three separate agencies.

- 1) Id is the inborn reservoirs of primitive psychic energy called libido, unconscious demanding immediate satisfaction on the basis of pleasure principle regardless of external which ego and superego develops and it consists of energy thing that is inherited.
- 2) All energy of human behavior is provided by two inborn id instincts namely sex and aggression, which he spoke of Eros – life instincts and thanatos, death instincts.
- 3) Ego embodies a rational cognitive capacity that demands of super ego.
- 4) Id seeks pleasure ego test reality and superego strives for perfection. From anxiety, defense mechanism or unconscious attempts to reduce anxiety by denying or destroying reality.

The technique of Eric Berne's transactional refers to wholesome transaction from childhood to adulthood. Freud also emphasizes the early experiences in personality development. He speaks of psychosexual development of the individual.

- 1) The oral stage, during infancy.
- 2) The anal stage between the age 2 and 3.
- 3) The phallic stage between 3 to 5.
- 4) From 5 up to early adolescence the stage of Oedipus complex / Electra complex. Then from 5 up to early adolescence sexual force is subordinated which marks the latency, period and finally the genital stage of heterosexuality.
- 5) Psychosexual maturity is reached by an individual as the end result of successful passage through the full sequence of stages.

Carl Jung differs from Freud in taking a more positive and optimistic attitude towards human nature believing that people not only try to gratify their instincts but also try to develop their potential.

Jung agreeing with Freudian view of unconsciousness, which represents the accumulated experiences, and culture of the human species throughout its evolutionary development from primitive times.,

Alfred Adler's personality theory stress the uniqueness of one's personality looks upon aggression is more significant than sex as a motive of behavior. He points to the innate striving for superiority.

To Erickson, personality is the resultant from interaction between the needs of a person and the demands of a society at a particular stage of development.

He refers to 8 psychosocial stages of development. A particular type of crisis characterizes each stage. Ego identify crisis during adolescence and now an individual resolves such crisis determines personality characteristics.

H.S.Svilan has stressed the interpersonal nature of personality and has laid on the acquisition of language as a means of normal personality development.

Social learning theories of personality:

These theories say that consistency of behavior, results not only from rigid personality traits but also from other factors like environmental stability.

Skinner and Hull's learning theories are based on the above factors. **Dollard and Miller** pointed fear, as an important factor in personality development as it acts as a powerful motive or drive in the promotion of learning.

The 'role' theory of G.H Mead speaks of different roles one plays in life (a son, pupil, leader, friend etc.) and gradually internalizes the associated traits to form his personality.

A person's behavior depends upon the specific nature of the situation, how the situation is appraised by him as well as past reinforcement of behaviour in similar situations.

Behaviorists theories of personality:

Behaviourists is such a skinner emphasize that conditioning alone is not adequate to explain human character and personality.

Phenomenological theories of personality:

This includes humanistic conceptions of personality. These theories emphasize the existence of positive growth promoting forces in personality beyond more conflict resolution or tension reduction and also stresses present rather than past experiences.

Maslow's theory emphasizes inherent potentialities to seek self-actualization. Maslow and Carl Roger both dealt on humanistic and psychoanalytic theories on growth and self actualization.

Roger's client centered on non-directive counseling is popular. The most important concept is self. An individual with a strong positive self-concept seek growth and have pleasant productive relation with others.

G.Kelly's cognitive theory of personality consists of personal constructs that is the ways a person has of evaluating himself and his circumstances.

Defense mechanism: Another mode of reacting to difficulties is that of mental mechanism or defense oriented reactions to stress aims chiefly at protecting the self from hurt and disorganization.

EGO DEFENSE MECHANISMS

| Sl.No | Expression | Mode of reactions |
|-------|----------------------------------|--|
| 1 | Withdrawal | Protecting self from unpleasant, reality by refusal to perceive or face it. |
| 2 | Fantasy | Gratifying frustrated desires by imaginary achievements |
| 3 | Repression | Preventing painful or dangerous thoughts from entering consciousness. |
| 4 | Rationalism | Attempting to prove ones' behavior rational and justifiable and thus project worthy of itself and social approval. |
| 5 | Projection | Placing blame for difficulties upon other or attributing one's own unethical desires to others. |
| 6 | Displacement | Discharging pent up feeling usually of hostility or objects less dangerous than those, which initially aroused the emotions. |
| 7 | Emotional insulation | Reducing ego involvement and withdrawing into passivity to protect self from hurt. |
| 8 | Intellectualization (isolation) | Cutting of affective charge from harmful situations of separating incompatible attitudes by logic – tight compartment. |
| 9 | Undoing | Counteracting immoral desires or acts. |
| 10 | Regression | Retreating to earlier developments; levels involving less mature responses and usually a lower level of aspiration |
| 11 | Identification | Increasing feelings of worth by identifying oneself with person or institution. |
| 12 | Introjections | Incorporating external values and standards into ego structure so that the individual is not at their mercy as external threats. |
| 13 | Compensation | Covering up weakness by emphasizing desirable trait or making up for frustration in one or by over qualifying in another. |
| 14 | Acting out | Reducing the anxiety aroused by forbidden or dangerous desires by permitting their expression. |

Summary:

- “Psychology” is a branch of science dealing with knowledge of mind and soul. It plays a vital role in taking care of the patients in nursing.
- Factors influencing mental health are personal factors, interpersonal factors, and cultural factors
- Learning is defined as the mental activity by means of which knowledge, skill, attitude, appreciations and ideas are acquired, resulting in modifications of behaviors
- Factors influencing learning are nature of learner, nature of learning situation, nature of the learning material
- Theories of learning are Trail and error, Theory of conditioned reflexes, Cognitive learning

- An expression of an opinion or judgment upon what one has observed is observation
- Attention is the focusing of consciousness on a particular object or idea at a particular time to the exclusion of other objects or ideas
- Attention can be classified into two types voluntary and involuntary.
- Factors influencing attention includes external and internal.
- Perception is the process by which we discriminate among stimuli and interpret their meanings and appreciate their significance
- Perception are of two types auditory and visual perception.
- Emotion is the complete psychosis involving cognition, pleasure – pain and conation.
- Most of the physiological changes occurs during intense emotion.
- The theories of emotion are James theory and Cannon theory.
- Personality is the dynamic organization within the individual of those psychophysical systems, that determine his unique adjustment to his environment.
- A trait is an enduring and consistent characteristic of a person that is observed in a wide variety of situations. The traits are intelligence, emotional sensitivity ascendance, submission, irritable, warm etc.
- Norman listed 5 terms extroversion, agreeableness, consciousness, and emotional stability and culture.
- H.J.Evsenck speaks of three basic categories of personality.
 - 1) Extroversion – introversion.
 - 2) Neuroticism - stability.
 - 3) Psychotism - normality
- Galen has spoken of four kinds of human temperaments
 - 1) Choleric.
 - 2) Melancholic.
 - 3) Phlegmatic.
 - 4) Sanguine
- Sheldon speaks of three types of body build.Endomorphic, Mesomorphic,. Ectomorphic.
- Personality theories are grouped under three major heads
 - 1) Psychodynamic theories.
 - 2) Social learning theories.
 - 3) Phenomenological theories
- Defense mechanism operate on relatively automatic and habitual levels and they typically involve some measure of self – deception and reality distortion

QUESTIONS

Part A — ANSWER IN ONE OR TWO WORDS: (One mark)

- 1) Mention the types of attention.
- 2) What are the two types of mental activities involved in observation.
- 3) What are the two types of theories of emotion.
- 4) Write the basic sources of personality development.
- 5) Name the three basic categories of personality.
- 6) Name the psychological theories of personality.

Part B — MULTIPLE CHOICE QUESTIONS: (One mark)

- 1) Psychosexual theory was given by
 - a) Freud b) Carl Jung c) Erickson d) Skinner.
- 2) Psychoanalysis theory was emphasized
 - a) Freud b) Carl Jung c) Erickson d) Skinner
- 3) Fear as an important factor for personality development was pointed out by
 - a) Freud b) Carl Jung c) Erickson d) Dollard.
- 4) Classical conditioning was given by
 - a) Ivan Pavlov b) Skinner c) Dollard d) Freud.
- 5) Gratifying frustrated desires by imaginary achievements is
 - a) Fantasy b) Repression c) regression d) submission.
- 6) The father of educational psychology is
 - a) Gestalt b) Edward Lee c) Parlor d) Skinner
- 7) Four kinds of human temperaments was spoken by
 - a) Sheldon b) Krichmer c) Galon d) Hippocrates
- 8) The phallic stage is between
 - a) 2- 3 yrs b) 3-5 yrs c) 1-2 yrs d) 5yrs to adolescence
- 9) The extroversion – intro version category of personality spoken by
 - a) Evsenck b) Roger c) Kelly d) Galen
- 10) Preventing painful or dangerous thoughts from entering consciousness is known as
 - a) Projection b) Displacement c) Regression d) Repression
- 11) According to Erickson, the stages of psychological development is
 - a) 8 b) 9 c) 7 d) 10
- 12) The law described the response followed by a reward will be strengthened is the,
 - a) Law of exercise b) Law of readiness c) Law of effect d) all of this above

- 13) Operant conditioning was given by
a) Ivan Pavlou b) Skinner c) Dollard d) Freud
- 14) The items are perceived in complete units even though they may be interrupted by gaps is seen in
a) Continuation b) Closure c) Similarity d) Proximity
- 15) The basic sources of personality development are
a) Hereditary b) Environment c) Education d) Life style

Part C — WRITE SHORT NOTES ON: (5 marks)

- 1) State the steps of learning process.
- 2) What are the characteristics of learning by insight.
- 3) How will you classify the theories of learning.
- 4) Where are the areas, the principles of classical learning can be used.
- 5) What are the kinds of motivation. Give example.
- 6) State the body build according to Sheldon.

Part D — WRITE IN DETAIL: (10 marks)

- 1) List the factors influencing perception.
- 2) Learning by insight theory – discuss.

Part E — WRITE ESSAY: (20 marks)

- 1) Explain factors influencing learning.
- 2) Describe the factors increasing attention.
- 3) Discuss the physiological changes that occurs during emotion.
- 4) List down the defense mechanism and write the mode of reaction for any two expression.
- 5) Freud's theory of psychoanalysis



4. PRINCIPLES AND PRACTICE OF NURSING

INTRODUCTION

Nursing is a major component of the health care delivery system and nurses make up the largest employment group within the system.

Nursing services are necessary for every patient seeking care of various types including primary, secondary, tertiary and restorative. As nursing is an important part of health care delivery system, the nurses need to understand the system to effectively deliver quality care within it.

Nursing : Nursing is the process of recognizing, understanding and meeting the health needs of any person or society and is based on a constantly changing body of scientific knowledge.

DEFINITION OF NURSING PROCESS

The definition of the nursing process is a professional nurses approach to identify diagnose, and treat human responses to health and illness (American nurses association 2003)

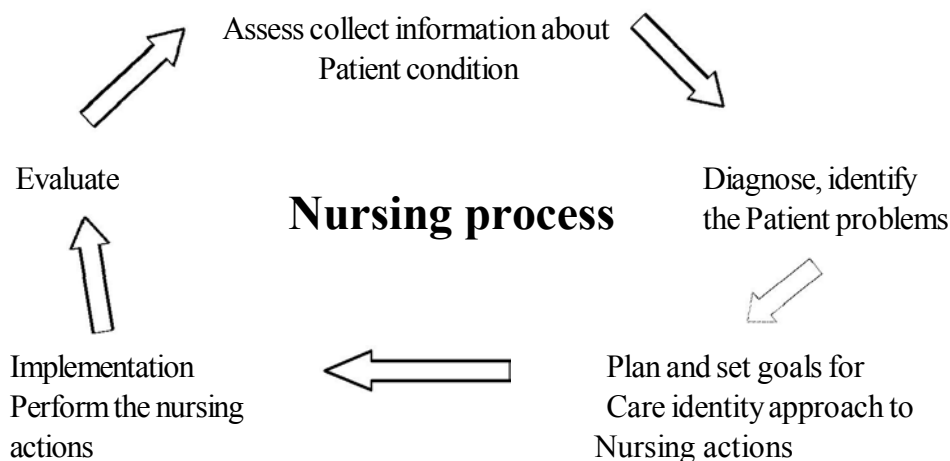
It is a deliberate intellectual activity whereby the practice of nursing is approached in an orderly, systematic manner of patient care, in a dynamic, continuous method to assist the patient to achieve and maintain health.

The nursing process is an orderly systematic manner of determining the patient's problems, making plans to solve them, initiating the plan or assigning others to implement it and evaluating the extent to which the plan was effective in resolving the problems identified.

The nursing process is a systematic method for assessing health status, diagnosing health care needs, formulating a plan of care, initiating plan and evaluating the effectiveness of plan.

STEPS IN NURSING PROCESS

- (1) Assessment (2) Diagnosis
- (3) Planning (4) Implementation (5) Evaluation



Assessment: This refers to a systematic collection of data, to assist in identifying needs and problems. Data are collected in a systematic fashion, utilizing the interview or nursing history, physical examinations, laboratory results and other resources.

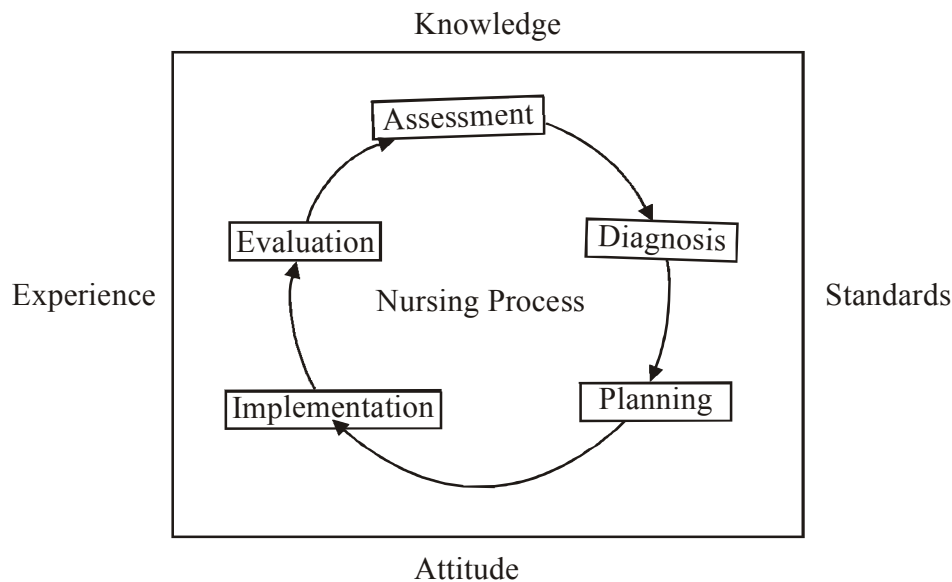
Diagnosis: Nursing diagnosis is a clinical judgment about individual family or community responses to actual and potential health problems and life processes. During this phase, the data collected during assessment are critically analysed and interpreted. Conclusions are drawn regarding the patient's needs, problems, concerns and human responses.

Planning: Planning is a systematic approach in developing a plan of action based on a careful assessment. Strategies are developed to prevent, minimize or connect the problems identified in the nursing diagnosis.

It consists of several steps including establishing priorities, setting objectives, writing interventions, recording outcomes of nursing interventions in an organized fashion to complete the nursing care plan.

Implementation: It refers to carry out a plan that is based on careful assessment of need. It is the initiation and completion of action necessary to achieve the outcomes or objectives.

Evaluation: It is an ongoing process that determines the extent to which the goal has been achieved. The nurses assess the progress of the patient, institute corrective measures if required, and revise the nursing care plan.



ADMISSION OF THE PATIENT

The entrance of a patient into a health care agency such as a hospital or a private clinic is termed as admission. A patient enters the hospital by himself or he may be brought to the hospital by his relatives, friends, neighbours or others.

Mentally ill patients, persons, who have tried to commit suicide and accident patients are admitted through a legal process.

All ill person enters the hospital to get his disorder cured when a healthy individual gets admitted into a hospital for a day or for investigations and observations and in order to find whether he is suffering from any illness which has not been manifested by any external signs and symptoms.

Patients who have become seriously ill suddenly, come the hospital without having had any time to settle their family work affairs.

Hence, they are not only worried and anxious about the illness, but also are upset about various other problems affect their family. Nurses must understand their physical and mental problems and be very kind and understanding.

Need for good reception of the patient: A nurse has an important role to play in the reception the patient to the hospital. The following are the purposes of this procedure: (1) Prepare the patient both physically and mentally for his stay in the hospital. (2) To help the patient to be comfortable and to provide him with a clean and safe environment. (3) To give a good impression of the hospital and its service so that the patient will fully co-operate with the treatment and nursing care.

A patient may be coming to hospital for the first time. He leaves his familiar home surrounding and his loved ones and comes to an unknown place and to unknown people. Any change in human life is anxiety producing and is viewed with fear.

Added to this, his physical condition gives him fear and anxiety. Hence, it is the nurse's duty to receive the patient, kindly sympathetically and with an understanding of his illness. If he is admitted, he is given a diet sheet and sent to the ward. If he is too ill and needs immediate attention he is given emergency treatment and then transported to the ward.

As soon as the patient comes to the ward, receive him, his relatives and his friends as if you are receiving your guests into your home. Ask them to be seated while you prepare the bed ready for the patient.

If the patient is in a serious condition, the ward nurse is informed in advance about the arrival of the patient, so that the patient does not have to wait till the bed is made ready.

Need for orientation to place and people: Inform the patient and his relatives about the hospital routine, the hospital rules, the general set up of the ward and the personnel working in the ward. Inform the patient's relatives about the time of visiting hours and supply them with visiting passes.

If the patient is seriously ill give the relative a special pass so that he will be able to stay with the patient in the hospital.

Need for admission assessment : Do a good assessment of his physical condition in order to plan his care. If his physical state needs immediate treatment report to physician and prepare your patient for physical examination and carry out the treatment, which the physician prescribes after the physical examination.

ORIENTATION TO THE WARD

The patient who is not very ill, are allowed to move about can be taken round the ward. Introduce the other patients to him and vice versa, and also with the nursing personnel working in the ward. Orient the patient to the whole ward, duty room, toilet rooms, and the unit prepared for him. After making the patient to be seated comfortably explained the hospital policies, procedures, and routines to the patients and his relatives. Tell him what is expected from him. Explain to him the time for meals serving, the doctors visit, visiting time the prayer service, if any and other hospitals routines.

CARE OF BELONGINGS

It is always good policy to discourage patients to keep / valuable things and money with them. Send the valuables to home through relatives. If he does not have anyone with him, enter the description of items in the register and send the valuables to the office for safe custody. Get the patient's signature or thumb impression in the register. However, inform the patient that he will get back his valuables on discharge.

It is important that you take care of the patient's clothing, should see that the clothing are cleaned and stored away with proper label or send them home for a fresh set of clean clothes.

However, encourage, patients to use hospital clothing. If a Patient is suffering from infectious disease, see that the clothing are disinfected and cleaned before they are sent home or stored away.

DISCHARGING OF THE PATIENT

Discharge is a preparation of a patient and discharge records to leave the hospital.

Purpose : (1) To ensure continuity of care to the patient after discharge. (2) To assist the patient in discharge process

Guidelines : The patients are discharge from the hospital in one of the following ways.

Discharge to home: The discharge to home or another hospital or another unit with in the hospital is initiated by the doctor who advises the patient that he is well enough to leave the hospital or requires treatment in another unit within the hospital or in an another hospital.

Discharge to another hospital or another unit within the hospital (referral). When a patient or family is not satisfied with the treatment or care given and wants to leave the hospital against the medical advice in such cases the patient or the relative is asked to sign a statement that he is going or taking the patient on his own will and responsibility.

Discharge against medical advice (AMA): Patient leaves the hospital against the medical officer's advice, when a patient escapes from the hospital without the knowledge of the hospital staff and without signing the said statement he is treated as absconded in the records.

Nurses Responsibility : Inform the patient and the relatives a day or two before the discharge. Get the discharge slip prepared after checking the vital signs and examining the patient. The nurse should see that the patients personnel hygiene is maintained, he is dressed in home clothes and has taken meals. Hand over the patient's belonging and any valuable, which have been kept safety, to the patient or the relative under proper receipt. Complete the unit admission and discharge registered case sheet and other records. Hand over the case sheet and other records medical record department under proper receipt. Inform the hospital authorities about the discharge if the patient is medico-legal. Hand over the discharge slip to the patient or relative and explain about the treatment and the diet to be taken at home, follow-up visit and inform to bring the discharge slip on every visits, any special advices pertaining to condition. See that the patient receives all the medicines as per discharge slip. Check the hospital things before the patient leaves the ward. Place the patient in the wheel chair or stretcher according to the patient's condition until he leaves the hospital. Immediately after the patient leaves, reorganise the patient unit.

BED AND BED MAKING

Bed making is an art. Skillful bed making contributes materially to the patient's comfort. Clean and comfortable bed includes the patient's unit in the hospital.

Purpose: (1) To provide clean and comfortable bed to the patient. (2) To observe and prevent patient's complications. (3) To save time, effort and material. (4) To provide a neat appearance of the ward/ unit. (5) To adapt the needs of the patient

Types of bed: The beds are of two types, ordinary and special beds.

Open (simple) bed: This is prepared for an ambulatory patient

Indication:(1) Provide a clean smooth comfortable bed to the patient.

Closed (unoccupied) bed: This is an empty bed in which the top covers are arranged in such a way that all linen beneath the counterpane or bedspread is full) protected from dust and dirt until the admission of new patient. On arrival of the patient, this bed is converted into open bed.

Indication: Keep the bed ready for receiving the new patient.

Occupied bed : This bed is prepared for bed- ridden patient, lying in the bed.

Indication: Provide a clean and comfortable bed with the least disturbance of the patient in it.

Special Beds

Admission bed: This is prepared for the newly admitted patient.

Indications : (1) Provide minimum disturbance to the patient during admission bath and physical examination. (2) Protect bed linen during admission bath and leave a fresh bed immediately ready for the use

Post-operative bed: This is prepared for the patient who has undergone surgery

Indication :(1) Protect bed linen from vomiting, bleeding, drainage and discharges. (2) Provide warmth and comfort to the patient to prevent shock.

Fracture bed: This is a hard firm bed designed for the patient with fracture particularly of spine, pelvis or femur.

Indication :(1) Aid in immobilizing the fracture, (2) Prevent unnecessary pain, (3) Provide warmth and comfort to the patient (4) Prevent undue sagging of the mattress.

Plaster beds: This is a hard bed designed for the patient with plaster.

Indications: (1) Aid in immobilizing the part until the plaster dries, (2) Aid in drying the plaster in correct position and shape, (3) Provide warmth to dry the plaster and keep the patient comfortable.

Amputation or stump bed: In this type of bed the top bed clothes are divided or split. This is known as amputation or stump bed when it is used for the patient with amputation of legs.

Indications: (1) Avoid disturbance to the patient during constant observation, repeated applications or treatments are necessary for abdomen or lower limbs, (2) Take the weight of the clothes off the side of the amputated limb or stump, (3) Keep the stump in good position, (4) Watch stump for haemorrhage constantly and apply a tourniquet instantly if necessary

Cardiac bed: This is prepared for a patient with heart disease.

Indication : (1) Relieve dyspnoea. (2) Assist in recovery of the patient (3) Provide comfort to the patient (4) Prevent complications

Rheumatism or renal bed: This is prepared to provide extra warmth to the patient.

Indications : (1) Provide extra warmth to the body in case of general debility and shock, (2) Provide comfort to the aching joints in patients with acute rheumatism. (3) Improve perspiration for excretion of waste products in case of nephritis

Burns bed: This is prepared for a patient with burns.

Indications : (1) Prevent infection to the burnt area, (2) Help in healing of the burnt area, (3) Provide comfort to the patient, (4) Prevent the patient from sticking to the sheet as a result of exudates oozing from the burnt area.

The beds must be versatile and adaptable to different needs of the patients with following arrangements

Side rails: These are used to prevent the patient from falling out of bed, protect the restless patient, provide the patient support to grasp and hold when moving about.

Hand cranks : These are located at the foot of bed and used to adjust the height of bed, raise or lower the head, foot or knee sections in order to maintain various bed positions for treatment or comfort.

Special attachments the attachments of various poles, frames and equipment for traction are used to modify the beds to meet various needs of the patient for treatment and comfort.

THERAPEUTIC ENVIRONMENT

- (1) Maintaining and creating trustful supporting relationship in care of patients.
- (2) It is clearly and genuinely communicating and performing care activity.
- (3) Allowing the supportive group in care of patients.
- (4) Acceptance of patients feelings and values and worthy as whole.
- (5) Assist the patient and family in identifying supportive groups. Maintaining a safe and secured environment.
- (6) Reinforce progress in behaviour or self care activities or terminating the relationship.
- (7) Encourage evaluation of progress between nurse and the patient.

PSYCHOSOCIAL ENVIRONMENT

Mental comfort is provided for the patient by eliminating his fear, anxiety and worry. He should receive sympathy and consideration from the nursing and medical staff. His relatives should avoid unpleasant news to him while he is in the hospital. Meeting his spiritual needs may help to give him mental peace and comfort again. .

BODY MECHANICS AND POSITIONING

Definition: Body mechanics means the co-oriented use of the body parts to produce motion and maintain equilibrium in relation to both internal and external forces. Posture is the relationship of the various parts of the body in activity or at rest. Position in patient in corrected body alignment means to give proper support to the body in order to maintain muscle tone and eliminate strain.

Purpose of good body mechanics and posture: (1) To provide maximum comfort and relaxation. (2) To aid in normal body function (3) To prevent contractures and neuromuscular deformities and complications (4) To conserve maximum possible energy by preventing unnecessary strain

Standing position: In correct standing position the head is held erect, back is kept straight as much as possible, chest is put forward, shoulders are kept back, elbows are slightly flexed, wrists are extended, fingers are slightly flexed, abdomen is drawn inward and kept flat, knees are slightly flexed, and are pointing ahead and parallel to each other about 3 inches apart.

Knowledge of correct standing position is necessary because all other positions are modifications of standing position. When a nurse helps the patient to sit or lie down in bed, she follows the principles of correct standing position and keeps patient's body in good alignment.

Sitting position : In sitting position, the weight of the body is balanced by ischial tuberosities the buttocks and the thighs.

Elbows are flexed and supported, hips are flexed at right angles to the trunk, knees are flexed at right angles to the thighs, and angles are flexed to right angles to the legs and are flat on floor. Back is held erect and the back and buttocks are supported by the back of the chair.

POSITIONS USED FOR PATIENTS

Dorsal position: Patient is flat on the bed with legs extended and arms at the sides of the body. This is not a comfortable position, as the curves of the body are not supported.

Dorsal recumbent position: This is called back lying position. This is a modification of standing position. The only difference being, the patient is in horizontal position instead of vertical.

Patient lies flat on his back with a pillow under his head. A small pad is placed in the hollow of the back, and the knees are slightly flexed. A soft pillow is arranged under the knees. A footboard is provided to prevent foot drop. Arms are kept at the sides of the body. Most of the patients are nursed in this position.

Lateral Position: Patient lies on his side with spine straight. The knees are flexed; the upper knees are more flexed than the lower one. Pillows may be provided for the head, in between the legs, and to support back and abdomen. The lower arm is kept above the head and the upper arm is placed on a pillow in front. The arms and legs do not bear the weight of the body. This position is used for general comfort, rest and relaxation. During back care, patient is placed in lateral position.

Left lateral position is used for vaginal, perineal and rectal examinations, and the post operative patients are kept in lateral position in order to maintain a clear airway.

Jack knife position: Patients lies on his back with his shoulders slightly elevated. The hips and knees are flexed and brought up to the abdomen and chest. The position is useful to perform a lumbar puncture.

Knee Chest Position: The patient knees on the bed and then lowers his head, shoulders and chest and rests them on the bed. Head is turned to one side, and kept on a pillow. The thighs are kept vertical. Arms are crossed above the head. This position is useful for performing vaginal and rectal examinations and for correcting displaced uterus or other organs.

Lithotomy Position: The patient is kept on his back. Head and shoulders rest on a small soft pillow. Knees are flexed well and buttocks are brought over to the edge of the bed. If it is used for a long period, the legs are supported by stirrups, attached to the table. The position is used for examination or operations on rectum and genital organs.

Prone Position: Patient lies flat on his abdomen with head kept on a pillow and turned to one side. Pillows are kept under the waist and under the lower legs. The arms are flexed at the elbow and kept above the head. This position is used when there is bed sore or burns or an injury at the back and as a change of position for patients with fractured spine.

Sims position or semi prone position: This is a modified left lateral position. The patient lies on the left side. Head, shoulders and chest are turned forward so that her chest rests on the pillow. The right knee is well flexed and rests on the bed in front. The left knee is slightly flexed and is positioned behind the right knee. This position is useful for performing vaginal examinations and for rests and relaxation.

Flower's Position: Patient is in a partially sitting position. The back of the bed is elevated to 45 degrees with the aid of a backrest and pillow or by adjustment of the cot. Patient's back, shoulder and head are supported well. The knees are flexed and supported with a pillow or by cot adjustment. A footrest is provided to prevent foot drop. Patients are not kept in this position for long time, since there is always the danger of thrombus formation. This position is used for patients with dyspnoea (difficulty in breathing), distended abdomen, abdominal surgery, cardio-thoracic disorders and ascites. The position is also useful while passing Ryle's tube and while performing tapping of ascites fluid.

Trendelenburg position: The patient lies on this back with the foot at the bed elevated on wooden blocks. Patient's head and trunk are lower than the legs.

Reverse Trendelenburg Position: The head and shoulders are at a higher level than the hips, legs and feet. This position is used for reducing intracranial pressure and for other treatment measure.

Basic Nursing Care: Patient and his environment including the bed comprises of patients unit, which needs to be maintained facilitating hygiene environment helping the cure process.

HYGIENIC NEEDS –PERSONAL HYGIENE

Definition: The word hygiene refers to "the science of health and its maintenance, the prevention of disease, and sanitary practices". Personal Hygiene is the activity of self-care, including bathing and grooming. Care of the skin, hair, nails, mouth, teeth, eyes, ears, nasal cavities, and perineal and genital areas.

Factors influencing personal hygiene practices

1) **Development level:** Children learn most of their hygiene practices at home and in their personal environment. They modify their behaviour with other family members. Many of these behaviours stick with them throughout life. The advancing age, hormonal levels and changes in the integumentary system often require hygienic practices.

2) **Cultural background:** Norms related to hygiene practices differ from culture to culture. For example, North American culture places a high value on personal cleanliness and people have a habit of bathing daily where as people from other culture may not consider bathing as a daily practice.

3) **Socio economic status:** Financial status often affects a person's ability to purchase hygiene products.

4) **Religion:** Some religions observe specific rules related to personal hygiene.

5) **Health Status:** Persons who are ill are often unable to attend to personal hygiene activities, either because they have a low energy supply or a specific physical deficit.

SAFETY AND COMFORT NEEDS

The environment in which the patient is placed should be comfortable and safe and it should contribute to his well beings and should not retard his recovery.

Safety means protection from possible injury. Many factors contribute towards the safety of patients in the hospital. The hospital buildings should be structurally sound for ensuring safety for patients with physical limitations such as, blind, aged or handicapped.

The nursing personnel must be safety conscious and they should take all efforts to prevent accidents in the hospital. she should report all accidents promptly and take measures to prevent them from happening.

Comfort: Comfort is a sense of mental and physical well being. Physical comfort gets affected due to a dirty and wet bed and lack of body alignment. High temperature and humidity, poor ventilation too much noise, unpleasant odours and glaring lighting make the patient uncomfortable. To promote comfort for the patients, certain mechanical devices can be used. Pillows can be used for giving support for the various part of the body. Sometimes – patient feels comfortable in a propped up position. In a hospital, a backrest is provided for the patient to keep him in a sitting position.

For relaxation of abdominal muscles, when patients are in pain or after an abdominal operation, knees can be kept flexed by means of a knee rest.

A pillow or a blanket or sheet rolled as a pillow can be improvised as a knee rest. Patients should not be kept with flexed knees for a long period. His circulation may get affected. Hence his position is changed frequently.

For supporting feet and for preventing foot drop, foot rests are used. This device keeps the feet at right angles to the leg and prevents deformities. Foot-rest can be improvised with sand bags.

Other devices used as comfort measures are air rings or cotton rings and air cushions air mattress, water mattress are to prevent pressure ulcer.

Mental comfort is provided for the patient by eliminating his fear, anxiety and worry. He should receive sympathy and consideration from the nursing and medical staff. His relatives should avoid unpleasant news to him while he is in the hospital. Meeting his spiritual needs may help to give him mental peace and comfort again.

Mechanical Devices for comfort measures : To hospitals use many mechanical devices for ensuring safety/patients.

Bed bars (side rails): are used to prevent patients from falling out of bed. Patients who require this safety measure are post operative patients, unconscious, semi-conscious mentally disturbed, sedated, blind or children or very old patients.

Back rest: These are usually made of metals. These are used to support the back of the patient in upright position.

Over bed table: The table such as the cardiac table is placed in front of the patient and the top of the table is adjusted to the desired height. As pillow is arranged on the top of the table so that the patient can lean forward on it for support. When he wants to take food, read or write.

Foot-boards: (Foot - rests): These are made of wood and are L shaped, so that one end can be slipped under the mattress to hold the other end in a firm upright position. The patient is placed in supine position to rest the bottoms of the feet flat against the surface of the foot-board (covered with sheet). These are used to prevent foot drop by maintaining good alignment.

Sand-bags: These are canvas, rubber or plastic bags filled with sand and are 1,5 and 10 lbs in weight. These are used to immobilize the body part, placing them snugly next to the part. eg. On either side of the feet to maintain the position of the feet on the foot board, immobilize the fractured limb.

Blocks (shock blocks): These are made of wood, may be high or low. These are placed under the foot of the bed for various reasons. Eg. Surgical shock, traction and postural drainage. This may be placed under the head of bed to promote drainage and improve cerebral circulation.

Hand rolls: These are made of cloth that is rolled into a cylinder about 4-5 inches long and 2-3 inches in diameter and stuffed firmly. These are used to keep the fingers from being held in a tight fist leading to flexion contracture in patients who are unable to move the hands due to paralysis, injury or disease.

Thigh rolls: These are made by folding a sheet to a desired length of 2-3 feet and then rolled into a tight cylinder. These are used to support the hips and thighs, preventing them outward rotation and keeping the feet in good alignment, in case of paralysis, fracture of the femur or hip surgery. To use the roll, place the loose end (flap) under the patients hips and thighs with the roll under the flap end and then tucking snugly along the hip and thigh.

Cradle: These are mostly semicircular in shape, made of wood or metal. These are used to prevent the weight of top bedclothes on patient's feet and toes. To use the cradle, Place it over the bottom bedclothes and the top bedclothes are then brought over the cradle. These are used for patients affected by burns.

Restraints are devices used to prevent agitated patients, persons who get out of bed at night in their sleep and small children, from falling out of bed.

Wire mesh for windows and doors are fixed to prevent insects.

Safety Measures : Patients should be safeguarded from fire accidents and from careless application of heat. Fire accidents occur mainly due to allowing patients to smoke in bed. Use of faulty electric appliances and careless use of oxygen cylinders. Patient may get injured from careless application of hot water bags, electric pads and application of medications on the skin. Poisonous drugs should be kept under lock and key with specific red label.

Patients may come to harm through bacteriological sources, insects and rodents. Food and water should be made safe for consumption. Insects and rodents should be eliminated.

ACTIVITY AND EXERCISES

Activity and exercise are necessary for healthy living. Activities usually performed in a day like eating, dressing, grooming, bathing, brushing etc are called activities of daily living.

Activities of daily living: It is essential for meeting the day to day needs. When a person is not meet these activities, it is the care giver responsibilities to meet their needs. According to their health status the degree of assistance required will vary those who are recording sick needs total assistance in order to meet their daily needs. Exercise is the performance of physical exertion for improvement of health or the correction of physical deformity.

Benefits of exercise : (1) Exercise strengths muscles (2) Helps to prevent constipation (3) Increases appetite (4) Improves sleep (5) Stimulates blood circulation (6) Improves lung ventilation (7) Prevents obesity (8) Promotes physical and mental well being. (9) Promote urinary function (10) It regulates body temperature

Types of exercise : There are two types of exercises. They are

Active exercise: Active exercise is a type of physical activity accomplished by the patient without assistance. these exercise help the patient to attain the normal physiological function of the body.

- (1) Deep breathing and coughing exercise for complete lung expansion usually done by post operative patient.
- (2) Exercise of the limbs through full range of motion which include flexion, extension, adduction, abduction and rotation
- (3) Moving in bed to change the position
- (4) Foot exercise to prevent foot drop and toe deformities.
- (5) Abdominal and gluteal contraction exercise

Passive exercise: In passive exercise the movements or activity is carried out by another person and the patient makes no voluntary effort to assist or resist the action. The passive exercises are usually carried out by the physiotherapist or the nurse. The performance of certain nursing procedures such as bathing the patient, giving back care and changing the position etc., provides some passive exercise for the patient. Passive exercise is useful for patient with restricted movements, deformities and unconsciousness.

MOVING, SHIFTING AND LIFTING PATIENT

As nurses you may be required to move and lift patients. An important point you have to bear in mind while moving patients is that you must observe correct body mechanic for your patients as well as for yourself.

While lifting heavy objects, it is wise to stand with your feet while apart and firmly on the floor. The weight should be lifted close to the body. Flex your knees so that your strong muscles of the legs bear the weight of the object.

Purposes: (1) To perform the task efficiently. (2) To avoid the patient from unnecessary effort (3) The prevent nurses from strain and back injuries (4) To promote circulation and muscular tone

Moving upward or downward: Two nurses are required to do this. One nurse places her one hand under the patient's shoulder and the other hand under the lumbar region.

The other nurse stands on the other side of the bed and does the same as the first nurse. The patient, if he is able, is asked to flex the knee and push against the matters with heels. Both nurses together bring the patient up.

Moving from one side of bed to another: Move pillows towards the side of the bed. Place your one arm under the shoulders and the other under the lumbar region.

Move upper part of the body to the side of the bed. Then keep one arm under the lumbar region and the other under the thighs and move the middle part of the body to the side of the bed. Lastly place one arm under the thighs and the other under the ankles and move the lower part of the body to the side of the bed. See whether the whole body is straight and in good alignment.

Turning on side: Before turning move the patient a little away from the centre. If he is to be turned on the left side, you stand at his left. Keep his right arm crossed on the chest and right leg crossed over the left leg. Flex the right knee slightly keep one hand on the patient's right shoulder and the other on his right hip and gently roll him to left lateral position.

Moving patients from stretcher to bed: Keep the head of the stretcher at right angles to the foot of the bed. Three nurses are needed.

All stand on the same side of the stretcher one nurse places her arms under the patient's head and shoulders, another keeps her arms under the hips, the third has her arms under the thighs and legs.

All together lift the patient, turn and place him on the bed. The lifters observe body mechanics for themselves. They keep their backs straight, flex their knees and place their one foot forward while transferring the patient.

OXYGEN NEEDS

Oxygen is administered whenever there is deficiency in the blood 'is shown by cyanosis. Patients with respiratory dysfunction are treated with oxygen therapy to relieve anoxaemia or Hypoxemia. The normal amount of oxygen in the blood must be in the range of 80 to 100 mm. Hg. If it falls below 60 mm of Hg irreversible physiological effect may take place. The brain cells receive 20 percent of the body's oxygen supply and can live only for 3 to 5 minutes if their oxygen supply cut off.

Purpose : (1) To supply oxygen in conditions when there is interference with the normal oxygenation of the blood.

Indications for Oxygen Inhalation : (1) Breathlessness due to asthma, pulmonary embolism, emphysema, cardiac insufficiencies etc, (2) Obstructed airway due to growth, enlarged thyroid, (3) Cyanosis (4) Shock and circulatory failure (5) After severe haemorrhage (6) Anaemia. (7) Patients under anaesthesia. (8) Asphyxia due to any reason e.g. drowning, inhalation of poisonous gases, hanging etc. (9) Poisoning with chemicals that alter the tissues ability to utilize oxygen e.g. cyanide poisoning. (10) Carbon monoxide poisoning. (11) Postoperative chest surgery and thyroidectomies. (12) Insufficient oxygen in atmosphere. (13) Air hunger

Methods of Oxygen Administration: Administration of oxygen depends upon the condition of the patient, the concentration desired, the facility available and the preference of the doctor. It can be given by following ways:

Oxygen by nasal catheter: This is the usual method of administering oxygen to the patients in the ward. The nasal catheter is inserted into the nostril reaching upto the uvula. The catheter is taped on the forehead to keep it in place. The nasal catheter permits free movement for the patient and nursing care may be given with much more ease.

Oxygen by B. L. B. Mask: When oxygen concentration of over 25% is needed or when oxygen is given under pressure the mask is used. If the mask does not fit snugly over the face, oxygen will be lost from the mask. It is useful for the patients who are unable to breathe through the nose. Flow of 8 to 12 litres oxygen will be sufficient to maintain the concentration of oxygen to 25 to 60%.

B. L. B. [Boothby, Lovelace and Bulbalian] is a rubber mask. It is made to fit over the nose or nose and mouth. The reservoir bag is attached to it.

Oxygen by Tent : It consists of a canopy over the patient's which may cover the patient partially or totally. It is connected to a supply of oxygen. The canopies are transparent, so that the nurse can observe the patient. The lower portion of the canopy is tucked under the bed to prevent the escape of oxygen.

O₂ cylinders and accessories: Oxygen is supplied in cylinders or tanks. It is stored under a pressure of 2200 lbs 1000 kg per sq. inch. Piped in oxygen is stored under oxygen cylinder are low pressure about 50 to 60 lbs per sq. inch. The oxygen cylinders are painted black with white neck.

The Wolfs bottle has two holed rubber cork in which two glass tubes are inserted - one short and one long. The long tube is attached by rubber tubing to oxygen cylinder. The short tube is attached by rubber tubing and glass connection to a nasal catheter. The large valve of the cylinder is opened with keys. There is a regulator to regulate the flow.

Care of oxygen cylinders :

- 1) Handle the cylinder with care.
- 2) Oxygen stand should be used to prevent falling and causing injury to someone or to the equipment.
- 3) It should be always placed at the head of the bed.
- 4) Oxygen does not cause fire but it supports combustion. So avoid any source of fire from the cylinder for fear of fire.
- 5) Visitors and other patients may need to be reminded. Hang "No smoking" board to the oxygen cylinder.
- 6) Oxygen cylinders should be stored in a cool Temperature, because high temperature can cause expansion of the gas with consequent loss of gas through the safety valve.
- 7) Do not use electric appliances close to oxygen.
- 8) Oil or grease should not be used on the regulator, because in the presence of high oxygen concentration, oil is likely to catch the fire and the cylinder may explore.
- 9) Mark empty cylinder, replace protection cap, and set aside from full cylinders.
- 10) Inspect the apparatus at frequent intervals and make sure that it is in working condition. The nurse should learn the working of cylinders, its regulators etc. before handling the apparatus.

Precautions:

- 1) Giving oxygen is an emergency procedure, so it should be ready for 24 hours.
- 2) The nurse should see that the cylinders are full and all the apparatus is in working condition, the key is attached with the cylinder in a bag.
- 3) There should not be any leakage in rubber tubing.

- 4) There should be written order for O₂ inhalation and specific dose must be prescribed to avoid oxygen toxicity.
- 5) Use regular to reduce the pressure of the oxygen in the cylinder to a safer level.
- 6) Measure the flow in litres per minute. Adjust the flow of oxygen 2 to 4 litres per minute for adults when the nasal catheter is used.
- 7) Use sterile or disposable nasal catheters to avoid infection.
- 8) The catheter should be changed at least every 8 hourly to avoid blockage of catheter.
- 9) The catheter may be taped to the forehead for the comfort of the patient and to keep it in place.
- 10) Patient's nostrils should be lubricated with petroleum jelly, if there is any sign of irritation.
- 11) Oxygen administration must never be stopped until the cause of hypoxia is reversed.
- 12) If nurse is leaving the patient for short period, leave a call bell near the patient
- 13) The premature babies should be given oxygen inhalation only for a short time and at a very low concentration to avoid retrolental fibroplasia.
- 14) Observe the patient, receiving oxygen inhalation continuously to detect early signs of oxygen toxicity.
- 15) Since oxygen helps in combustion, fire precautions are to be taken when the oxygen is on flow.

ELIMINATION NEEDS

Definition: Elimination is the process by which waste products are removed from the bowel and bladder by means of faeces and urine.

Factors affecting bowel and bladder elimination: Age, dietary intake, fluid intake, physical activity, psychological factors, position during defecation, pain, pregnancy, surgery, anaesthesia and diagnostic test.

Common bowel elimination problems :Constipation, impaction, diarrhoea, incontinence, flatulence, haemorrhoids and bowel diversion.

Common bladder elimination problems: Incontinence, Urinary retention.

SUMMARY

- (1) Nursing is the process of recognizing, understanding and meeting the health needs of any person or society and is based on a constantly changing body of scientific knowledge
- (2) There are five steps in nursing process. They are assessment, diagnosis, planning, implementation, evaluation.
- (3) Application of nursing process
- (4) The entrance of a patient into a health care agency is termed as admission.
- (5) Nurses responsibilities are Inform the patient and the relatives a day or two before the discharge
 - (a) Get the discharge slip prepared after checking the vital signs and examining the patient
 - (b) The nurse should see that the patients' personnel hygiene is maintained, he is dressed in home clothes and has taken meals.
 - (c) Hand over the patient's belonging and any valuable, which have been kept safety, to the patient or the relative under proper receipt

- (6) Skilful bed making contributes materially to the patient's comfort
- (7) Beds are of two types ordinary, and special beds
- (8) Body mechanics means the co-oriented use of the body parts to produce motion and maintain equilibrium in relation to both internal and external forces.
- (9) The hygiene refers to the science of health and its maintenance the prevention of disease, and sanitary practices.
- (10) Comfort is a sense of mental and physical well being
- (11) Restraints are used to prevent agitated patient's who get out of bed at night in their sleep and small children, when falling out of bed
- (12) While lifting heavy objects flex your knees so that your strong muscles of the legs bear the weight of the object.
- (13) Patients with respiratory dysfunction are treated with oxygen therapy to relieve "anoxaemia" or Hypoxemia". The normal amount of oxygen in the blood must be in the range of 80 to 100 mm
- (14) Oxygen can be administered by the ways of nasal catheter, B.L.B. mask, and an oxygen tent
- (15) Elimination is the process by which waste products are removed from the bowel and bladder by means of faeces and urine.
- (16) Exercise is the performance of physical exertion for improvement of health or the correction of physical deformity.

QUESTIONS

Part A — ONE WORD ANSWERS: (One mark)

- | | | |
|-------------|---------------------|-------------|
| a) Nursing | b) Personal Hygiene | c) Dyspnoea |
| d) Position | e) Hypoxemia | f) Cyanosis |
| g) Anoxia | h) Elimination | i) Comfort |

Part B — MULTIPLE CHOICE QUESTIONS: (One mark)

- 1) The relationship of the various parts of the body in activity (or) rest.
 - 1) Posture 2) Exercises 3) comfort
- 2) A clinical judgement to actual health problems
 - 1) Assessment 2) Implementation 3) Diagnosis
- 3) A bed prepared for bed-ridden patient.
 - 1) Occupied bed 2) Closed bed 3) Open bed
- 4) Patient is in a partially sitting position
 - 1) Semi-prone position 2) Trendlenburg's position 3) Fowler's position
- 5) Sense of mental and physical well being
 - 1) Comfort 2) Position 3) Rest

- 6) The mechanical device used for the patient to prevent falling from the bed
 1) Back rest 2) Foot board 3) Bed Bares
- 7) Shape of the foot boards
 1) 'L' Shape 2) 'I' Shape 3) 'T' Shape
- 8) The device used to improve circulation and promote drainage
 1) Sand Bags 2) Blocks 3) Over bed table
- 9) Colour of the oxygen cylinder
 1) Blue with white neck 2) Black with white neck 3) White with black neck
- 10) Flow of oxygen for an adult per minutes
 1) 2 - 4 litres per minutes 2) 4 - 6 litres per minutes 3) 1 - 2 litres per minutes
- 11) Amount of oxygen saturation in the blood
 1) 80 to 100 mm of Hg 2) 60 to 70 mm of Hg 3) 50 to 60 mm of Hg
- 12) The systematic data collection in identifying needs and problems is known as
 1) assessment 2) diagnosis 3) implementation 4) evaluation
- 13) The patient leaves the hospital against the medical officers advice is known as
 1) Discharge 2) referral 3) AMA 4) abscond
- 14) The type of bed is prepared to provide extra warmth to the patient
 1) Fracture 2) Amputation 3) cardiac 4) Rheumatism
- 15) Modified left lateral position is known as
 1) Sims position 2) Fowlers position
 3) Jack knife position 4) Trendelen burg position
- 16) The devices used to prevent agitated patients from falling out of the bed.
 1) Hand rolls 2) Back rest 3) blocks 4) restraints
- 17) The indications for oxygen administration are
 1) Breathlessness 2) Asphyxia 3) carbon monoxide poisoning 4) all of the above
- 18) The normal amount of oxygen in the blood is
 1) 60-70 mm Hg 2) 50-70 mm Hg 3) 80-100 mm Hg 4) 70-90 mm HG
- 19) Deep breathing and coughing exercises falls under
 1) Active exercise 2) passive exercise 3) stretching exercise 4) relaxing exercise
- 20) The common bladder elimination problem is
 1) Impaction 2) incontinence 3) flatulence 4) diversion of bowel
- 21) The position used for reducing intracranial pressure is
 1) Trendelenburg 2) Reverse Trendelenburg 3) Prone 4) Fowlers position

Part C — WRITE SHORT ANSWERS: (5 marks)

- a) Types of exercises
- b) Therapeutic environment
- c) Steps in nursing process
- d) Purposes of good body mechanism
- e) Factors affecting bowel and bladder elimination

Part D — WRITE IN DETAIL: (10 marks)

- a) Nurse's responsibilities in discharge procedure
- b) Purposes of bed making
- c) Benefits of exercises
- d) Care of oxygen cylinder.

Part E —WRITE ESSAY: (20 marks)

- a) Mechanical devices for comfort measure
- b) Types of positioning.
- c) Admission procedure.
- d) Types of bed-making and indications

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5. Health assessment and physical examination

DEFINITION OF PHYSICAL EXAMINATION

It is defined as a complete assessment of a patient's physical and mental status.

PURPOSES OF PHYSICAL EXAMINATION

(1) To gather baseline data about the client's health. (2) To supplement confirm or refute data obtained in the nursing history. (3) To confirm and identify nursing diagnoses. (4) To make clinical judgment about a client. (5) Changing health status and management. (6) To evaluate and physiological outcomes of care. (7) It offers an opportunity for health teaching (breast and testicular self-examination)

Indications of Physical Examination: Is done in hospitals and during home visits, on admission, before and after diagnostic & therapeutic procedure, on discharge, on follow up, health campus.

METHODS OF PHYSICAL EXAMINATION

Observation of the patient : Webster's dictionary defines observation as "the act or power of noticing". Nurses are with the patients throughout day and night. Your report of observation is very valuable in helping the physician to arrive at proper diagnosis and treatment. The essence of good nursing depends largely on intelligent observation. It is through observation you notice your patients' deviations from normal condition.

Your observation and prompt actions may help patients from getting into serious complications such as haemorrhage and other similar problems. Your plan of nursing care also depends upon good observation.

Good observation depends on your intelligence and knowledge. Skill in observation is acquired through careful training in using your senses namely, seeing, hearing, touching and smelling.

It is through the sense of seeing you observe whether the patient is walking with difficulty, whether he is in pain and whether he has any other visible problems.

From hearing the sound of his breathing you will be able to understand whether the patient is having difficulty in breathing. Touching the patient reveals whether his body temperature is raised above normal or whether the skin is of normal texture or not. Your sense of smell tells you the nature of discharge from wounds and body cavities.

Observation is a continuous process as a patient's condition is never static. It changes continuously. These changes are noticed through careful observation. A nurse's observation includes not only the physical condition of the patient, but also his psychological aspects.

Your observation becomes meaningful when it is accompanied by questioning. To come to clear interpretations of your observations, you have to question your patient so that you will be able to find out the problems experienced by the patient.

Through observation you identify the objective symptoms of your patient. Changes in colour of the skin, pulse, respiration, discharges from body cavities and changes in speech are some of the examples of objective symptoms.

Pain, nausea, fear, anxiety, dizziness and itching are identified by questioning the patient. These are examples of subjective symptoms.

Certain symptoms cannot be identified by observation or questioning. For example, some special techniques are needed to note changes in temperature, pulse, respiration and blood pressure; X-rays and laboratory tests are used for finding out changes in structure and functions of various systems of the human body.

Physicians use methods such as inspection, palpation, percussion and auscultation for observation of patient's condition.

Inspection is observing with eye.

Palpation is the art of feeling with the hand.

Percussion and auscultation depend on the production of sound.

Percussion is tapping an area to produce sounds.

Auscultation is listening to sounds within the body with a stethoscope. It is the art of hearing the heart sound, bowel movement etc.

Olfaction : Sense of smell, (odour)

PRINCIPLES OF PHYSICAL EXAMINATION

Head to foot examination: When a patient comes to the hospital or clinic, do an overall observation of the patient, note down his problems, report to the senior nurse and write your observations in the nurse's record sheet.

Use the following as a guide for your observation and for estimation of your patient's condition.

1) The general structure of the body: Whether he is obese, malnourished, acutely ill or chronically ill. Whether he is weak and unable to walk or walks with aid whether he is in pain. Note the colour of the skin-pale, jaundiced.

2) Mental status and level of consciousness: Whether the patient is cheerful or depressed, anxious and worried, irritable, afraid or sad. Whether oriented to place, person and time. Whether fully conscious, drowsy or comatose.

3) Hair and scalp: Whether the hair is clean, thick, thin, matted, dirty or coarse. Whether there is any lesion, dandruff, pediculi or nits on the scalp.

4) Eyes: Whether the eyes are protruding, sunken or crossed. Whether the colour is abnormal - Reddish or yellow. Whether there is swelling, discharge, abnormal watering, pain, burning, itching, photophobia or headache. Whether the vision is normal or poor. Whether the patient uses glasses.

5) Face: Whether the face is pale, flushed or jaundiced. Whether there is swelling, ulcers, rashes or injuries. Whether his eyes are swollen or sunken.

6) Mouth: Whether his breath smells of drugs or alcohol or has a bad smell. Whether the gum is inflamed, swollen, bleeding or ulcerated. Whether the lips are cyanotic, dry swollen, cracked or ulcerated. Whether the teeth are loose, broken, artificial or irregularly arranged. Whether he has any toothache. Whether the taste is impaired, or disturbed. Whether the tongue is dry, cracked, coated, inflamed, ulcerated, blistered, fissured or swollen.

7) Throat: Whether the patient has any ulcer, inflammation or pain. Whether he has any difficulty in swallowing.

8) Speech: Whether the speech is absent. Whether he has any difficulty in speech-stammering or incoherent. Whether the voice is hoarse or weak.

9) Nose: Whether there is any deformity, swelling or discharge of mucous, blood or pus. Whether the sense of smell is present or absent.

10) Ears: Whether he is able to hear or not. Whether there is collection of wax in the ear. Whether the patient experiences any ringing or buzzing sounds, dizziness, itching or pricking.

11) Neck: Whether the patient has pain and difficulty in moving the neck. Whether there is any swelling or distended vein.

12) Chest: Whether the patient suffers from cough. Whether the sputum is of abnormal colour or quantity. Whether the breathing is laboured or normal.

13) Breast: Whether there are any abnormalities in the shape and size. Whether there are any lumps or discharge from the nipples.

14) Abdomen: Whether it is soft, tender, distended, hard, swollen, flabby or protruding. Whether he has any nausea, vomiting or pain. Whether his appetite is normal or not.

15) Back: Any swelling lump or any sore / ulcer at the back.

16) Upper Extremities: Whether the nails are broken or brittle. Whether there is clubbing of fingertips, tremors of hands, swelling of extremities, pain in the joints or any other abnormality, all range of motions present

17) Lower extremities: Normal in shape and size, any deformity, all range of motions present.

18) Skin: Whether there are any sores, wounds, rashes or scales. Whether the skin is dry, moist, hot, cold or clammy.

19) Excretions and discharges: Whether the colour, consistency, amount, odour, and characteristics of stools, urine, sputum, perspiration, vomitus and vaginal discharge are normal or abnormal. Whether patient gets any pain or any other discomfort during excretion.

Charting: The nurses are required to report and record their observations. She reports her findings to the professional nurse and to the physician.

Recording of the observations is called charting. The nurses should chart their observations correctly. All chartings should be brief, concise, account and complete.

Charting helps physicians, nurses and others to understand the condition and progress of the patient. The chart is also used for legal procedures and research.

A patient's chart includes records maintained by physicians and nurses. A nurse should be able to maintain records related to nursing and she should be able to understand the notes made by physicians and others.

PHYSIOLOGICAL ASSESSMENT

Vital signs: Temperature, pulse respiratory rate and oxygen saturation, blood pressure, pain are called vital signs as indicators of health status. These measures indicate effectiveness of circulation, respiratory, neural and endocrine function because of their importance they are referred to as vital signs.

Temperature: Degree of heat maintained by the body. It is the balance between the heats produced and heat lost.

Oral temperature : 98.6F (37°C)

Rectal temperature/Tympanic : 99.6F (37.5°C)

Axillary temperature : 97.6F (36.4°C)

Fever: It occurs because of heat loss. Mechanisms are unable to keep pace with excess heat production, resulting in an abnormal raise in body temperature

Thermometer: (clinical thermometer): It is used for measuring body temperature

Thermometer into two types: (1) Basing on the materials. (2) Basing on the route

Basing on materials (a) Electronic thermometer (b) Disposable thermometer (c) Glass thermometer (d) Temperature sensitive strip

Basing on the route: (a) oral temperature (b) rectal temperature (c) tympanic thermometer

The Common Sites for Taking Body Temperature: To get accurate measurement of the body temperature the bulb of the thermometer must be placed where it can be completely surrounded by body tissue and where there are blood vessels situated near the surface. The temperature may vary if the bulb of the thermometer comes in contact with clothing, air. Moisture etc. the common sites for taking body temperature are mouth, groin, rectum, axilla.

Each device measures temperature using the Celsius or Fahrenheit scale. Following formulas are used in converting values

To convert Fahrenheit into Celsius

$$C = (F - 32) \times 5/9$$

E.g convert 104°F into Celsius

$$C = 104 - 32 \times 5/9$$

$$C = 72 \times 5/9 = 40^\circ\text{C}$$

To convert Celsius to Fahrenheit

$$F=C \times 9/5 + 32$$

E.g convert 37°C to Fahrenheit

$$= (37 \times 9/5) + 32$$

$$= 66.6 + 32 = 98.6^\circ\text{F}$$

Contraindication for rectal method

- 1) The patients who had rectal surgery or inflammation of the rectum
- 2) The patients who are having diarrhoea
- 3) When the rectum is packed with faecal matter
- 4) Patient who are having some kind of treatments (eg) bowel wash enema ect

Contraindications for the oral method: Patients who are

- 1) Extremely nervous
- 2) Delirious
- 3) Unconscious
- 4) Hysterical and Mentally confused
- 5) Patient having convulsion mouth breathe
- 6) Patients who have injuries
- 7) Inflammation of operation in the mouth
- 8) Children under the age of 6 years
- 9) Extremely weak patient

Types of fever

Terms used to describe the types and phases of fever

Onset: Onset or invasion of fever is the period when the body temperature is rising and it may be a sudden or gradual process

Fastigium or stadium: Fastigium or stadium of fever is the period when the body temperature has reached its returning to normal. The fever may subside suddenly (decline by crisis or gradually (decline by lysis)

Crisis: Crisis is sudden return to normal temperature from a very high temperature within a few hours of days

True crisis: The temperature falls suddenly within few hours and touches normal, accompanied by a marked improvement in the patients condition

Subnormal temperature: When the body temperature falls below normal it is called subnormal temperature. The temperature may vary between 95° to 98°F or 35 to 36.7°C

Hyperthermia: When the body temperature is raised to 105°F or above it is called hyperthermia

Hypothermia: If the temperature falls below 95°F or 35°C, the condition is called hypothermia

False crisis: A sudden fall in temperature not accompanied by an improvement in the general condition is called false crisis. It may be danger signal and not a sign of improvement

Lysis: The temperature falls in a zig-zag manner for two of three days of a week before reaching normal during which time, the other symptoms also gradually disappear

Constant fever or Continuous fever: Constant fever or Continuous fever is one in which the temperature varies not more than two degrees between morning and evening and it does not reach normal for a period of days or weeks

Remittent fever: Remittent fever is a fever characterized by variations of more than two degrees between morning and evening but does not reach normal level

Intermittent or quotidian fever: The temperature is raised from normal or subnormal to high fever and back at regular intervals. The interval may vary from few hours to three days. Usually the temperature is higher in the evening than the morning

Inverse fever: In this type the highest range of temperature is recorded in the morning hours and the lowest in the evening which is contrary to that found in the normal course of fever

Hectic fever: When the difference between the high and low point is very great, the fever is called hectic or swinging fever.

Relapsing fever: Relapsing fever is one in which there are brief febrile periods followed by one or more days of normal temperature

Irregular fever: When the fever is entirely irregular in its course, it cannot be classified under any one of the fevers described above and it is called irregular fever

Rigor: Rigor is sudden severe attack of shivering in which the body temperature rises rapidly to a stage of hyperpyrexia as seen in malaria

Low pyrexia: In low pyrexia the fever does not rise above 99 to 100°F or 37.2 to 37.8°C

Moderate pyrexia: The body temperature remains between 100 to 103°F or 37.8 to 39.4°C

High pyrexia: The temperature remains between 103 to 105°F or 39.4 to 40.6°C

Hyperpyrexia: The temperature goes above 105°F

Frequency of taking temperature in the hospital: Frequency of taking temperature is determined by the condition of the patient. For patients who are not seriously ill, it needs to be taken in the morning and evening. The temperature is to be checked every 4 hours or even more frequently for those who are actually ill, who are having high fever, and post operative patients. If the temperature is taken by rectum or axilla it should be specified in the chart

Fever (PYREXIA): Fever or pyrexia is defined as the rise in body temperature above 99°F (37.2°C). The causes of fever are infections, diseases of the nervous system, certain malignant neoplasms, blood-

diseases such as leukemia, embolism and thrombosis, heat 'stroke from exposure to hot environment, dehydration, surgical trauma and crushing injuries, skin abnormalities that interfere with heat loss, allergic reactions to foreign proteins and pyrogens etc.

In fever, all the systems of the body are affected. It may vary with the nature of the diseases

Respiratory system: Shallow and rapid breathing

Circulatory system; Increased pulse rate and palpitation

Alimentary system: Dry mouth, coated tongue, loss of appetite, nausea, vomiting, constipation, or diarrhea

Urinary system: Diminished urinary output, burning micturition, high colored urine

Nervous system: Headache, restlessness, irritability, insomnia, convulsions, delirium

Musculo-skeletal system: Heavy sweating, hot flushes, goose flush, shivering or rigors.

Integumentary system: Heavy sweating, hot flushes, goose flush, shivering or rigors

Fever is not a disease but it is a sign. fever is a protective function of the body, "because the rise in temperature prevents the growth of organisms causing the disease. Fever if not too high hastens the destruction of bacteria by increasing phagocytes, and by producing immune bodies. A temperature of 104 to 105°F for several hours will destroy the organisms of syphilis and gonorrhoea. The range in the body temperature within which the cells can function efficiently is between 34 to 41°C (94 to 106°F). the central nervous system is extremely sensitive to the temperature variations. Irreversible changes may occur in the nervous system if the body temperature goes above 41°C or below 34°C

Care in Fevers

1) Regulation of the body temperature : Care of the patients in fevers focuses on reducing the elevated body temperature. When the patients temperature is moderately elevated, various methods of reducing the temperature be started. The room temperature should be maintained at a comfortable temperature. The room should be well ventilated. The blankets and excess clothing should be removed but prevent the patient from getting draughts. The various method used for cooling the body are:

- 1) Exposure to cool air an electric fan. Administration of cool drinks
- 2) Application of cold compress and ice bags
- 3) Cold sponging and cold packs
- 4) Cold bath
- 5) Ice cold lavages and enemas
- 6) Use of hypothermic blankets of mattresses

When surface cooling is used treatment is directed at not only cooling the body but also preventing shivering. Shivering must be prevented because it increases metabolic activity, produces heat, increases the oxygen usage markedly, increases circulation, may cause hyperventilation and respiratory alkalosis. It takes longer time to reduce body temperature in a shivering patient

2) Meeting the nutritional need: The cellular metabolism is greatly increased during fever. The oxygen consumption in the body tissues approximately 13 percent for each centigrade degree of rise in

temperature of 7 percent for each Fahrenheit degree, Therefore a high caloric diet is indicated in fevers. Sincere the digestive process is slowed down the diet should be easily digestible and palatable. Most of the patients prefer fluid diet.

Unless it is contraindicated, the fluid intake is increased to 3000ml in 24 hours to prevent dehydration and to eliminate the waste products

Care in rigor: Rigor is characterized by three stages:

1) The first stage or cold stages: the patient shivers uncontrollably. The skin is cold, face is pinched and pale, the pulse is feeble and rapid. The temperature rises rapidly to 103°F (39.4°C) or above. In this stage, cover the patient with blankets and apply warmth with hot water bags. Give warm drinks. Protect the patient from falling.

2) The second stage or hot stage: the skin feels hot and dry and patient feels very thirsty. The shivering stops. The patient may be restless. The temperature may continue to rise

During the second stage, remove all the blankets and hot appliances. Cover him only with a thin blanket. Give him cool drinks. Cold compresses are applied to the head to relieve congestion and headache. The temperature is carefully recorded every 10 to 15 minutes. Watch pulse and respirations carefully. If the temperature goes very high (105°F) (40.5°C) cold sponging may be started. Watch for the early signs of sweating.

3) The third stage or stage sweating: the patient sweats profusely. The temperature falls. The pulse improves. Acute discomforts are diminished. The patient may go into state of shock and collapse if not cared properly

PULSE

Definition of pulse: The pulse is the palpable bounding of blood flow noted at various parts on the body. Pulse is rhythmic fluctuation of fluid pressure against the arterial wall created by the pumping action of the heart muscle by placing fingers over an artery particularly at the location where it cross the bond

Sites for checking pulse:

- | | |
|--------------------|----------------------------|
| 1) Temporal artery | 2) Carotid artery |
| 3) Brachial artery | 4) Radial artery |
| 5) Femoral artery | 6) Popliteal artery |
| 7) Dorsalis pedis | 8) Posterior tibial artery |

Apical pulse Auscultated in adult

Apical pulse is palpated to count pulse rate in infants

Characteristics of pulse

1) Rate: It is number of pulse beats in a minute. Normal rate in adult is 80 to 100 per minute

2) Rhythm: It refers to regularity of the beats, beats are spaced at regular intervals they are said to be regular. Interval varies between the beats it is called irregular

3) Strength: The strength/ amplitude of a pulse reflects the volume of blood ejected against the arterial wall

4) Volume: It refers to the fullness of the artery it is the force of the blood felt at each beat

5) Tension: It is the degree of compressibility

6) Equality: It refers to assess both radial pulses and compare the characteristics of both

7) Principles: Exercise, emotion and anxiety will cause increased pulse rate, finger tips sensitive to touch will feel the pulsation. Moderate pressure allow one to feel superficial radial artery characteristics of the pulse vary with individuals

Factors involved in pulse

1) Age: The heart rhythm in infants and children often varies markedly with respiration

2) Autonomic nervous system: Stimulation of the parasympathetic nervous system results in decreasing in the pulse rate. Stimulation of sympathetic nervous system results in an increased pulse rate

3) Medications: Certain cardiac medication such as digoxin decreases heart rate

RESPIRATION

Meaning of respiration: Respiration is the mechanism of body uses to exchange gases between the atmosphere and blood and the cells

Rate: Rate is the number of full respiration in a minute, normal rate is 16-20 breaths/minute

Depth of respiration: Normal average man at rest inspires and exhales about 500cc of air with each respiration. If more than this quantity of air passes out in and out of the lungs the respiration is said to be deep

Rhythm: In normal respiration rhythm is normal

Various sites of respiration

- 1) Chest
- 2) Abdomen

Factors involved in respiration:

1) Age: Normal growth from infancy to adulthood results in a larger lung capacity as lung capacity increases the respiratory rate decreases. Medications narcotic decreases respiratory rate and depth

2) Stress: Stress increases the rate and depth of respiration

3) Exercise: It increases rate and depth of the air decreases to meet the body's need for additional oxygen

4) Altitude: The oxygen content of the air decreases as the altitude increases

5) Gender: Men normally have larger lung capacity than woman

6) Body position; A straight erect position promotes full chest expansion. A sloped as slumped position impairs ventilator movement

7) Fever: During fever the respiratory rate increased because heat can be lost from lungs

BLOOD PRESSURE

Definition: Blood pressure is the pressure exerted by blood on the wall of a blood vessel. The normal range of blood pressure is 120/80 mm of Hg in adult.

When the ventricles are contraction the pressure is at its highest this is known as the 'Systolic Pressure'

'Diastolic Pressure' is when the ventricles are relaxing and the blood pressure is at its lowest

Hypertension: when the systolic pressure is above the normal level

Hypotension: when the systolic pressure is below the normal range

Purposes: (1) To acquire a base line. (2) Monitor for fluctuation (3) To diagnose disease (4) To assess the cardiovascular system (5) To monitor the effects of medication

Types of equipment required:

1) Mercury Sphygmomanometer: this is the simplest and most accurate and economical device for measuring blood pressure as long as it is used correctly

2) Aneroid Sphygmomanometer: there register pressure through a bellows and lever system, which is more indicate than the mercury reservoir and column

3) Automatic digital sphygmomanometer: there remove some of the human error from BP measurement, but observer training is still necessary.

PAIN

Definition : Whatever the person says it is existing whenever the existing person says it does.(MC Caffery 1999).

Pain is the fifth vital sign.

Characteristics of pain :

1) Severity : Ranges from no pain to excruciating pain

2) Timing : duration and onset of pain

3) Location: body area involved.

4) Quality : what the patient feels the pain is

5) Personal meaning: how affects the persons daily life.

Factors increasing and decreasing pain: age, gender, activity, rest, sleep, diet, culture, home remedies, drugs, alcohol, diversional activities like listening to music, watching T.V., yoga, meditation, etc.

Pain Assessment: Pain intensity scale

Simple Descriptive Pain Intensity Scale

| | | | | | |
|---------|-----------|---------------|-------------|------------------|-------|
| No pain | Mild pain | Moderate pain | Severe pain | Very Severe pain | Worst |
|---------|-----------|---------------|-------------|------------------|-------|

0-10 Numeric Pain Intensity Scale

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|----|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|

Visual Analog Scale

| | |
|---------|--|
| No pain | pain as bad as it could be possible or unbarrable pain |
|---------|--|

Faces Pain Scale- Revised: This instrument has 6 faces depicting expressions that range from contented to obvious distress. The patient is asked to point to the face that most closely resembles the intensity of his or her pain.

TESTING AND EXAMINATION

URINE

Characteristics of urine:

1) Color: Normal urine ranges from pale, straw colors amber, depending on its concentration.

Bleeding from the kidneys or ureters causes urine to become dark red, bleeding from the bladder or urethra causes bright red urine.

Dark amber urine may be a result of high concentrations of bilirubin caused by liver dysfunction.

2) Clarity: the normal urine appears transparent at voiding. Urine that stands several, minutes in a container becomes cloudy renal disease many appear cloudy or foamy because of high protein concentrations.

3) Odour: Urine has a characteristics odour. The more concentrated the urine. The stronger the odour

Characteristics of Normal Urine:

- 1) **Volume:** One to two litres in 24 hours but varies
- 2) **Color:** Yellow or amber but varies.
- 3) **Turbidity:** Transparent when freshly voided but becomes turbid (cloudy) upon standing.
- 4) **Odour:** Urine has a characteristic odour. The more concentration the urine the stonger the odour
- 5) **pH:** 4.6 and 8.0 average 6.0 varies.
- 6) **Specific gravity:** 1.001 to 1.035.

Common Urine Tests:

Urine Testing: The nurse often collects urine specimens for laboratory testing. The type of test determines the method of collection

Specimen collection: The nurse collects random. Clean voided or mid stream, sterile, and timed specimens.

Urinalysis: The laboratory performs a urinalysis on a specimen obtained by any of the previously described methods. The specimen should be examined as soon as possible, preferably within 2 hours.

Specific gravity: The specific gravity is the weight or degree of concentration of a substance compared with an equal volume of water

Urine culture: A urine culture requires a sterile or clean voided sample of urine. It takes approximately 24 to 48 hours before the laboratory can report findings of bacterial growth.

Urine test

Purposes of Sugar test: Testing the urine for the persons and the amount of sugar provides the doctors with information about the amount of insulin needed by the patient.

Purpose of Acetone test: Acetone is an abnormal finding that indicates that the body has begun to break down stored fats to use for energy, since it is not able to use the sugar.

Purpose of Albumin test: High albumin excretion is a prognostic of renal failure and complications such as myocardial infarction.

Indications for Sugar , Acetone and Albumin

Sugar in the urine indicates diabetes mellitus. In pregnancy when the renal threshold is lowered. The sugar is found in the urine.

Acetone is found in the urine of people losing weight or in starvation.

Albuminuria is presently the most reliable early indicator of adverse renal and cardiovascular events in diabetic patients. The consensus is that screening and intervention for albuminuria are worthwhile in patients with insulin dependent diabetes, more often in type I diabetes mellitus than type II. Increased albumin excretion suggests the onset of diabetic nephropathy.

Testing the urine for glucose and acetone is generally done four times a day. The most accurate method is to obtain a double voided urine specimen in which the first voided is set aside and the patient is asked to void a short time later. This second voiding consists of the most recently produced urine from the kidney and is the best indicator of the amount of sugar being excreted at that moment not of urine that may have been in the bladder for hours. If the patient has a Foley's catheter the urine specimen should be taken from the tubing, which contains the latest formed urine not from the drainage bag.

An albumin testing usually requires a 24-hour specimen without preservatives. Some laboratories will accept a random specimen.

Preparation of the patient :

- 1) On the previous day explain the procedure to the patient.
- 2) Explain to the patient when the urine to collect how to collect and the amount to be collected.
- 3) Provide an appropriate container and demonstrate to him how to use it
- 4) Instruct him not to contaminate the out side of the bottle.
- 5) Ask the patient to wash the internal genitalia with soap and water and rinse it with water.
- 6) If the patient is unable to do himself the nurse assists him.

Preparation of articles

Correct collection and preparation of urinary specimens for diagnostic testing contributes to accurate test results. Bedside tests for urine glucose and acetone must be done precisely according to the direction to obtain accurate results. Timing of the reading is crucial and the result may be incorrect if the reading is taken too early or too late.

Patient family teaching :

- 1) Encourage reporting for routine urinalysis and follow up examination
- 2) Advice avoidance of any medicine unless specifically prescribed
- 3) Teach the patient and family the importance of fluid intake
- 4) Teach the patient and family how to perform the test

Patient condition:

Presence of sugar in the urine about 140 - 180 mgm/ 100 ml of blood is glycosuria

Presence of ketone in the urine is ketonuria.

STOOL

| Characteristics | Normal Findings | Special Classification |
|-----------------|---|---|
| Volume | Variable | <p>The diet high in roughage produces more faeces than a soft, bland-diet.</p> <p>Consistency large diarrhoeal stools suggest a disorder in the small bowel, small and frequent stools urgency to bed pan suggest a disorder of the colon 'or' rectum</p> |
| Colour | <p>Infant: Yellow</p> <p>Adult: Brown</p> | <p>The brown colour of the stool is due to stercobilin, a bile pigment derivative</p> <p>The rapid rate of peristalsis in the infant causes the stool to be yellow.</p> <p>The colour of the stool is influenced by diet. For example, the stool will be almost black if the person eats red meat & dark green vegetables, such as spinach. The stool will be light brown if the diet is high in milk & milk products and low in meat.</p> <p>The absence of bile may cause the stool to appear whiter or clay-coloured</p> <p>Certain drugs influence the colour of the stool. For example, iron salts cause the stool to be black. Antacids cause it to be whitish.</p> <p>Bleeding high in the intestinal tract causes a stool to be black owing to the digestion of the blood.</p> <p>Bleeding in lower intestinal tract will result in fresh blood in the stool.</p> |
| Odour | Aromatic, may be affected by foods ingested | <p>Excessive putrefaction causes a strong odour. The presence of blood in the stool causes a unique odour.</p> |
| Consistency | Soft, Semi-Solid, & formed | The consistency of the stool is influenced by fluid & food |

Sample of the Label

Name of the Patient: _____ Ward/Bed No. _____
 Age: _____ Sex: _____ OP/IP: _____
 Name of Specimen: _____
 Nature of Test to be Done: _____
 Date of Collection: _____

Abnormality of Stool

Blood in stool - Different forms are

1) Haematochezia: Passage of bright red blood per rectum mixed with 'or' without stool, ex: haemorrhoids, anal fissure & fistula, trauma, ischemic colitis, diverticulitis, polyps, malignancy etc.

2) Melena: Characteristics are black tarry (sticky) stool (use to production of acid haematin). Offensive (acid haematin is altered by bacteria). Semisolid in consistency. Red-coloured fluid comes out from the Usually associated with vertigo, dizziness 'or' syncopal attack during defecation. Causes are (1) Duodenal ulcer (2) Carcinoma of the stomach

3) Occult Blood Causes are: Intake of NSAID, hookworm infestation & colo-rectal cancer etc.

SPUTUM

Sputum is the mucous secretion from the lungs, bronchi, and trachea. It is important to differentiate it from saliva, the clear liquid secreted by the salivary glands in the mouth, sometimes referred to "spit". 30 ounces of mucus produced/day.

Healthy Individuals do not produce sputum.

Clients need to cough to bring sputum up from the lungs, bronchi, and trachea into the mouth in order to expectorate at into a collecting container.

Document amount of sputum collected, color, odour consistency (thick, tenacious, watery) and presence of haemoptysis'.

Characteristics of sputum

| Characteristics | Normal | Abnormal or Disease Condition |
|-----------------|--|--|
| Amount | No sputum of very little is expectorated | Amount may vary according to the disease. Eg. Asthma, Bronchitis. |
| Colour | It is colour less & translucent | Yellowish colour indicates bacterial infection |
| | | Blakish colour indicates carbon pigment Eg. Smoking |
| | | Bright red/ Dark red, tarry colour indicates blood |
| | | Greenish colour indicates bronchiectasis |
| | | Brown colour indicates gangrenous condition of lung. |
| Odour | Odourless | Unpleasant odour indicates lung abscess, lung cancer, lung gangrene |
| Consistency | | Forthy – watery tenaciously and thick depending on type of condition |

Sputum production : Sputum production with coughing is not normal. Question the client about sputum color (clear, yellow, green, rusty, bloody) and odor.

Quality: Watery, stingy, frothy, thick.

Quantity: teaspoon, tablespoon, cup. Document in client's medical record any changes in color, odor quality, or quantity. Assertion whether sputum is produced only often the lying in a certain position.

The amount of sputum produced is increased several disorder, for instance. Clients with bronchitis may expectorate several cups of sputum daily.

Summary :

- 1) Physical examination is defined as complete assessment of a patients physical and mental status
- 2) The methods of Physical examination are inspection palpation, percussion, auscultation, and olfaction.
- 3) The recording of the observations is called charting.
- 4) Temperature is degree of heat maintained by the body. It is the balance between the heats produced and heat lost.
- 5) The common sites for taking body temperature are mouth, groin, rectum, axilla
- 6) Fever or pyrexia is defined as the rise in body temperature above 99°F (37.2°C).
- 7) Crisis is sudden return to normal temperature from a very high temperature within a few hours of days
- 8) Rigor is sudden severe attack of shivering in which the body temperature rises rapidly to a stage of hyperpyrexia as seen in malaria
- 9) Pulse is rhythmic fluctuation of fluid pressure against the arterial wall created by the pumping action of the heart muscle by placing fingers over an artery particularly at the location where it cross the bond
- 10) Respiration is the mechanism of body uses to exchange gases between the atmosphere and blood and the cells
- 11) Blood pressure is the pressure exerted by blood on the wall of a blood vessel.
- 12) Hypertension: when the systolic pressure is above the normal level
- 13) Hypotension: when the systolic pressure is below the normal range
- 14) Bleeding from the kidneys or ureters causes urine to become dark red, bleeding from the bladder or urethra causes a bright red urine.
- 15) Absence of bile may cause the stool to appear whiter or clay colour.
- 16) The amount of sputum produced is increased several disorder, for instance. Clients with bronchitis may expectorate several cups of sputum daily

QUESTIONS

PART A — ONE WORD ANSWERS: (One mark)

- | | | |
|-------------------------|--------------|----------------|
| a) Physical examination | b) Olfaction | c) Percussion |
| d) Temperature | e) Fever | f) Fastigium |
| g) Rigor | h) Pyrexia | I) Haemoptysis |
| j) Melena | | |

PART B — MULTIPLE CHOICE QUESTIONS: (One mark)

- 1) Art of feeling with the hand
 - 1) Palpation
 - 2) Inspection
 - 3) Percussion
- 2) Recording the observation is called
 - 1) Monitoring
 - 2) Charting
 - 3) Documenting
- 3) Degree of the heat maintained by the body
 - 1) Saturation
 - 2) Temperature
 - 3) Blood pressure
- 4) Normal rectal temperature
 - 1) 98.6 degree-F
 - 2) 99.6 degree-F
 - 3) 97.6 degree-F
- 5) Sudden returned to normal temperature from a very high temperature with in a few hours of a day.
 - 1) Lysis
 - 2) Crisis
 - 3) Fastigium
- 6) The body temperature is raised to 105 degree-F is called
 - 1) Hypothermia
 - 2) Hyperthermia
 - 3) Hectic Fever
- 7) Temperature falls in a zigzag manner
 - 1) Lysis
 - 2) Hypothermia
 - 3) Hyperthermia
- 8) Exchange of gas between atmosphere and blood
 - 1) Pulse
 - 2) Respiration
 - 3) Blood pressure
- 9) The normal range of blood pressure for an adult
 - 1) 120/80 mm of Hg
 - 2) 110/70 mm of Hg
 - 3) 120/90 mm of Hg
- 10) Brown colour sputum indicates
 - 1) Bronchitis
 - 2) Bacterial infection
 - 3) Gangrenous of lung
- 11) Coughing out of blood with sputum
 - 1) Haemoptysis
 - 2) Haematemesis
 - 3) Epistaxis
- 12) The method to produce sound by tapping an area is known as
 - 1) Percussion
 - 2) Auscultation
 - 3) palpation
 - 4) none of the above
- 13) The formula to convert Fahrenheit into Celsius is
 - a) $C = (F + 32) \times \frac{5}{9}$
 - b) $C = (F + 32) \times \frac{9}{5}$
 - c) $C = (F - 32) \times \frac{5}{9}$
 - d) $C = (F - 32) \times \frac{9}{5}$

- 14) When the difference between the high temperature and low temperature is great, the fever is
 a) Inverse fever b) Hectic fever c) Raise crisis d) Rigor
- 15) The second stage of rigor is
 a) Cold stage b) Sweating stage c) Hot stage d) Warm stage
- 16) The degree of compressibility of pulse is known as
 a) Strength b) Tension c) Equality d) Volume
- 17) The specific gravity of urine is
 a) 1.000 to 1.035 b) 1.010 to 1.035 c) 1.031 to 1.035 d) 1.010 to 1.031
- 18) Black tarry stool is
 a) Haematochezia b) Malaena c) Occult blood d) Haematemesis
- 19) Greenish colour sputum indicates
 a) Bacterial infection b) Bronchiectasis c) gangrenous condition d) Asthma
- 20) The pressure when the ventricles are relaxing and the blood pressure at its lowest is
 a) Systolic b) Diastolic c) Pulse pressure d) mean pressure

PART C — WRITE SHORT ANSWERS: (5 marks)

- a) Care of patient with fever
- b) Characteristics of pain.
- c) Purposes of physical examination
- d) Methods of physical examination
- e) What are the Contraindication for oral temperature?
- f) What are the methods used for cooling the body?

PART D — WRITE IN DETAIL: (10 marks)

- a) Describe sites and characteristics of pulse?
- b) Pain scale
- c) Characteristics of urine
- d) Explain common site for taking temperature?
- e) Abnormalities of stool

PART E — WRITE ESSAY: (20 marks)

- 1) Explain head to foot examination of patient?
- 2) Explain urine testing?
- 3) Management of Rigor
- 4) Characteristics of stool

6. MEDICAL AND SURGICAL ASEPSIS

The concept of asepsis (freedom from organisms) is important for all health care workers who have direct or indirect patient contact. Nurses are the persons who have frequent contact with the patients to provide care for 24 hours. It is the responsibility of the nurse to be aware of the patients at risk of developing infectious and also a duty to protect them with aseptic techniques.

DEFINITION OF ASEPSIS

Asepsis is the practice to reduce or eliminate contaminants (such as bacteria, viruses, fungi and parasites) from entering the operative field in surgery or medicine to prevent infection.

Definition of aseptic techniques: Aseptic technique is the effort to keep a client as free from hospital micro-organisms as possible.

PRINCIPLES OF ASEPSIS

Three things that are extremely important in achieving asepsis are the reduction of time, trauma and trash.

(1) Time : The time taken for any medical or surgical procedure is an important factor. Longer the time taken, have the possibility of greater exposure to contamination.

(2) Trauma: Trauma occurred due to rough handling, excessive dead space, foreign bodies will contribute to infection.

(3) Trash : It refers to contamination by bacteria or foreign matter.

Essential components of maintaining asepsis in a hospital include:

(1) Hand washing, (2) Utilizing gloves, gown and mask as indicated, (3) Cleaning equipment. (4) Handling linens in ways that prevent germs from spreading.

TYPES OF ASEPSIS

The two types of aseptic techniques the nurse practices are medical and surgical asepsis.

Medical asepsis: It is a clean technique which includes procedure used to reduce the micro organisms and prevent their spread. (e.g.) changing patient's bed linen daily, hand washing.

Surgical asepsis: It is a sterile technique which includes procedures used to eliminate the micro organisms. Sterile technique is used where sterile instruments are used (e.g.) in operation theatre.

Medical asepsis: Medical asepsis is commonly referred as clean technique. The goal is to reduce the number of pathogens or prevent the transmission of pathogens from one person to another. Techniques used should be appropriate to interrupt the spread of the known pathogen.

Guidelines for maintaining medical asepsis:

(1) Thorough hand washing is basic technique for infectious control. (2) Know about patient's susceptibility to infection (e.g.) Age, Nutritional status, Stress etc., (3) Never use aseptic technique haphazardly. (4) Protect health workers from exposure to infectious agents. (5) Aware of the body sites where nosocomial infectious can occur. (6) Proper usage of protective devices like gowns, gloves, masks and protective eye wear. (7) Procedures should follow the principles of techniques, so as to interrupt. The transmission of micro-organisms.

Surgical asepsis: Surgical asepsis is a sterile technique to eliminate all microorganisms including spores and pathogens, from an object and to protect an area from microorganisms. Surgical asepsis is used in operating room, delivery room, certain diagnostic testing areas, certain procedures like insertion of urinary catheter, sterile dressing changes, preparing an injectable medication etc. When following surgical asepsis, areas are considered contaminated if they are touched by any object that is not also sterile. While doing the procedure, it is necessary to explain the procedure to the patients to facilitate their cooperation. Inform the patient which objects and areas may not be touched and direct the patient to avoid sudden movements that might contaminate the equipment. This helps the patient assist in maintaining the sterility of procedure.

BASIC PRINCIPLES OF SURGICAL ASEPSIS

- (1) Sterile object remains sterile when touched only by another sterile object.
- (2) Only sterile objects may be placed on a sterile field.
- (3) An object held below a person's waist is contaminated. Nurses never turn their backs on a sterile tray.
- (4) A sterile object becomes contaminated by prolonged exposure to air.
- (5) Avoid talking, coughing, sneezing over sterile field or object.
- (6) When a sterile surface comes in contact with a wet contaminated surface, the sterile object becomes contaminated by capillary action.
- (7) The edges of sterile field or container are considered to be contaminated.
- (8) Use dry, sterile forceps when necessary. Forceps soaked in disinfectant are not considered sterile.

Use of gloves: Gloves, not substitute for good hand hygiene. It should worn only once and discarded appropriately. It is more important to perform good hand hygiene before and after using gloves. Gloves provide a barrier but are not impenetrable.

Gloves are used for the following situations:

- (1) High risk setting like operating room, labour room.
- (2) Handling the sterile surgical instruments.
- (3) While doing the aseptic procedures like catheterization, suctioning, bowel irrigation, dressing the wound etc.
- (4) While doing some of the diagnostic procedures like Thoracentesis, liver biopsy, renal biopsy, lumbar puncture etc.
- (5) While caring the patients with infectious diseases.
- (6) While handling the blood and blood products.

Use of aprons: Aprons are usually worn to prevent soiling of the nurse's clothing by the patient's blood and body fluids. They provide barrier protection and are worn before entering the patient's room. Gown is worn only once and is then discarded appropriately. Gown is prepared by cloth or water proof materials. If a gown becomes heavily soiled or moistened with blood or body fluids when caring for a patient, remove it, perform through hand hygiene and put on a clean gown.

Use of masks: Masks help prevent the wearer from inhaling large particle aerosols, which usually travel short distances and small particle droplet nuclei, which can remain suspended in the air and travel longer distances. Masks prevent the nurses to touch eyes, nose and mouth, thus limiting the contact of organisms with mucous membranes

Masks practices are used in various situations like sometimes the patient's visitors also have to be used when they are with patients who have respiratory infections. Sometime, the patients with immuno suppressive drug need to wear mask for specific precautions when transported outside the room.

A mask is worn only once and never lowered around the neck and then brought back over the mouth and nose for reuse. It should certainly be changed before it becomes damp from the wearer's exhalations.

STERILIZATIONS AND DISINFECTION

Definition:

Disinfection is the destruction usually by chemicals of pathogenic organisms not including bacterial spores.

Guidelines to be considered:

- Some organisms are carries to destroy than others.
- The greater the number of organisms, the longer it takes to destroy them.
- The type of equipment to be disinfected or sterilizes makes a difference.
- Items used for certain procedures must be sterile.

Methods of sterilization:

- 1) **Heat** : It is rapid and reliable method to destroy the small and heat resistant objects.
- 2) **Chemicals** : It is slow, corrosive and used for heat-sensitive objects for large surfaces.
- 3) **Filtration** : It requires membrane filtration apparatus and only used for liquids.
- 4) **Irradiation** : Ionizing irradiation is reliable but expensive and it is used to sterilize the rooms.

A) **Tyndallisation:** Repeated steaming at 100 degree centigrade of culture media on each of three successive days, allowing spores to germinate and to be subsequently killed.

B) **Boiling** This method is suitable for enamel. Metal, glass and rubber wares. Bowl sterilizers are used for large articles, instrument sterilizers for smaller articles.

Points to remember:

- 1) See that articles are quite clean, and completely immersed in the water, which also must be clean.
- 2) Only after the water comes to the boil start timing. If more articles are added, the sterilizing time must begin again.

3) Boil vigorously for 5 minutes. boiling will not kill spores.

4) Remove articles with sterile tongs or other lifting forceps. On to a sterile surface.

C) Autoclaving: This is a reliable method and may be used for most articles. The autoclave is a metal chamber with an outer jacket and a lid or door, which can be firmly clamped. Steam is generated by heating water in a boiler or in the outer jacket. Air is evacuated from the chamber either by displacement with steam, or by a vacuum attachment. Then the steam is allowed to build up pressure, usually 15 or 20 lbs per square inch, and is kept at that pressure, usually for 15 to 30 minutes. Then the heat is turned off, the steam evacuated, and the contents the autoclave.

Points to remember:

1) All articles should be clean and dry before packing. Any organic matter such as blood or pus prevents penetration of steam.

2) The holes in drums must be open when placing into the autoclave, and closed immediately on taking them out.

3) Bundles should be not too large and not tightly packed. Steam should be able to penetrate to the centre.

4) Rubber gloves cannot stand high temperature and long sterilizing. Autoclave them separately at 15 lbs pressure for 15 minutes.

5) To autoclave bottles of fluid, loosen the screw caps. Evacuate the steam slowly.

General instruction:

1) The articles being sterilized should withstand high temperature.

2) The wrapper and the container should allow penetration of the steam into the article.

3) The inner chamber must not be too full nor the contents arranged too compactly. Bundles and drums must be packed loose. Cans or jars must be opened and turned on their sides so that steam can easily penetrate the contents.

4) The temperature and pressure of the steam should be high enough to kill all the microorganisms including spores. The usual temperature is 121 degree celsius and the pressure is 1.05 kg/cm².

5) The destruction of a bacteria depends upon the length of time the articles are exposed to steam under pressure. The minimum time is 30 minutes. If the pressure is increased the exposure time can be reduced.

6) In operating an autoclave, it is important to remember that all the air in the inner chamber must be driven out and entirely replaced by steam. Otherwise although the gauge may show a pressure of 15 lbs, this pressure would be caused by a mixture of steam and air and the temperature would be lower than that of the steam alone.

7) The articles should be left in the autoclave for a short time after the procedure is over to dry the materials.

Working of the autoclave:

Autoclave is the name given to a sterilizer that utilises saturated steam under pressure (saturated means the steam exerts maximum pressure for water at the given time)

The steam is used in the autoclave for two reasons:

- 1) When steam is held in a closed container, it is compressed and the temperature rises far above that of the boiling point of water.
- 2) Steam is able to penetrate porous materials very rapidly, provided that, it is not impeded by unsuitable wrappers or by air trapped within fabrics or hollow instruments.

An autoclave consists of an outer chamber and an inner chamber, which can be tightly closed by a safety lock. The steam is introduced first into the outer chamber until the desired temperature is reached. At this point, the steam is turned into the inner chamber which is packed with articles that are to be sterilized.

As the steam enters the inner chamber, the air is forced out through the valves. The steam is kept flowing into the inner chamber until the desired temperature is reached. It is very important to note the temperature as well as the pressure of the inner chamber. When the desired levels are reached, it should be maintained to the desired length of time (Temp: 121 degree celsius, Pressure: 1.05 kg/cm² and the exposure time is 30 minutes.)

The removal of air from an autoclave, during the sterilization process is important for two reasons:

- 1) Air left in the center of a pack or in the cannula of a catheter will prevent the steam from coming into direct contact with the center of the pack or to the lumen of the catheter. Failure to contact means failure to sterilize.
- 2) Air mixed with steam reduces the temperature of the steam.

At the end of the period, the steam supply is shut off, but the door is not opened until the pressure gauge is at zero and the temperature has fallen to 100 degree celsius. This allows the liquids to cool to a point when they will not escape from their containers with the reduction of pressure and it also helps to dry the packaged goods.

D) Dry heat: Sterilizing of glassware including syringes is often done in a hot air oven, at 160 degree centigrade for one hour. Spores as well as organisms are killed. Rubber will not stand up to this heat.

This method is efficient if heat penetrates through dressings, towels and gown.

Two methods are used

- 1) **Incineration** : Used for disposal of dressings, laboratory media and human tissues and used oil. Hospital incinerator may cause unacceptable environmental pollution.
- 2) **Hot air oven** : It is used for objects which cannot tolerate moisture. Mostly used for glassware, oils, powders.

Methods of disinfection:

Destruction of organisms by chemical is used in the following circumstances:

- **Environmental** : Disinfection of excreta, floors, furniture, linen and fabrics.
- **Instruments / Equipments**: Sterilization of heat sensitive objects in contact with patient.
- **Skin and wounds**: Removal of pathogens.
- **Food medication**: Preservation in prevention of spoilage.
- **Water**: Removal of pathogens.
- **Vaccines**: Destruction of organisms or denaturation of toxins.

Chemical sterilization: It is the method used for eye instruments and other delicate instruments.

Points to remember:

- 1) The articles must be clean and free from pus, blood or oil.
- 2) They must be completely immersed in the disinfectant.
- 3) The disinfectant should be of a certain strength and the articles must be in contact with it for a certain length of time.
- 4) After sterilization, articles must be well rinsed in sterile water before use.

Fumigation or gas sterilization:

Total surface exposure to formaldehyde gas under conditions of controlled humidity, temperature and time exposure will destroy all vegetative forms of bacteria, viruses and most of the spores. The best results can be obtained with high concentrations of gas, humidity above 60% and temperature of not less than 18 degree celcius. The exposure time varies one to sixteen hours. The agents that are commonly used for the fumigation are formalin tablets, ethylene oxide liquids etc.

The disadvantages of the gas sterilization are that it has a pungent smell, is irritant to the eyes, skin and mucus membrane.

Ultraviolet light sterilization:

Ultraviolet sterilization is effective for disinfecting working surfaces and air inside the rooms.

Disadvantages:

- 1) Light travels in straight lines and does not penetrate. Only the surface of an object in direct line with ultraviolet source is irradiated. Any bacteria in shadows are unaffected. All surfaces should be exposed to the rays. Ultraviolet rays does not penetrate the liquids.
- 2) Prolonged exposure to the ultraviolet rays causes conjunctival damage. To prevent this, dark glasses should be worn.
- 3) It is also injurious to the skin and tissues.
- 4) It is expensive. The cheapest form of ultraviolet radiation is obtained free from sun. Gama rays have the greatest power of penetration and is used for the sterilization of plastic items such as disposable syringes and catheters which will not withstand heat sterilization and sharp instruments such as hypodermic needles, and scalpel blades. The greatest advantage of this method is that the articles can be packed before sterilization in individual sealed plastic packs or aluminium foils which avoids any handling and possible recontamination after sterilization.

Principles of disinfection:

- Only objects which cannot be heat treated.
- It is important to remove grease and proteins before use.
- Dilution of concentration should be accurately measured.
- Dilutions should be made aseptically.
- Disinfectants should be appropriately chosen for their purpose, cost antimicrobial range, toxicity and corrosiveness.
- Disinfectants for general cleaning are a waste of money.

Types of chemicals:

A) Alkylating agents:

They are capable of killing bacteria, spores and viruses. They are the acceptable chemical alternative to usual heat treatment.

They include:

- 1) **Formaldehyde** : used for instruments and machines sterilization.
- 2) **Gluteraldehyde** : used for instrument sterilization.
- 3) **Ethylene oxide** : used for rubber and plastics articles sterilization.
- 4) **Propiolactone** : Used for gaseous sterilization.

B) Phenols:

It includes acids and semi-synthetic compounds in soap solution. It is somewhat toxic with a unpleasant smell. It is used for general purpose disinfectants for contaminated surfaces. It has no activity on spores.

Advantages of disinfection: This is the method used to sterilize the articles that are destroyed by heat and the metallic objects prone to corrosion. This is the most easy method of disinfecting articles.

Disadvantages: This method does not ensure sterilisation, because the disinfectants does not destroy the spores. Some disinfectants are injurious to the skin and articles.

Important points to remember:

- 1) The disinfectant chosen should be efficient to destroy pathogens.
- 2) They should be used in correct strength.
- 3) The articles should be fully submerged in it.
- 4) They are placed for a sufficient length of time.
- 5) They should not be injurious to the skin and articles.
- 6) The article should be thoroughly cleansed to remove the organic material which will protect the bacteria against the action of disinfectants.
- 7) The disinfectant should be inexpensive.
- 8) Instruments soaked in germicides must be adequately rinsed with sterile water before being used.

HANDLING OF STERILE ARTICLES:

- 1) Always wear a mask when handling sterile articles.
- 2) Sterilized articles must be kept in containers or on sterile towels, and kept covered till used. Never allow contact of unsterile with sterile articles.
- 3) Make sure there is no dampness. As this could make the things unsterile.
- 4) Never allow any unsterile article including the arms and hands, to pass over a sterile field.
- 5) Never touch the inside of a package or container with your fingers. Use the sterile forceps.
- 6) To pull a cork from a bottle of sterile fluid, take care not to contaminate the inside part of the cork nor inside the rim of the inner side up, and then replace it without delay.
- 7) When lifting a cover from a sterile container, lay it down with the inner side up, then replace it without delay.
- 8) To carry a sterile bowl or other container, hold it with your hands underneath, and do not touch the rim.

Rules for use of sterile forceps:

- 1) The sterile jar holding the forceps must be cleaned, re-sterilized and filled with fresh antiseptic lotion daily. The sterile forceps should be cleaned and autoclaved or boiled.
- 2) When in use, keep the forceps at elbow level and pointed downwards, because if you lift it upwards the solution may run on to your hand and then back to the forceps, making it unsterile.
- 3) Put the forceps back into the jar immediately after use. Replace carefully without touching the rim of the jar. If the forceps becomes contaminated in any way, it must be re-sterilized before being put back into the jar.

Preparing articles for sterilization:

A convenient method often used to be prepared with sets of the instruments, swabs, sponges, dressings, towels and sutures needed for each type of operation or sterile procedure. These sets are packed into drums, bundles, or on trays, labeled and kept ready for sterilization. The articles should be carefully arranged so that those needed first are on top. They must be loosely packed for steam to penetrate. Drums must have the perforations opened. Bundles should have a double wrapper or close woven cloth or of paper.

Dressings, swabs and sponges are usually made of several thicknesses of surgical gauze. Raw edges must be folded in. swabs and dressings are again folded to the desired size. Sponges used for abdominal surgery need to be large, stitched around the edges and a piece of tape sewed to one corner. When an artery forceps is clipped to the end of the tape, there is no risk of the sponge being left inside the abdomen.

Packing gauze is made in various sizes. Use gauze four times the width of the desired packing. Fold the edges so that they meet in the middle, and again fold down the centre, and roll.

Cotton wool is prepared in various ways. Cotton balls of various sizes are prepared by rolling between the palms. Some may be needed for internal surgery, and for this the cotton ball must be covered with gauze and tied. This type of swab is grasped with a long handled forceps. Cotton squares of various sizes are to be cut for use in dressing wounds. Some may require to be covered with gauze.

Instruments: Surgical instruments should be washed first in cold water, then in warm water with a detergent after use. Use a brush to clean well especially between the teeth of artery forceps and clamps. To be properly sterilized, there should be no trace of dried blood or discharge. Rinse in clean water, then boil for 5 minutes and dry well.

Sharp instruments, knives and needles should be dealt with separately, taking care to avoid cuts and puncture wounds.

Syringes and needles: As soon as possible after use, draw up some water into the syringe and push enough through each needle to make sure they are not blocked. Infected syringes (used for withdrawing blood or pus) should be washed immediately in a cold disinfectant solution. Next wash the syringes and needles in warm soapy water, using a bottle brush for the barrel. Rinse in clean water. Take care not to get barrels and plungers mixed. But keep them always paired together.

Needles should be examined carefully for sharpness. The tips may be rubbed carefully on a sharpening stone. Take care not to prick your finger as infection may be transmitted in this way.

Rubber tubing after use should be cleaned with cold water, then with hot soapy water. Then rinsed. The inside must be thoroughly clean. Then it is boiled, and hung over a rail to drain. Put away loosely coiled, to avoid kinking. Rubber catheters should be cleaned by running cold water, boil for 5 minutes, then dry, with a towel or by hanging up.

BIOMEDICAL WASTE MANAGEMENT

Biomedical waste is the waste, which is generated by hospital, nursing homes, Clinic, dispensaries, veterinary institution, animal house. Pathological laboratory and blood bank and is not degradable.

Classification of waste:

1) General waste:

- a) General sweeping.
- b) Kitchen waste
- c) Packing material.
- d) Paper pieces.
- e) Waste from laundry, kitchen, wards and laboratory.

2) Infectious waste:

- a) Human anatomical waste (human tissue, organ and body parts).
- b) Microbiology and microtechnology waste (waste from Laboratory cultures, stocks or specimens of micro organisms lie or attenuated vaccines, human and animal cell culture used in research and industrial laboratories , waste from production of biological, toxins, dishes, and devices used for transfer of cultures.
- c) Solid waste (items contaminated with blood and body fluids including cotton, ressing, soiled plaster casts, linen, beddings, other materials contaminated).

3) Sharps:

- a) Hypodermic needles, stitching needles, needles attached with tubing.
- b) Scalpel blades, razors, nails etc.
- c) Broken glass materials, syringes, blood vials, edges of slides and cover slips in contact with infectious agents.

Segregation, packing, transporting:

- 1) Biomedical waste shall not be mixed with other wastes.
- 2) Bio medical waste shall be segregate into containers/ bags at the point of generation prior to its storage, transportation, treatment and disposal. The containers shall be labeled.
- 3) Notwithstanding anything contained in the motor vehicles act, 1988, or rules there under, untreated bio medical waste shall be transported only in such vehicle as may be authorized for the purpose by the competent authority as specified by the government.
- 4) No untreated bio medical waste shall be kept stored beyond a period of 48 hours: provides that if for any reason it becomes necessary to store the waste beyond such period, the authorized person must take permission of the prescribing authority and take measures to ensure that the waste does not adversely affect human health and the environment.

Measures to minimize health risk due to medial waste:

- 1) Use appropriate protecting clothing like apron, thick layer gloves, long boot with thick sole, face masks, eye glasses when required, with arrangement of disinfection and disposal arrangement for staff handling hospital waste.
- 2) Popularize use of color and emblem code on container bags.
- 3) Introduce monitoring and surveillance for problem areas or high risk areas.
- 4) Constitute a Hospital Acquired Infection control committee.
- 5) Incinerator.
- 6) Conforms to pollution control board norms.
- 7) Built in safety.
- 8) Easy to operate and maintain.
- 9) Minimum site work.
- 10) Shredder for plastic materials (plastic, bottles, syringes, IV sets etc) cuts plastic waste into small pieces of 1 cm size chips thus ensuring that syringes, and other plastic material are rendered nonrecyclable.
- 11) Segregation of waste from Hospital kitchen, canteen and house s inside the hospital premises is collected from house to house and transported to vermicomposting site.

Categories of bio medical waste:

| Category No.I | Human anatomical waste |
|----------------------|---|
| Waste | Human tissue Human organs Human body parts, |
| Treatment & disposal | Incineration/ Deep Burial. |
| Colour coding | Yellow. |
| Container | Plastic bag. |

| | |
|------------------------|--|
| Category No.II | Animal waste |
| Waste | Animal tissues, organs, body parts carcasses bleeding parts, fluid blood, experimental used in Research, waste generated by veterinary, hospitals colleges, Discharge from hospitals, Animal house. |
| Treatment & disposal | Incineration/ Deep Burial. |
| Colour coding | Yellow. |
| Container | Plastic Bag |
| Category No.III | Microbiology & Biotechnology |
| Waste | Waste from laboratory culture, stocks or specimens of microorganisms, live or attenuated vaccines human and animal cell culture used in research and infectious agents from research and industrial laboratories, waste from production of biological, toxins, dishes and devices used for transfer of cultures. |
| Treatment & disposal | Local Autoclaving/Microwaving/Incineration |
| Colour coding | Yellow/Red |
| Container | Plastic Bag/ Disinfected container |
| Category No. IV | Waste Sharps |
| Waste | Needles, syringers, scalpels, blades, glass, etc that may cause puncture and cuts. This include both used and unused sharps. |
| Treatment & disposal | Disinfection -Chemical treatment with 1% hypochlorite solution/ local autoclaving/ shredding. |
| Colour coding | Blue / White translucent |
| Container | Plastic Bag/ Puncture proof container |
| Category No.V | Discarded Medicines and Cytotoxic Drugs |
| Waste | Waste comprising of outdated contaminated and discarded Medicines. |
| Treatment & disposal | Incineration/ destruction and drugs disposal in secured landfills |
| Colour coding | Black |
| Container | Plastic Bag |
| Category No.VI | Solid Waste |
| Waste | Items contaminated with blood and body fluids including cotton, dressings, soiled plastercasts, linen, beddings, other material contaminated with blood. |
| Treatment & disposal | Incineration autoclaving/ microwaving |
| Colour coding | Yellow/Red |
| Container | Plastic Bag/ Disinfected container |

| | |
|-------------------------|---|
| Category No.VII | Solid Waste |
| Waste | Waste generated from disposable items other than the waste sharps such as tubings, catheters, intravenous sets etc. |
| Treatment & disposal | Disinfection by chemical treatment with 1% hypochlorite solution autoclaving/microwaving and multilation/ shredding. |
| Colour coding | Red |
| Container | Plastic Bag/ Disinfected container |
| Category No.VIII | Liquid Waste |
| Waste | Waste generated from laboratory and washing cleaning, house-keeping and disinfecting activities. |
| Treatment & disposal | Disinfection by chemical treatment with 1% hypochlorite solution and discharge into drains. |
| Category No.IX | Incineration Ash |
| Waste | Ash from incineration of any bio-medical waste |
| Treatment & disposal | Disposal in municipal landfill |
| Color Coding | Black |
| Container | Plastic Bag |
| Category No.X | Chemical Waste |
| Waste | Chemical used in production in biologicals, chemicals used in disinfection, as insecticides, etc. |
| Treatment & disposal | Chemical treatment with 1% hypochlorite solution and discharge into drains for liquids and secured landfill for solids. |
| Color Coding | Black for solids |
| Container | Plastic Bag |

Summary:

Nurses are the persons who have frequent contact with the patients to provide care for 24hours. It is the responsibility of the nurse to be aware of the patients at risk of developing infectious and also a duty to protect them with aseptic techniques.

- Asepsis is the practice to reduce or eliminate contaminants (such as bacteria, viruses, fungi and parasites) from entering the operative field is surgery or medicine to prevent infection.
- Three things that are extremely important is achieving asepsis are the reduction of time, trauma and trash.
- The two types of aseptic techniques the nurse practices are medical and surgical asepsis.
- Medical asepsis is a clean technique which includes procedure used to reduce the microorganisms and prevent their spread. (e.g.) changing patient's bed linen daily, hand washing.

- It is a sterile technique which procedures used to eliminate the micro organisms. Sterile technique is used where sterile instruments are used (e.g.) in operation theatre.
- Disinfection is the destruction usually by chemicals of pathogenic organisms not including bacterial spores.
- The three main methods of sterilization are heat, chemicals, irradiation, and filtration.
- The methods of disinfection are environmental, equipments, skin and wound, food medication, water, and vaccine.
- The types of chemicals used for disinfection are alkylating agents and phenol.

Questions

Part A — ANSWER IN ONE OR TWO WORDS: (One mark)

- 1) What is the sterile technique used to eliminate micro organism?
- 2) What is used for gaseous sterilization?
- 3) Which method is used to sterilize instrument and machines?
- 4) Which method is used to dispose dressings, laboratory media and human tissues?
- 5) What is the pressure maintained in the autoclave?

PART B — MULTIPLE CHOICE QUESTIONS: (One mark)

- 1) The technique which includes procedures used to reduce the microorganisms and prevent their spread is
 - a) medical asepsis
 - b) surgical asepsis
 - c) sterilization
 - d) disinfection
- 2) The basic technique for infection control is
 - a) Wearing mask
 - b) wearing gloves
 - c) wearing gowns
 - d) hand washing.
- 3) To prevent soiling of the nurses clothing by the patients blood and body fluids by wearing
 - a) mask
 - b) gloves
 - c) gown
 - d) all of the above.
- 4) The destruction of microorganism by chemicals is
 - a) medical asepsis
 - b) surgical asepsis
 - c) sterilization
 - d) disinfection
- 5) Exposure of heat resistant materials to steam under increased pressure is
 - a) autoclaving
 - b) filtration
 - c) steaming
 - d) dry heat
- 6) A sterile technique is eliminate the micro organisms in operation theatres is known as
 - a) Medical asepsis
 - b) surgical asepsis
 - c) disinfection
 - d) none of the above
- 7) From inhaling large particles aerosols prevents by
 - a) Gown
 - b) Mask
 - c) Aprons
 - d) Gloves

- 8) Enamel and clear wares are sterilized by the method of
a) Tyndallisation b) chemicals c) boiling d) radiation
- 9) The desired temperature for autoclaving is
a) 121°C b) 112°C c) 100°C d) 125°C
- 10) The effective sterilization for disinfecting working surfaces and air inside the room
a) Chemical b) Ultra violet light c) Incineration d) none of the above
- 11) The instruments and machines for sterilization the chemicals used
a) Gluteraldehyde b) Propiolactone c) Ethylene oxide d) Formaldehyde
- 12) Which is not the general waste in the following items.
a) packing material b) kitchen waste c) solid waste d) proper pieces
- 13) The colour coding for disposing sharps and glasses is
a) yellow b) red c) blue d) black
- 14) The types of chemicals used for disinfection are
a) alkalizing agents b) Phenol c) both d) none of the above
- 15) The tubing's, catheter & IV sets can be disposed in the following colour containers
a) yellow b) black c) red d) blue

PART C — WRITE SHORT NOTES ON: (5 Marks)

- 1) Principles of asepsis.
- 2) Principles of surgical asepsis.
- 3) Principles of disinfection.
- 4) Use of gloves;
- 5) Guidelines for maintaining medical asepsis.

PART D — WRITE IN DETAIL: (10 Marks)

- 1) Explain about disinfection?
- 2) Describe about medical asepsis?

PART E — WRITE ESSAY: (20 Marks)

- 1) Sterilization and disinfection.
- 2) Medical and surgical asepsis.

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7. FIRST AID

DEFINITION OF FIRST AID

First Aid is the initial assistance or treatment given to some one who is injured or suddenly taken ill.

Aims of first aid: First aid treatment is given to a casualty: (1) To preserve life.(2)To prevent worsening of the condition(3)To promote recovery

RULES AND PRINCIPLES OF FIRST AID

(1) Get to the scene quickly, to help in saving life. (2) If the cause of the accident is still there, remove it or the casualty from danger.(3) Be calm, Methodical and quick but gentle in handling the casualty .(4) As far as possible keep the casualty where he is until everything is ready for transporting him,(5) Look for the following and treat this first (a) Failure of Breathing.(b) Bleeding. (c) Unconsciousness.(6) Reassure the casualty and others present to reduce shock, (7) See that the casualty is in best position to aid recovery,(8) Clear the cloud tactfully. The casualty needs fresh air. Any other first aider present may help you. Get help also to call the police, direct traffic etc as needed.(9) Diagnose injuries and give first aid that is essential. Make use of available first aid equipments. If there is none, improvise the material at hand.(10) Arrange for medical aid as soon as possible, for careful transport, and for informing relatives. (11) Stay with the casualty, continuing to observe and give care until handing over to the doctor. (12) Do not attempt too much: do the minimum first aid so that the conditions does not become worse and life can be saved. (13) Do not remove clothing unnecessarily, as this may add to shock. (14) Do not give anything by mouth to a casualty who is unconscious, who may have an internal injury or who may soon be given an anaesthesia.

FIRST AID IN EMERGENCY SITUATIONS

FIRE

Rapid and clear thinking at a fire is vital. Fire spreads very quickly so your first priority is to warn any people at risk. If in a building, activate the nearest fire alarm. You should also alert the emergency services at once. Panic spreads fast among people trapped in fire. Encourage the people to evacuate the area. Do not delay or re-enter a burning building to collect personal possessions. Ignition (an electric spark or naked flame) a source of fuel/petrol, wood or fabric) and oxygen (air)

Clothing on Fire: Always follow this procedure: (1) Stop, drop and Roll (2) Stop the casualty panicking, running around or going outside. (3) If possible, wrap the casualty tightly in a coat, curtain, blanket or heavy fabric. (4) Roll the casualty along the ground until the flames have been smothered. (5) If water is available cool the burn with the liquid.

BURNS

Skin plays key roles in protecting the body from injury, infection and in maintaining body temperature. The skin consists of two layers. The outer layer (epidermis) and the inner layer (dermis) and fatty tissue (Subcutaneous fat) the epidermis is protected by an oily substance called sebum secreted from sebaceous glands which keeps the skin supple and water proof.

The dermis contains the blood vessels, nerves, muscles sebaceous glands, sweat glands, hair follicles Ends of the sensory nerves (sensations like heat, cold, touch, pain) Blood vessels supply nutrients and regulates the body temperature.

Depth of burns: Burns are classified according to the depth of the skin damage. There are 3 depths.

Superficial : Only epidermis (eg) Sunburn

Partial thickness : Destroys epidermis, Pain, Blister formation

Full thickness : No pain sensation, skin scared. Need urgent medical attention.

Assessing a Burn

| <i>Types of Burn</i> | <i>Causes of the burn</i> |
|----------------------|---|
| Dry burn | Flames, contact with hot objects |
| Scald | Steam, Hot liquids |
| Electrical Burn | High Voltage currents over head cables lighting strikes Frost bite |
| Cold injury | Frost bite |
| Chemical burn | Industrial chemicals, inhaled fumes and corrosive gases, chemical agents |
| Radiation burns | Sun burn, over exposure to ultra – violet rays, Expose to radio active sources. |

Assess for: Pain, difficulty in breathing, signs of shock

Aims: (1) To stop the burning and relieve pain (2) To maintain an open airway(3)To minimize the risk of infection (4) To arrange urgent removal to hospital (5) Principles to be followed stop, drop and roll (6) Help the casualty to lie down (7) Continue cooling the affected area (8) Cover the injured area with sterile/clean cloth to protect from infection. (9) Monitor the vital signs - level of response. (10) Do not break the blisters.(11) Do not apply ointments leads to infection. (12) While waiting for help to arrive, reassure the casualty and see for shock.

Electrical Burn: Burns may occur when electricity passes through the body. Burns may be caused by a lightning strike by high-low voltage electric current. An electric shock can also cause cardiac arrest. If the casualty is unconscious, make sure that the casualty is in safe area, open the casualty's airway and check for breathing and do C.P.R. Do not approach the casualty of high voltage electricity until the current has been switched off and isolated.

Chemical Burns :Most corrosive, strong chemicals are in industry. Chemical burns are always serious and casualty needs urgent hospital treatment.Never attempt to neutralise acid or alkali burns unless trained to do.Chemical burn to the eye, first aider is to wash out the eye so that the chemical is diluted and dispersed.Do not allow the casualty to touch the injured eye or forcibly remove the contact lens.

Sun burn: Caused by over exposure to sun.Reddened skin, pain and blistering. If there is extensive blistering seek medical advice.

Heat Exhaustion : Caused by loss of salt and water from the body through excessive sweating. Complaints of headache, dizziness, confusion loss of appetite and nausea, sweating with pale and clammy skin, cramps in the arm, legs and abdomen, Rapid pulse and breathing. Help the casualty to a cool place. Give him plenty of water, weak salt solution. Monitor the vital signs. Be prepared to give CPR if necessary. Transfer the casualty if necessary.

Heat Stroke: This condition is caused by failure of body temperature regulation in the brain. Usually due to high fever or prolonged exposure to heat. Head ache, dizziness, discomfort, restless ness, Hot & flushed, dry skin, bounding pulse, high temperature above 104° F (40°C).

Management: (1) Quickly remove the casualty to a cool place wrap the casualty in a cold, wet sheet until the temperature comes down to 100°F or give cold sponge. (2) Monitor and record the vital signs. (3) If the casualty becomes unconscious prepared to give CPR. If the casualty is breathing normally place him in a recovery position.

FRACTURES

A fracture is a break in continuity of a bone, this may vary from a crack to a Complete break.

Causes of Fractures: **Direct Force:** A bone can be fractured at the point where the force of a blow is applied. **Indirect force:** The bone breaks away from the spot of application of force (eg.) fracture of the clavicle with out a stretched hand while falling open and closed fractures.

In an open fracture, one of the broken bone ends may pierce the skin surface or there may be a wound at the fracture site. An open fracture carries a high risk of infection. In closed fracture, the skin above the fracture is intact. However bones may be displaced causes damage to the internal organs. May cause bleeding (internal) and suffer shock.

Types of Fractures:

Green stick fractures: Closed fracture mostly it occurs in children..

Complicated fractures: They occur when the jagged ends of the bone fragments damage blood vessels, nerves or a joint, broken bones in the chest may penetrate the lung, heart or liver. In fractures of the skull the brain is usually damaged.

Depressed fractures: These occur in the skull when the broken ends of the bones are pressed inwards.

Communated Fractures:In these cases, the bone is broken into several fragments. This is serious because there will be muscle damage with more bleeding at the fracture site.

Impacted Fractures : After a heavy fall, the fracture may be impacted by the force, (eg.) Spinal injury falling from tree.

Pathological Fractures: These occur when the bone is weakened by loss of calcium, infection or cancer. Minimal cause a break in such cases. In old age the bones are more brittle, and may break spontaneously due to calcium loss which is part of the ageing process.

Stress Fractures:Stress caused by repeated minor trauma as in athletic training. Involved in strenuous training, such as jogging or marathon running.

Management: (1) Advise the casualty to keep still.(2) Support the injured part for immobilization. Splints can be used for the support of the area.(3) Dressing to be done and do Bandaging to the injured part. (4) Arrange to transport the casualty to hospital as necessary. Treat for shock. (5) Monitor the vital signs.

DROWNING

Drowning is a condition of suffocation which may lead to death, due to airway spasm or water entering into the airway during swimming or when in water.

Drowning is a silent killer. People who are drowned may not be able to call for help because they expend all their energy to breathe or to keep the head over water. Be alert for signs that some one may be in trouble. A swimmer flailing his or her arms. Displaying uneven swimming motions. Lying face down in water. Only the head, showing above water with mouth open.

The drowning sequence: Begins with panic or struggle followed by submersion with breath holding, then water swallowing before passing out, within 3 minutes of being under water, loss of consciousness, within 5 minutes, brain suffers damage, then the heart goes into irregular rhythm before it stops breathing.

Signs: Abdominal distension and vomiting. Bluish or pale skin of the face and lips. Cough with clear or frothy pink sputum. Decreased consciousness or unconsciousness. Laboured or no breathing. Weak or no heart beat.

First Aid: (1) Reaching the victim. (2) Reach from ashore. (3) If you cannot reach a person, wade closer. (4) Throw an object that floats with a line to the victim (throw and tow). (5) Use a boat if one is available. (6) If not use must swim to the person, use a towel/board for him to hold. (7) Stabilize the victim in water. (8) Keep the victims head and body aligned, place one hand in the middle of his back. (9) Your arm directly over the victims head. (10) Place your other hand under the victim's upper arm, near the shoulder. (11) Slowly and carefully rotate the victim over in the water, by lifting the shoulder and rotating it over. (12) Support the victim in neutral position in water and start mouth to mouth ventilation. (13) If in deep water, give the occasional breathe of air while towing the casualty ashore.

Additional Care Measures : (1) When you can place him on a firm surface, check breathing and pulse and continue resuscitation if necessary (2) As soon as the casualty begins breathing, place in recovery position. (3) Keep the casualty warm. (4) If possible, remove wet clothing and dry him off. (5) Cover with spare clothes and/or towels. (6) If needed treat for hypothermia. (7) Arrange removal to the hospital. (8) Transport in a stretcher case, maintaining the treatment position.

HAEMORRHAGE

Haemorrhage or bleeding: is a flow of blood from an artery, vein or capillary.

Types of hemorrhage

Arterial Bleeding: Blood is bright red in colour. It spurts at each contraction.

Venous Bleeding: Blood in dark red in colour. It does not spurt. Steady flow.

Capillary Bleeding : Blood is red in colour. It does not spurt. Slow in flow.

Effects of hemorrhage: The loss of red blood cells causes a lack of oxygen to the tissues of the body. A decrease in blood volume causes decrease in blood pressure. The heart's pumping rate increases to compensate for reduced blood pressure. The force of the heart beat is reduced since there is less blood to pump.

How to recognize external bleeding : Evidence of major external blood loss. Symptoms and signs of shock. Casualty complains of thirst. Blurring vision, fainting, giddiness. Face and lips become pale. Skin feels cold and clammy. Pulse faster and weaker. Restlessness. Breathing shallow (air hunger). Unconsciousness may occur.

Internal Bleeding : Wounds that have penetrated skull. Wound that have penetrated the chest on abdomen. Signs and symptoms of shock. Blood may appear from one of the body orifices like nose, ear, mouth rectum, urethra, vagina.

Management: Control bleeding as soon as possible. Keep the wound clean and dress it to minimize blood loss and prevent infection. Quickly transfer the casualty to hospital.

How to Control Bleeding.

Direct pressure: Place your hand directly over the wound and apply pressure, firm and steady until the bleeding stops. Tie a bandage firmly enough to control bleeding but not so tight to cut off the circulation. Immobilize the injured part. Never replace any dressing once it is applied. If the dressing is soaked, place another dressing and hold both in place with firm pressure.

Elevation: Elevate the bleeding part of the body above the level of the heart so that the flow of blood will slow down in that part and blood clotting take place.

Pressure Points: Applying pressure over the pressure points pressing over the underlying bone pressure points on the arms (brachial pressure point) on the groin (femoral pressure point).

Applying a tourniquet: A standard tourniquet is a piece of web belting about 36" long with a buckle device to hold it tightly in place when applied. This is used to stop bleeding. Care to be taken not to cut off the circulation.

Management: Apply direct pressure over the wound with your fingers and palms, with clean pad/cloth you can ask the casualty to apply direct pressure herself. Elevate and support the injured part above the level of the casualty's heart to reduce blood loss. If you suspect the casualty is going into shock, raise and support her legs so that they are above the level of her heart. Secure the dressing with bandage. Tie it with pressure not too tightly to cut off the circulation. Further bleeding still occurs, put on the another bandage over the previous one. Monitor the vital signs. Watch for the signs for shock. Dial for an ambulance and transport the casualty to hospital till then the first aider should not leave the casualty until taken over by doctor or nurse.

Bleeding from the Nose (Epistaxis) : Bleeding occurs from the blood vessels inside the nostrils. Bleeding coming from Nose is also a sign of fractured skull. Make the casualty to sit with the head bent forward, loosen the tight clothing around the neck. Allow the blood to drain from the nostrils. Ask the casualty to breathe through her mouth and to pinch the soft part of the nostril for 10mts. If the bleeding restarts tell the casualty to reapply pressure. If bleeding follows a head injury, the blood may appear thin and watery. It is a serious sign because it indicates skull fracture. Tell the casualty to pinch her nose. Advise her not to speak, swallow, cough spit because she may disturb the blood clots that have formed in the nose. Give her clean cloth to wipe off the dribbling. Advise the casualty to rest quietly for few hours. Avoid exertion, blowing of nose at least four hours so as to not to disturb the clot. If after 30 mts also bleeding persists or recurs, seek medical aid.

SHOCK

Shock occurs with every accident or sudden illness. The nervous system is affected and later if the condition of shock continues, the circulation of blood gradually fails and the patient dies. Prompt first aid treatment is needed to prevent shock increasing, and to help the patient to recover from the primary shock.

Signs, Symptoms and Treatment of Shock: A shocked person may only feel a little faint, weak and cold. And look pale, or he may collapse with signs and symptoms as follows: (1) He feels faint, weak and giddy. (2) The skin feels cold and damp- there is sweating even in cold weather. (3) Colour is pale and cyanosed (4) He will usually vomit. (5) The pulse is weak and become rapid. (6) He may be restless, mentally confused, and become unconscious in later stages

Treatment:

- 1) Reassure the casualty if he is conscious
- 2) Lay him on his back with the head low. If shock is severe, raise the lower part of the body unless there is injury to the head or chest
- 3) Loosen tight clothing, but do not remove clothing
- 4) If he feels cold, cover him with the blanket, but do not try to warm him by any means
- 5) Offer him a warm sweet drink, e.g. tea or coffee, unless there is internal injury or he is not fully conscious.
- 6) Keep him quiet, and undisturbed, giving only essential first aid treatment for injuries. Avoid causing pain
- 7) If there are severe injuries, or shock increases, get the casualty to the health center or hospital without delay. He urgently needs I.V. fluids

Electrical Shock: If an electrical current or lighting flash passes through a person's body. The effects may be mild or so severe as to cause immediate death. There may be failure of respiration while the heart continues to beat. There may be burns where the body was in contact with a live wire.

Aims of first aid treatment:

- 1) Have the source of electricity switched off
- 2) Check breathing, and give artificial respiration immediately if he is not breathing.
- 3) Treat any burns

BANDAGING AND SPLINTING

Purposes : (1) To secure dressing in position., (2) To form slings for support. (3) To secure pads

Roller Bandages : These bandages are made of cotton, gauze crepe, elastic fabric or linen are wrapped around the injured in spiral turns, figure of eight. To improvise, material may be torn into strips of the required length and width.

| | | |
|-----------------------|--------------------|--------|
| Width required | For finger | 2.5 cm |
| | For head and arm | 6 cm |
| | For the leg, about | 9 cm |
| | For the body | 15 cm |

The bandages should be tightly and evenly rolled.

Rules for Applying Roller Bandages : Face the casualty, except for bandages the head or back of the neck. When bandaging the left limb, hold the roll of bandage in the right hand and vice versa. Apply the outer side of the bandage to the part, and unroll no more than 5 cm at a time. To bandage a limb, work from below upwards, and from inside towards the outside over the front of the limb. See that the bandage is neither too tight nor too loose. Each layer should cover two thirds of the previous layer of bandage. Finish in front, not over the wound, and fix the end with a safety pin, sticking plaster, stitching, or by tearing the end into two tails and tying. The completed bandage should be comfortable, look neat and fulfil its purpose with no restriction of circulation.

Patterns Used in Bandaging

Circular turns, as used for head and trunk.

Simple spiral, for parts of uniform thickness, e.g. fingers, wrist.

Reverse spiral, used on limbs where the thickness of the part varies e.g. forearm, leg

Figure – of – Eight: This may be used on limbs instead of the reverse spiral, also for the hand and foot.

Spica, used for the shoulder, hip and thumb

Divergent spica, for a flexed joint, e.g. elbow, knee, heel

Recurrent, to cover tips of fingers or a stump

Special bandages such as **capeline** for the head, eye bandage, ear and breast bandages.

Choosing the Correct Size : Before applying a roller bandage, check suitable width for the injured area

Applying a Roller Bandage: Keep the roller part of the bandage (Head) upper most as your work (the unrolled part) is called the “tail”. Stand in front of the casualty except in cape line (Head bandaging and eye bandage are applied standing behind the client). Support the part while bandaging. Learn to use both hands equally, changing the bandage hand to hand. Work from below to upwards. Finish off securely with either reef knot, safety pin, bandage clip, adhesive tap. Tucking in the end.

Splinting: Splints can be made out of wood, card board, iron rods used to support the fractured part and for immobilization.

Traingular Bandages: have various use in first aid. To make two bandages, take a 1 metre square piece of strong cotton cloth, cut in across from corner, and hem the edges. The long side is called the ‘base’, and the corner opposite to it the ‘point’, The bandages may be applied opened out or it can be folded into a ‘broad’ or ‘narrow’ bandages. A reef knot is used to tie the ends of the bandage, because it is flat and will not slip. The rule for tying a reef knot is ‘right over left, then left over right’. If you keep this rule you cannot go wrong.

Slings are used to support or limit movement of the upper limb, in cases of injury or inflammation. Three types of slings are used:

Large Arm sling: This is used in cases of simple rib fracture and for fracture of the forearm. When applied, only the finger tips should show, the whole arm being well supported.

Collar and Cuff Sling : This supports the wrist only. With the casualty’s forearm flexed and fingers touching the opposite shoulder, a clove hitch, made from a narrow bandage, is placed round his wrist. The ends of the bandages are taken around the neck and tied in the hollow just above the collar bone, on the injured side.

Triangular Sling : This supports the arm with the hand well raised. It gives relief from pain when used in fracture of the collar bone. First place the open bandage across the chest with the point beyond the elbow and one end over the hand. Tuck the base comfortably under the forearm. Take the end behind the elbow across the back and tie to the first end with the knot just in front of the shoulder, on the uninjured side. Fold in the point and fix the bandage with the safety pin.

Improvised Slings : The lower edge of the casualty's coat or shirt may be turned up and pinned to support the arm, or the hand may be passed inside a buttoned up coat. A muffler, tie or other suitable cloth may be used to support the arm.

Bandage for the Scalp : Place the open bandage on the head with the point at the back. Fold a narrow hem at the base, place it just above the eyebrows, then take the two ends backwards, cross them below the occiput with the point underneath, then back to the forehead where they are tied. Draw the point down and then upwards, and fix it with a safety pin.

EFFECTS OF EXTREME HEAT

People can be identified as high risk in relation to heat and heat related illness. There are 3 types of heat related illness;

- 1) Heat stroke
- 2) Heat Exhaustion
- 3) Heat cramps

HEAT STROKE OR SUN STROKE

This condition is caused by failure of body temperature regulation in the brain. Usually due to high fever or prolonged exposure to heat. Heat stroke may be caused by high temperature in factories or furnaces.

Signs and Symptoms: Headache, dizziness, discomfort, restless ness, Hot & flushed, dry skin, bounding pulse, high temperature above 104⁰ F (40⁰C), rapid unconsciousness

First aid:

- 1) Remove the patient to dry and shady place, loosening his collar, and other tight clothings.
- 2) Rise the head and upper part of the body
- 3) Sprinkle cool water on his body or wrap him in a wet sheet and fan him.
- 4) Keep on taking body temperature every 10 minutes.
- 5) After the body temperature fallen to 102⁰ F wrap him in a dry sheet and keep fan him.
- 6) If the patient is conscious, cool water mixed with salt and glucose for drinking.
- 7) Remove to the hospital

HEAT EXHAUSTION

It is caused by too high temperature in the atmosphere directly by the sun, or due to hard work and confinement in a close, hot atmosphere like factories etc.

Signs & Symptoms:

- 1) Head ache, dizziness, nausea, vomiting, and sometimes abdominal cramps, or cramps in the limbs.
- 2) Face in pale with cold sweat
- 3) Pulse is weak
- 4) Shallow breathing
- 5) Temperature is normal or slightly raised
- 6) Sometimes there is unconsciousness
- 7) There may be a shock
- 8) Loss of appetite

First aid:

- 1) Remove the patient to a cool place
- 2) Place him flat on his back
- 3) Loosen his clothing
- 4) Give him plenty of salted water (1/4 litre every ½ hourly)
- 5) Observe the patient

HEAT CRAMPS

These are intermittent, painful contractions of skeletal muscles. These cramps occur because the fluid lost in sweat by drinking water but doesn't replace sodium. Sodium depletion is responsible for the cramps. Heat cramps usually occur in muscles that have been involved in a strenuous activity. Body temperature is normal and the serum sodium may be normal or low.

First aid:

- 1) Replace the sodium with salt tablets or an electrolyte solution
- 2) Adding salt in the diet will prevent heat cramps

Points to prevent heat injury:

- 1) Limiting the strenuous activities in the hot weather
- 2) Stay indoors and wear a minimum of clothing's during heat waves.
- 3) When temperatures are unusually high outdoor activities should be cancelled.
- 4) Wear clothes that are loose fitting, light in colour and cover the body as much as possible when outdoors
- 5) Loose weight if you are obese
- 6) Avoid heavy exercise
- 7) Use measures to improve ventilation and reduce heat by shades
- 8) Cooking should be done in early morning or late evening to avoid heating up the house during the hot part of the day

9) Fans and vents over stoves and ovens should be used to help remove heat from the house.

10) Eating more salts, but must be accompanied by an increased amount of fluids.

11) Drink lot of water, even the person with cardio vascular disease who might otherwise be limiting fluids.

Effects of extreme cold: Effects of extreme cold are common in person who live or work in a climate where temperature falls below 32°F or are in high altitudes.

FROST BITE

Frost bites occurs when the body is exposed to extreme cold temperature.(i.e.) ice crystals forming inside the cell can result in permanent circulatory and tissue damage. Body areas susceptible to frost bite are the ear lobes, tip of the nose, fingers and toes.

Signs and symptoms:

- 1) The exposed part becomes cold, painful and ultimately numb
- 2) Colour first is red, then become white which may later lead to gangrene
- 3) Injured area is white, waxy and firm to touch. Patient loses sensation in the affected area.

Nursing action: Gradual warming measures, analgesia, and protection of the injured area.

First aid:

- 1) Remove all wet or tight clothings from the frost bitten area
- 2) Carry the patient to a closed room with out a fire and undress him carefully.
- 3) Remove tight gloves, boots, shocks, rings etc from the body
- 4) Donot rub the frozen part with snow or anything else
- 5) Put him to bed and cover him snugly with a dry cloth.
- 6) Give him warm drinks
- 7) If face or ear is affected, cover the frozen patch with a gloved hand until normal colour and sensation return.
- 8) Sent for a physician immediately

Important points to prevent cold injury:

- 1) Plan activities carefully to minimize exposure
- 2) Dress for the weather
- 3) Avoid vigorous washing of the face
- 4) Saving the beard until after the day's outing
- 5) Apply protective cream to the face prior to exposure
- 6) Wear several layers of loose warm clothing
- 7) Use hand protection. Mittens are generally more effective than gloves
- 8) Avoid alcohol and cigarettes

- 9) Avoid becoming unduly fatigue
- 10) Do not use snow, ice cold water
- 11) If freezing occurs, avoid thawing the part until refreezing is eliminated as a threat.

BITES AND STINGS

Bites from sharp, pointed teeth cause deep puncture, wounds that carry germs into the tissues.

Snake Bite: Commonly two types of snakes are found in our country.

- 1) Colubrine
- 2) Viper

All snakes are not poisonous. Identification of the snake is important to enable to give appropriate treatment to be given. If the snake has been killed it should be taken with the causality to the hospital most of the people die from fear.

Signs and Symptoms

- 1) A pair of puncture marks.
- 2) Severe pain, redness, swelling at the site of the bite.
- 3) Drowsiness.
- 4) Dimness of vision.
- 5) Breathing difficulty.
- 6) Unable to speak.
- 7) Increased salivation.
- 8) Convulsions
- 9) Shock.
- 10) Weakness of hands and legs, loss of sensation, watering of mouth, slow respiration and weak pulse.

First aid:

- 1) Help the causality to lie down. Reassure her.
- 2) Wash the wound.
- 3) Slash the wound with knife.
- 4) Immobilize the affected part.
- 5) Treat for shock.
- 6) Resuscitation, if difficulty in breathing.
- 7) Shift the causality to hospital immediately.
- 8) Take the killed snake, if available, for proper management.

Scorpion bites: Generally scorpion can be seen in the moist dark places and in rainy season. Though the scorpions are not seriously poisonous but sometimes persons can become unconscious

Signs & Symptoms:

- 1) Severe burning
- 2) Intolerable increasing pain in the bitten area
- 3) Giddiness
- 4) Vomiting
- 5) Unconsciousness

First aid:

- 1) Patient should make to lie comfortably and soothing cream applied.
- 2) If the patient is unconsciousness, send him to doctor or hospital
- 3) If a big blister is seen after 6-12 hours and it burst by itself, do the dressing with antibiotic cream

Dog Bite: A rabid animal is aggressive, drooling saliva, must be approached with care. The most serious infection risk is rabies, a potentially fatal viral infection of the nervous system. The virus is carried in the saliva of the infected animal. Tetanus is also a potential risk following any animal bite. The dog should be watched for 10 days. If the dog is healthy after this period then there is no danger of rabies.

Symptoms:

- 1) Headache, nausea, vomiting, fever.
- 2) Restlessness, confusion.
- 3) Difficulty in swallowing.
- 4) Foul smelling of the mouth.
- 5) Hydrophobia-Difficulty in drinking water.
- 6) Aerophobia
- 7) Respiratory paralysis.

First aid:

- 1) Thorough washing of the bitten area and wash the wound with soap and water (Detergent solution) for 5-10 minutes.
- 2) Dress the wound with clean sterile gauze or cloth. Apply antibiotic cream
- 3) Shift the causality immediately to the hospital
- 4) The dog should be kept under observation for 10 days

Cat bite: Cats keep roaming around the houses but if they are disturbed and touched they become violent and can attack. It causes two types of wounds

1. On biting with teeth
2. Scratches by the nails

First aid: Wash the wound and apply the dressing properly.

Rat bite: Rats are harm to the humanbeing in different ways.

- 1) The flea found on their body spread a dangerous disease called plague.
- 2) Sometimes they scrap the palm of the hand or foot of sleeping person

Signs and symptoms: Fever

First aid:

- 1) Wound should be washed and dressed properly
- 2) Patient should be sent to the hospital

Bees and Wasp bite:

Insect such as Bee and Wasp the bite is painful rather than dangerous.
Starting pain will be there later mild swelling and redness appears.

Signs & Symptoms:

- 1) Local pain, itching and severe swelling
- 2) Low blood pressure
- 3) Unconsciousness

First aid

- 1) To relieve the pain try to remove the sting with tweezer.
- 2) Treatment of the local area.
- 3) Bee Venom is acid neutralize with ammonia, soda wasp venom is alkaline neutralize with vinegar.
- 4) To relieve pain and swelling apply cold compress.
- 5) Sent the patient to the hospital

Ticks and Mites bites:

Tick is a small insect like bed bug. It is about half or one centimeter long. It has a terrible capacity to stick to the body and keep sucking the blood during this period it spreads germs of certain diseases in the body by which tularaemia, rocky mountain spotted fever.

Signs & Symptoms: Typhus Fever

First aid:

- 1) The tick or mite has bitten and it is stucked should be immediately removed.
- 2) Should be pulled force fully
- 3) Apply burning cigarettes on the dorsal surface.
- 4) Apply oil turpentine or kerosene to remove the tick or mite.
- 5) The wound should be washed with soap and water
- 6) Apply antibiotic cream
- 7) Apply bandage

Spider bite:

There are 2 types of spider. 1. Black spider 2. Tarantula

Black spider is more poisonous. Tarantula is big, hairy and less poisonous.

Signs and Symptoms:

- 1) Redness
- 2) Severe pain
- 3) Local swelling
- 4) Stomach cramps
- 5) Muscle hardness
- 6) The face, legs and hands looks swollen
- 7) Breathlessness and shock

First aid:

- 1) Patient should be made to lie in a comfortable position
- 2) Should be covered with blanket or bed sheet
- 3) A cloth or rope should be tight at a distance from the bitten area. So, the blood is not absorbed in other parts of the body.
- 4) If the patient is conscious, give coffee or tea to drink.
- 5) Bitten area should be clean and bandage
- 6) Sent him to the hospital.

Leech bite:

Leech is generally found in tanks, rivers, moist and muddy places. It sucks quite a large amount of blood.

First aid:

- 1) Apply a burning stick or cigarette on the dorsal surface.
- 2) Wash the wound and apply bandage.

Fish stings:

Two breeds of thorny fish viz sting ray fish and jelly fish and generally harm to the humans by stinging.

Signs & Symptoms: Severe pain

First aid:

- 1) The sting should be taken out by scratching the skin.
- 2) Wash the wound and do the dressing
- 3) Apply cold bandages of ammonia and water to get relief from the burning sensation
- 4) If the pain is severe, get the medical aid.

POISONING

Poison is a substance which is taken into the body in sufficient quantity may cause temporary or permanent damage. They may be consumed, accidentally (by mistake, by Ignorance), for suicidal purpose, intentionally for killing enemies

Routes of Taking Poisons: (1) Eating or drinking poisonous substance by mouth. (2) By inhaling gases, fumes, chemical vapours. (3) By injection into the skin as result of bites (eg.) snake bites, hypodermic injection. (4) Absorption through skin (eg.) poisonous sprays.

Another common type of self poisoning is termed para suicide. A young person who is emotionally distributed may take such as pain killer or sleeping tablets. The object is to obtain attention and to try and solve the emotional problem, rather than to take their life.

Recognition : (1) Depends on the poison. (2) Vomiting, sometimes blood stained. (3) Impaired consciousness. (4) Pain or burning sensation. (5) Empty containers in the area (6) History of ingestion/ Exposure

HOUSE HOLD POISONING

- ◆ Almost every household contains poisonous substances, such as bleach, paint stripper, glue, paraffin, insecticides, pesticides, alcohol, petroleum products, acids, alkalis, sedatives etc.

Dilute or weaken the poisonous substances.

- ◆ Excess water should be given to weakened their concentrated state except acid poisoning.

Taking out poisonous substances by including vomiting:

- ◆ The poisonous substances can be taken out of the body by inducing vomiting. Mixing two tablespoons of salt in one glass of water or two teaspoons of soda bicarb in a glass of water or by mixing one teaspoon of mustard water powder in lukewarm water. If the above substances are not available then lukewarm water alone is also useful.
- ◆ In all cases of poisoning seek the medical help of call the doctor immediately.

Hypnotics:

- ◆ Heroines and badbiturates can lead to sleep, deep coma by which the respiration is slowed down.
- ◆ Take out the poisonous medicines by inducing vomiting or weaken those substances by giving more water to drink.
- ◆ Keep the person awakened who is sleeping with the effect of sleeping pills.

GAS POISONING: It arise with inhalation of poisonous gases such carbon monoxide, carbon di oxide, inflammable gases, steam of ammonia etc.

The effects of these poisonous gases

- 1) Reduce the amount of oxygen inhaled air.
- 2) Affects the oxygen caring capacity of blood
- 3) Damage the mucous membrane of the respiratory tract, not allowing the oxygen absorbed in the blood from the lungs

Signs & Symptoms:

- 1) dizziness
- 2) tightening of chest

- 3) loss of consciousness
- 4) meiosis
- 5) respiratory failure
- 6) falling in blood pressure and pulse
- 7) twitching and convulsion
- 8) asphyxia
- 9) cyanosis
- 10) circulatory collapse

First aid:

- 1) Bring the patient in the open air
- 2) Keep the patient warm under blanket or bedsheet
- 3) If the respiratory process is stop, start giving artificial respiration
- 4) There is no quick improvement, make an arrangement to send him to hospital.

FOOD POISONING:

Food poisoning occurs due to contaminated water, food substances, unboiled and uncleaned vegetables, contaminated kulfi, milk and cream products contains bacterias, it produces toxins.

Signs & Symptoms:

- 1) nasuea and vomiting
- 2) cramping abdominal pains
- 3) diahorrea
- 4) head ache
- 5) fever
- 6) features of shock
- 7) collapse

First aid: The main aim of first aid is to eliminate the poison, give bland fluids such as water, diluted fruit juice or weak tea. The poisonous effect can be weakened by inducing vomiting. But with constant vomiting and diarrhoea, the water and electrolyte balance of the body gets disturbed which results in to the weakness and condition of shock arises, the patient should be sent the doctor and hospital immediately.

Alcohol poisoning: Alcohol (ethanol) is a drug that depresses the activity of the central nervous system. Small quantities generally produce only a slight change of mood.

Dangers of alcohol poisoning:

- ◆ An unconscious casualty is in danger of inhaling and choking on vomit.
- ◆ Hypothermia can occur when exposed to cold.
- ◆ Misdiagnosed.

Signs and symptoms:

- ◆ A strong smell of alcohol
- ◆ Unconsciousness.
- ◆ A flushed and moist face
- ◆ Deep, noisy breathing
- ◆ A full, bounding pulse.

First Aid: If a person is intoxicated with liquor then he should be made to sit and vomit. After this give him strong tea or coffee. If the patient is unconscious and the symptoms of head injury are seen, then arrange to send him to the hospital immediately.

Dhatura poisoning: This poisoning is due to consumption of seeds of tree “dhatura” which may be eaten unknowingly or accidentally or may be due to consumption of belladonna alkaloids containing medicine.

First aid:

- ◆ Keep the patient in cool, dark and silent room and control the severe movements patiently.
- ◆ Vomiting should not be induced in conditions of unconsciousness and cramps.
- ◆ Cold bandages should be applied.
- ◆ Artificial respiration can be given if necessary.

Protective measures

- ◆ Medicine bottles and packets should be clearly labeled and unlabelled bottles should not be used and destroyed.
- ◆ Toxic medicines should be labeled poison and keep it in locked almirah.
- ◆ The label on the bottle should be read before taking the medicine, during measuring the dose and while keeping the bottle back to the place.
- ◆ Cleaning agents should be labeled.
- ◆ To avoid food poisoning food should be prepared with cleanliness and kept covered. adequate cooking and boiling to be done.

Lead poisoning: More industrial workers are exposed to lead, as it is most commonly used metal in industries. Most cases of industrial lead poisoning is due to inhalation of fumes and dust of lead or its compounds.

Symptoms:

Insomnia, headache, mental confusion, metallic taste, stomach burning, constipation followed by diarrhea, convulsions, muscular weakness, skin, cold and cyanotic.

First aid:

- ◆ Keep the person quiet.
- ◆ Gastric lavage with magnesium or sodium sulfate and analgesics for pain. maintain fluid and electrolyte balance.
- ◆ Diazepam for convulsions.
- ◆ Calcium ethylene diaminetetraacetic acid is the specific antidote.
- ◆ Adequate urine flow.
- ◆ Reduce or eliminate exposure to lead.

Mercury poisoning: It occurs in the occupations related to crushing, roasting and condensation of mercury from ore, manufacture of paints, chlorine, caustic soda, paper and pulp.

Symptoms: Tremor, gingivitis, disturbed sleep, burning sensation in mouth, throat. Abdominal pain, nausea and vomiting. Diarrhea and bloody stools. Weak rapid pulse, slow shallow respiration, cold and clammy skin.

First aid:

- ◆ Egg white, milk or flour by mouth.
- ◆ Lavage with activated charcoal.
- ◆ Dimercaprol I.M. pencillamine.
- ◆ Demulcents and analgesics.
- ◆ Treat for shock/ acute renal failure.

Cyanide poisoning: Cyanides are among the most common and most deadly poisons known.

Symptoms: Utter a cry, unconscious, rapid respiration, later slow and gasping. Death usually within 5 minutes.

Smaller doses- acrid taste, choking, anxiety, dizziness, headache and convulsions with frothiness.

First aid:

- ◆ Immediate emesis and gastric lavage no delay. Inhale amyl nitrate immediately 15-30 seconds every 2-3 minutes.
- ◆ I.V sodium nitrite .3g in 10ml of water at rate of 2.5ml-5ml this is being done simultaneously.
- ◆ 25-50ml of sodium thiosulphate 50% to be administered.
- ◆ Artificial respiration.
- ◆ Recumbent position.

Turpentine poisoning: It is derived from various coniferous, pine trees, which yields a volatile oil, as oil turpentine which is used in the preparation of paints, varnishes and in medicine. Turpentine poisoning usually occurs by inhalation.

Symptoms: Warm or burning sensation in the gullet and stomach, followed by cramping, vomiting and diarrhea. weak respiration and pulse. Irritation of urinary tract and CNS.

First aid:

- ◆ Gastric lavage.
- ◆ Soothing drinks and stimulants.
- ◆ Increase fluid intake.

Radiation hazards: Many industries use radium and other radioactive substances and these exposures will lead to various hazards.

Effects of radiation: Acute burns, dermatitis, blood dyscrasias, malignancies, genetic effects, lung cancer, affects the eyes, intense conjunctivitis, keratitis

Prevention:

- ◆ Avoid direct contact.
- ◆ Wear x-ray thick shield during exposure.
- ◆ Monitor film badge or pocket electrometer frequently for every 6 months.
- ◆ Adequate ventilation in working area.
- ◆ Replacement and periodic examination of workers for every 2 months.
- ◆ Pregnant woman should avoid exposure.

Noise induced hearing loss: Every one in industry is concerned about industrial noise and its effect on the hearing in workers. But noise problem is generally a neglected subject.

Hearing conservation programme: The principles involved in HCP are outlined below:

- ◆ Noise survey
- ◆ Audiometry
- ◆ Hazard evaluation
- ◆ Noise reduction
- ◆ Hearing protective devices.

First aid in establishment:

Employers should develop appropriate first-aid arrangement in their undertakings. Regulation and their associated code of practices be evolved which should apply to virtually all people at work and cover first aid regulation.

Employers should prepare a written statement of policy on first- AID, covering employees and bring it to the notice of all concerned.

First – aid room.

Guidance on the requirement of First AID rooms is contained in the Factories Act 1948. This is to provide treatment for minor injuries, ambulance should be there and well equipped first AID box to be there.

Control measures to avoid risk of occupational diseases:

- ◆ Pre employment medical examination
- ◆ Periodical medical examination
- ◆ Change of job assignment
- ◆ Education
- ◆ Use of personal protective appliances where required
- ◆ Substitution
- ◆ Enclosure
- ◆ Employment

- ◆ Monitoring of work environment
- ◆ Adopting engineering control measures
- ◆ Good house keeping and good ventilation.

FOREIGN BODIES

Foreign bodies in the skin: Small foreign bodies (wood splinters, shards of glass) usually cause minor puncture wounds with little or no bleeding. If foreign bodies deeply embedded in a wound is not be removed by a first aided, it may cause further injury.

Splinters: Small splinters of wood, metal or glass in the skin particularly of the hands, feet and knees are common injuries. It should be drawn out by using tweezers.

First aid:

- ◆ Clean area around the splinter with soap and water
- ◆ Sterilize a pair or tweezers by passing them through a flame
- ◆ Grasp the splinter as close to the skin as possible
- ◆ Squeeze the wound to encourage a little bleeding
- ◆ Apply an adhesive dressing “plaster”

Foreign bodies in the eye:

Sand particles, dust, small pieces of glass, coal, emery stone, metal, usually enter the eye as foreign bodies. These particles get situated under the eye lids or eye balls.

Signs & Symptoms:

- 1) Pain and irritation
- 2) Watery eyes
- 3) Photophobia

First aid:

- 1) Try to take out only those foreign bodies which are lying only on the surface area of the eyes.
- 2) In an emergency condition, it becomes necessary to take out foreign bodies then the hand should be washed properly and cotton piece or soft hand kerchief should be made wet with a corner made pointed and then the foreign body should be taken out with a help of pointer end.
- 3) If the foreign body in the middle portion do not try to take it out because this can lead to great harm. The eyes should be closed, padded and then patient should be sent to the hospital.
- 4) The foreign body sometimes comes out when the hairs of the lower eye lid get rubbed with the upper under part of the eye.
- 5) Do not rub the eyes vigorously
- 6) Examine the eyes carefully with soft hands

Foreign bodies in the ear: The cases of foreign bodies in the ear occur generally in children like peas, buttons, seeds, flies, mosquitoes or bed bugs.

First aid:

- 1) Never use pin or piece of wire to take out foreign bodies from the ear.
- 2) Mosquitoes, bed bugs or flies die by putting olive oil or soda bicarb in luke warm water in to the ears.
- 3) Sent the person to hospital.

Foreign bodies in the nose: Certain foreign bodies like pieces of betel nuts, grains or peas and other seeds enter the nose.

First aid:

- 1) Putting olive oil or weather oil in the nose either the foreign body comes out or irritation of the nose subsides
- 2) Do not sneeze force fully
- 3) Sent the person to hospital.

Foreign bodies in the throat: Generally in the throat or upper part of the respiratory tract, some pieces of food, small bones of fish, coins or artificial teeth or other things can enter.

First aid:

- 1) Generally the foreign body not seen in the throat and even if it is seen then do not try to take it out by finger or other measures.
- 2) Bend the person down and by patting on the shoulder the things comes out
- 3) Artificial respiration
- 4) Send the patient to the hospital.

Foreign bodies in the Stomach: The introduction of foreign bodies into the stomach are generally found in the children like buttons, seeds of fruits, coins, safety pins

First aid:

- 1) No immediate risk
- 2) Get eliminated during evacuation
- 3) No need to give laxatives.

CAR ACCIDENT

The situations

- look of victims
- inspect the victims for bleeding, asphyxia or burning car

Prevent further accident.

- put out fire with a rug, soil or sand
- turn off car lights and switch off the igniter
- apply the brakes or blocks the wheels with a bulky object

- set warnings – a red reflector triangle and a white scarf or newspaper along the road up to 200 yards either side of the accident

- at night wear boldly white

The patient: Patient should be protected by supporting neck and jaw with a collar made from a newspaper thickly folded to form a rigid but pliable support about 3 by 12 inches and inserted into a stocking.

Extracting the patient from a buckled car especially if the doors are jammed and if the injuries include fractured spine and limbs. Leave it to the experts of police, ambulance, fire brigade, rescue doctors.

The car first aid kit:

- Kit should be kept in a well closed but easily opened, clearly labeled, metal or plastic box
- Triangular bandages
- Women discarded stockings
- White gauze
- Gamgee tissue (in large pieces 12 inches by 18 inches)
- Cotton elastic or crepe bandages
- Adhesive tape
- Scissors and a rescue blanket

When breaks don't work – what to do

- pump the break pedal
- park means the parking break use it but don't jam it. It can cause a spin
- shift into a lower gear
- side swipe something a guard rail or curb, some bushes, even parked car.

Six things to do before help arrives:

- avoid a second collision. Don't park behind the wreck, or on the opposite side of the road
- Reduce the chance of fire by turning off the ignition
- Assist the injured
- Get the victims out of danger
- Get help. Call the police or ambulance
- Search the area for victims who might have been thrown from the cars involved.

CARDIO PULMONARY RESUSCITATION (CPR)

Resuscitation includes all measures that are applied to revive patients who have stopped breathing suddenly and unexpectedly due to either respiratory or cardiac failure. Cardiac arrest is one of the common causes for cardio respiratory failure.

When a person stops breathing spontaneously, his heart also stops beating. Clinical death occurs. Within 4 to 6 minutes, the cells of the brain, which are sensitive to the paucity of oxygen begin to deteriorate. If the oxygen supply is not restored, the patient suffers irreversible brain damage and biological death occurs.

Cardio – respiratory failure:

The respiratory and cardio-vascular systems are interdependent. The heart consumes more oxygen per minute than any other organ in the body, because it is constantly beating. Consequently, when the lungs stop working, the heart fails. Conversely, the ventilation of the lungs fails soon after the heart stops. This is because the respiratory centre in the medulla oblongata can not function without the continuous supply that is normally transported to it by the cardio vascular system.

Sequence of cardiopulmonary resuscitation:

A – Airway.

B – Breathing.

C – Circulation

General instruction:

- 1) CPR techniques are used in persons whose respirations and circulation of blood have suddenly and unexpectedly stopped.
- 2) The immediate responsibilities of the resuscitator are:
 - To recognize the signs of cardiac arrest.
 - To protect the patient's brain from anoxia.
 - To call for help.
- 3) The CPR must be initiated within 3 to 4 minutes in order to prevent permanent brain damage.
- 4) The CPR techniques should not be discontinued for more than 5 seconds before normal circulation and ventilation of lungs are established.
- 5) Before CPR is attempted in a patient, make sure that the airway is clear.
- 6) Cardiac compressions help to stimulate the circulation.
- 7) The artificial breathing and the cardiac massage should correspond to the normal respiration and pulse rate. The ratio of cardiac compression to ventilation rate is 5:1 i.e 5 cardiac compression to one ventilation. Cardiac compression given at the rate of 60 per minute. Ventilations are given at the rate of 12 per minute.
- 8) When there are two rescuers, both position themselves on either sides of the victims i.e one rescuer does artificial ventilation while the other does external cardiac compressions. The ratio of cardiac compression to ventilation rate is 15:2
- 9) The circulation of blood is initiated with the external cardiac massage because, the pressure exerted on the pliable sternum squeezes the heart against the spine forcing blood out of the heart into aorta.

- 10) Watch for complications that may occur during the cardio – pulmonary resuscitation.
- 11) Discontinue the procedure only when you are sure that the respirations and circulation re re-established.
- 12) Patient’s vital signs are watched constantly over a period of 24 to 48 hours after the cardiac arrest, because of the danger of recurring another cardiac arrest at any time.
- 13) A naso –gastric incubation and aspiration of gastric contents are necessary for a patient with full stomach to prevent vomiting and aspiration of vomitus into the lungs.

Complications:

- 1) Damage to the cervical spine due to hyperextension of the neck.
- 2) Fracture of the rib and xiphoid process.
- 3) Hemopericardium.
- 4) Pneumothorax.
- 5) Intra abdominal hemorrhage.
- 6) Gastric distention of air.
- 7) Aspiration of the vomitus into the lungs.

EMERGENCY KIT

An emergency bag or kit will help you to provide emergency care and treatment in an efficient way. The contents of an emergency bag will vary considerably according to place of practice, proximity of a primary health centre, medical clinic or hospital, your individual preference for practice in a speciality area only; and standing orders for administration of medicines, injections, or any other treatment in an emergency. Some nurses may wish to add or delete items from the list of suggested items given in the following section.

The emergency bag should be a portable one, with compartments and pockets with flaps. Replacement of each item as soon as possible after use is imperative to avoid wasting time looking for items in an emergency. Check the bag regularly replenish when necessary and keep items in the same place.

Emergency Bag Contents

| | Items and Description | Quantity |
|-----------------------|---------------------------|----------|
| For Assessment | Flashlight, (Medical use) | 1 |
| | Tongue spatula | 1 |
| | Thermometer | 1 |
| | Aneroid sphygmomanometer | 1 |
| | Stethoscope | 1 |
| | Gloves, rubber | 1 pair |
| | Small writing pad | 1 |
| | Pen | 1 |

| | Items and Description | Quantity |
|-------------------------------------|--|-----------------|
| For Emergency Care Treatment | Bandages, assorted sizes | 6 |
| | Bandage triangular | 2 |
| | Gauze pads, individually packed, sterile | 6 |
| | Adhesive dressing strips (band-aid) | 1 packet |
| | Cotton tipped applicators | 6 |
| | Cotton wool, small packet | 1 |
| | Adhesive tape | 1 roll |
| | Safety pins, assorted sizes | 1 dozen |
| | Eye pads | 2 |
| | Splints, light wood, plywood | 2 |
| | Bottles, screw-topped, wide mouthed (for specimen) | 2 |
| | Catheters, plastic or rubber, urethral | 2 |
| | Gastric lavage tube, rubber, medium size | 1 |
| | Tourniquet or rubber tubing strip | 1 |
| | Intravenous drip set, disposable type with needle | 1 set |
| | Hypodermic syringe - 2 ml. | 1 |
| | Hypodermic syringe - 5 ml. | 1 |
| | Hypodermic needles No.26, 24, 22 sizes | 4 |
| | File for cutting ampoules | 1 |
| | Pocket knife | 1 |
| | Scalpel | 1 |
| | Scissors blunt tipped | 1 |
| | Scissors sharp pointed | 1 |
| | Forceps, artery clamps | 2 |
| | Forceps, dissecting | 1 |
| | Dextran or Dextrose solution (as intravenous drip starter in non-breakable flask or bag) | 500 ml. |
| | Oral Rehydration power | 2 packets |
| | Tetanus Toxoid 5 ml. vial | 1 vial |
| | Injection Adrenalin 1:1000 1 ml. | 2 ampoules |
| | Injection Pethidine 100 mg in 2 ml. | 1 ampoules |
| | Injection Morphine Sulphate 30 mg in 2 ml. | 1 ampoules |
| | Injection Atropine Sulphate 1 mg in 1 ml. | 1 ampoules |
| | Combined Injection Morphine Sulphate and Atropine Sulphate | 1 ampoules |
| Oral Medications | | |
| Antihistamines eg. | Tablet Avil, Phenergan, Benadryl. | |
| Antispasmodics eg. | Tablet Spasmindon, Belladonna | |
| Antimetics eg. | Tablet Siquil, Stemetil, | |
| Analgesics eg. | Tablet Aspirin, Dispirin, Crocin, Paracetamol, Novalgin | |
| Anti-asthmatics eg. | Tablet Aminophylline, Ephedrine | |
| Antacid eg. | Tablet Aludrox, Gelusil | |

Topical Medications for External Application

| | |
|----------------------------------|-----------|
| Rectified Spirit 30 ml. | 1 bottle. |
| Tincture benzoin 30 ml. | 1 bottle. |
| Tincture Iodine, weak | 1 bottle. |
| Lotion Calamine 30 ml. | 1 bottle |
| Lignocaine/Xylocaine ointment 9% | 1 tube. |

Eye Ointment

| | |
|------------------------------|--------|
| Tetracycline Eye Ointment 1% | 1 tube |
|------------------------------|--------|

Summary:

- 1) First Aid is the initial assistance or treatment given to someone who is injured or suddenly taken ill.
- 2) Do not delay or re enter a burning building to personal possessions
- 3) Burns are according to the depths are superficial, partial thickness, full thickness.
- 4) Chemical burn to the eye, first aider is to wash out the eye so that the chemical is diluted and dispersed
- 5) A fracture is a break in continuity of a bone, this may vary from a crack to a Complete break.
- 6) Poison is a substance which is taken into the body in sufficient quantity may cause temporary or permanent damage.
- 7) Drowning is a condition of suffocation which may lead to death, due to airway spasm or water entering into the airway during swimming or when in water.
- 8) Haemorrhage or bleeding is a flow of blood from an artery, vein or capillary.
- 9) Bandages are made of cotton, gauze crepe, elastic fabric or linen are wrapped around the injured in spiral turns, figure of eight.
- 10) Frost bites occur when the body is exposed to extreme cold temperature.
- 11) Sun burn is Caused by over exposure to sun.
- 12) Heat stroke is caused by failure of body temperature in the brain

QUESTIONS

PART A — MEANING OF THE FOLLOWING TERMS: (One mark)

1. Cold injury.
2. Green stick fracture.
3. Rabies
4. Epistaxis
5. Shoulder spica

PART B — MULTIPLE CHOICE QUESTIONS: (One mark)

- 1) First aid treatment is given to a casualty to
 - a) Preserve life
 - b) Promote health
 - c) Prevent illness
- 2) Scald is caused by
 - a) Hot objects
 - b) Steam
 - c) Flames

- 3) Sun burn is a type of
 a) Superficial b) Partial thickness c) Full thickness
- 4) Loss of salt and water from the body through excessive sweating causes
 a) Heat exhaustion b) Thirst c) Frost bite.
- 5) The bone is broken into several fragments.
 a) Comminuted fracture b) Impacted fracture c) Stress fracture
- 6) Electric shock can cause
 a) Cardiac arrest b) Respiratory arrest c) Hypoxia
- 7) Chemical burn to the eyes
 a) Washout the eyes b) Apply eye drops c) Don't do anything
- 8) Temperature of heatstroke is
 a) Above 104 degree b) Below 100 degree c) 102 to 104 degree
- 9) First aid for fracture
 a) Support the injured part for immobilization
 b) Monitor the vital signs
 c) Above all
- 10) Treatment for Scorpion bite
 a) Apply cold compress and wash with $KMnO_4$
 b) Apply hot compress and wash with $KMnO_4$
 c) Don't apply anything
- 11) The following are the signs and symptoms of heatstroke are except
 a) temperature rises up to 104 degree F or higher
 b) face is pale with cold sweat.
 c) Restlessness and confusion.
 d) Rapid unconsciousness.
- 12) The following are the first aid for the frost bite except
 a) Gradual warming by body heat.
 b) Give warm drinks and cover patient by dry cloth.
 c) Take the patient to the closed room.
 d) Rub the frozen part with snow.

- 13) The main aim of first aid in food poisoning is to
- Eliminate the poison.
 - Avoid their absorption.
 - Make them less harmful.
 - All of the above.
- 14) The vomiting should not be induced in the following poisoning
- Acetyl salicylic acid
 - Arsenic
 - concentrated acid
 - Atropine.
- 15) If the brakes of the car does not work the order of techniques to be used is
- Pump, park, shift, swipe.
 - Park, shift, swipe, pump.
 - Shift, swipe, pump, park.
 - Swipe, pump, park, shift.
- 16) The first aid for the foreign body in the ear are the following except
- use pin or wire to remove
 - use olive oil
 - out soda bicarb in luke warm H₂O & pour into the ear
 - Refer the client to the doctor
- 17) The specific antidote for the lead poisoning
- magnesium sulphate
 - diazepam
 - Sodium sulphate
 - calcium EDT acid
- 18) The common features of gingivitis, tremors with sleep disturbance are seen in
- Mercury poisoning
 - Lead poisoning
 - turpentine poisoning
 - cyanide poisoning
- 19) The signs & symptoms of turpentine poisoning are
- Burning sensations in the stomach
 - Diarrhea & vomiting
 - Weak pulse & shallow respiration
 - all the above
- 20) Employees working in radiation should be monitored for exposure of intervals of
- 9 month
 - 3 month
 - 6 month
 - 4 months

PART C — ANSWER THE FOLLOWING: (5 marks)

- 1) Define first Aid and write aims of first aid.
- 2) What are the types of haemorrhage?
- 3) Types of insects bite?
- 4) Write signs and symptoms of snake bite.
- 5) What are the patterns used in bandages?

PART D — WRITE IN DETAIL: (10 marks)

- 1) Types of burns
- 2) Types of fracture
- 3) Drowning-management
- 4) Rules for applying roller bandage
- 5) Types of sling

PART E — WRITE ESSAY: (20 marks)

- 1) Rules and principles of first aid
- 2) Burns management
- 3) First aid management for poisoning
- 4) Management of bleeding
- 5) Management of insect bite

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8. HOSPITAL HOUSE KEEPING

A well managed house keeping department can reduce the cost of hospital operation considerably. If the hospital house keeping is of poor quality, nursing care suffers, nursing education is adversely affected, efficiency is lowered and the morale is impaired.

PRINCIPLES OF GOOD HOUSE KEEPING

- 1) The dusting can be done best by a damp duster or by an oiled cloth. A dry duster scatters the dust.
- 2) Dusting is done after sweeping and not before
- 3) Soap and water are used for cleaning.
- 4) Friction aids in mechanical cleaning. Use brush when cleaning a grooved surface..
- 5) Abrasives are harmful to the painted and polished surface.
- 6) Albuminous materials (e.g., body discharges) are coagulated by the heat. So, it should be removed with cold water.
- 7) Bacteria grow in dark, moist and unclean places
- 8) Exposure to sunlight destroys some bacteria
- 9) Disinfection by chemicals depends upon the cleanliness of the article, the strength of the disinfectant and the length of exposure.
- 10) Effective sterilization depends upon the cleanliness of the articles, the degree of heat and the length of exposure
- 11) Heat, chemicals, abrasives and solvents are harmful to some materials.
- 12) Choosing the correct and the simplest method of cleaning, saves time, material and energy
- 13) Equipment suitable for the purpose for which it is used and in good condition, conveniently located and arranged, saves time material and energy.
- 14) The cleaning articles are stored in a neat and tidy always.

CLEANLINESS AND ORDERLINESS:

Cleanliness and orderliness go hand in hand. Nurses are held responsible for the cleanliness of the wards.

Purpose in cleaning:

- 1) To leave a clean polished surface where possible, so that dirt may not be accumulated.
- 2) To remove all dust, dirt and breeding places of micro – organisms with the least disturbance to the patient.
- 3) To prolong the life of the articles.
- 4) To keep the articles in such a condition that they are ready for use at any time.
5. To maintain the aesthetic factors.

CARE OF RUBBER GOODS:

The rubber goods in common use are mackintosh, hot water bottles, ice caps, ice collars, rubber tubes, catheters, gloves and rubber beds.

Natural and synthetic rubber deteriorate with age, exposure to heat, light, moistures and by chemicals. Rubber good should never be dried by artificial heat, nor by contact with the radiator or stove. It should be free from Greece and acids.

If autoclaving is used, short periods of exposure are recommended (10-15 minutes).

Cleaning of rubber mackintosh:

- 1) Spread the mackintosh on the table or a flat surface and wet with cold water
- 2) Rub the upper surface with soap and water
- 3) Turn the other side rub with soap and water
- 4) If strains are present to be removed.
- 5) For disinfection use lyzol or dettol 1:40
- 6) Hang them on a horizontal cylindrical pole
- 7) Both surfaces absolutely dry powder them.
- 8) Store them flat or rolled, never folded.
- 9) Store them in a dark cool place.

Care of Rubber Gloves:

- 1) It is desired that the wearer of the gloves should wash on their hands just before they are removed.
- 2) After removing from the hands, they are washed with soap and cold water, first on the outside then invert and repeat on the inside.
- 3) Rinse well with water both inside and outside
- 4) Holes and tears are discovered by submerging the glove filled with air in the water. If there holes, separate the gloves.
- 5) Hang them to dry.
- 6) Turn inside out and dry
- 7) When both sides are dry, powdered inside and outside and packed in pairs of the same size.
- 8) Steam under pressure is the best method of sterilizing gloves.

Care of Rubber Tubes:

Catheters vary in size and quality according to the special needs.

Cleaning of rubber tubes:

- 1) After use, wash them under running water
- 2) A small quantity of organic matter may be lodged at the eye end. Remove them using a swap stick
- 3) Clean them with the soap and water

- 4) Wash them again under running water
- 5) Boiled tubes for 5 minutes by putting them in the boiled water.
- 6) Dry it by hanging
- 7) When dried, powdered and store them in air tight container
- 8) Re boil or autoclave them before use.

CARE OF ENAMEL WARE

The articles commonly used are bed pans, urinals, kidney trays, sputum cups, feeding cups and trays.

Care of the bed pans:

- 1) Before emptying the bed pans, inspect the contents. If there are cotton sponges or sanitary pads should be removed by using a forceps.
- 2) Empty the bed pan to a lavatory pan
- 3) Rinse the bed pan with cold water under force
- 4) Wash with soap and warm water using a brush
- 5) To disinfectant the bed pans, soak them in Lysol 1:40
- 6) Bed pans may be placed in direct sun light for few hours
- 7) Keep them dry for the next use on the bed pan track

Care of the urinals:

The urinal should not be left standing for a long time with urine. It should be cleansed and disinfected by using Lysol solution 1:40

Care of the kidney trays:

- 1) Before emptying the kidney tray, inspect the contents. If there are cotton sponges or sanitary pads should be removed by using a forceps.
- 2) Empty the kidney tray to a lavatory pan
- 3) Rinse the kidney tray with cold water under force
- 4) Wash with soap and warm water using a brush
- 5) To disinfectant the kidney tray, soak them in Lysol 1:40
- 6) Kidney tray may be placed in direct sun light for few hours
- 7) Keep them dry for the next use on the kidney tray track

Care of the sputum cups:

Non infectious sputum may be emptied Lavatory pan.

Infectious sputum should be rendered by boiling or disinfection by chemicals or disposed by burning.

CARE OF INSTRUMENTS

Care of sharp instruments: The knives and scissors are the most commonly used sharp instruments. Sharp instruments are sterilized by hot air sterilizer exposing into a temperature of 160 c for an hour. Chemical disinfections can be done by submerging them fully under pure dettol or other disinfectants.

Care of other instruments: Operation theatre instruments should drop into a basin or bucket. Rinse the instruments thoroughly with cold water to remove the blood or other organic matter.

Clean the instruments with sodium carbonate (2 %) and hot water.

Care of glassware: Cleaning of the glass ware should have a hard smooth surface ground glass susceptible to erosion by water or steam. It should be sterilized with dry heat. Glass wares used for the parenteral therapy should be rinsed with freshly distilled water. When the glass goods are sent for autoclaving or boiling, should be adequately padded to prevent braking by rubbing with hard surfaces.

Care of syringes and needles: Syringes are expensive and common item of the glass ware used in the hospital. Rinsing immediately after use to prevent the pistons sticking to the barrels, thus prolonging the life of syringes.

Stuck syringes placed in 25 % of aqueous solutions of glycerine and boiled for 10 minutes.

When cleaning and sterilizing the syringes of the same number should be kept together. Sterilization by hot air is the best method of sterilization of glass syringes.

The important points to remember

- 1) After use cold water is forced through the needle with the syringes
- 2) Again wash it with warm water
- 3) If the needles are blocked wire stillest are used to remove
- 4) Needles are sterilized by 10 – 20 minutes.

Care of the stainless good:

Stainless steel utensils are suitable for almost every other purpose because they are easily cleaned, heat resistant and unbreakable.

CARE OF LINEN

Care of linen is important and expensive item in the hospital.

Rules:

- 1) The linen cup board should be kept in perfect order.
- 2) The cup boards should be locked when not in use.
- 3) Care should be taken to avoid linen being taken home by the patients
- 4) Stock should be checked at regular intervals.
- 5) All items should be used for the purposes for which they were made.
- 6) Torn linen should not be used on the bed but sent for mending
- 7) Soiled linen should not be placed on the floor
- 8) Damp linen should be dried immediately.
- 9) If soiled with urine or motion, these should be rinsed with cold water
- 10) Remove the strain where straining is un avoidable old linen should be used.

- 11) The infected linens should be disinfected first.
- 12) Use mackintosh wherever it is necessary to economize the use of linen.

General instructions for removal of strains from the linens:

- 1) Try whether the strains can be removed with cold water.
- 2) The strains which contains proteins such as blood, excreta, milk, pus from the wound are coagulated by the application of heat
- 3) If the strains contained fatty material, hot water and soak should be used.
- 4) When the strains do not response to the simple methods, bleaching agents may be used such as lemon juice, hydrogen peroxide and bleaching powder.
- 5) Use equal parts of hydrogen peroxide and dilute ammonia and moisture the strain until disappears.

Blood stains: Soak immediately in cold water. when the stains disappear, wash them in warm soapy water. If it is old stain, soak them in a mixture of hydrogen peroxide and ammonia.

For the thick blood stains on the mattress, apply a thick paste of starch and water and allow to stand in the sun. When the paste is dry and discoloured, brush off the stain.

Tea coffee, coco: Linen when it is stained with tea, coffee, and coco, remove it by pouring milk over it. Washing them in cold water or hot water. Sodium carbonate will remove the stains.

Rust marks: Apply salt and lime juice and exposed to sun light

Ink strain: Sprinkle salt and lime juice and lay in the sun to bleach the strain

Care of blankets: These are expensive articles and do not stand washing or steam disinfections without shrinkage. Blankets should be protected by sheets by under and over it.

Blankets are cleaned by dry cleaning to disinfect them by exposing them to sun light. When storing blankets should be carefully protected from moth using naphthalene balls.

Care of mattress and pillows:

Mattress should be brushed at regular and frequent intervals to prevent collection of dust and along the seams. To prevent rusting of the mattress from the wires or springs, use canvass between the mattress and bed sheett. When the patient discharged, mattress should be thoroughly brushed and examine for strains and tears. It should be treated at once. Disinfected by exposing them to sun light. Pillows should be protected from wet with blood and bodily discharges. They should be protected with mackintoshes when they are used for the patients with bleeding, vomiting etc.

CARE OF PATIENTS UNIT

Care of the flooring: Floors are mopped with mops of good quality. Vacuum cleaners may be used. Most of the floors washed with soap and water.

Wooden floors are kept well polished. They are mopped daily. Water should be wiped of immediately.

Cement floors can be cleaned with hot water and weak solution of sodium carbonate.

Mosaic floors cleaned with mild alkaline solution such as soda, soda bi carb etc.

Care of the walls: Cement and marble walls can be cleaned in the same way as the floors.

Painted walls: Never use cleaning solutions that contains a strong alkaline. Painted surface should always be carefully rinsed and dried.

Daily cleaning: The patients unit is swept and mopped twice or thrice a day to keep it clean. The furniture should be moved to collect the dust present under them. After sweeping, all the articles are dusted with damp duster, dampened with disinfectant.

Weekly cleaning: The roof and walls of the wall should be swept each week to remove the cob webs. The ceiling fans are dusted with the damp duster. All the furnitures should be scrubbed, washed and carbolized.

Care of the sanitary annex: Sanitary annex attached to the wards consist of bathing rooms, lavatories, hand washing places, place for washing and storing of bed pans, urinals etc.

Bathing room: The floor should be scrubbed, washed daily to prevent slipping. No water should stagnate in the bathing room

Lavatories: Lavatories pans should be cleaned with vim or sane fresh, using a brush if strains are present, smear a small amount of acid and wash it off. The patients and the relatives should be taught regarding proper use of latrine.

Hand washing place: The drains may become blocked by the refuse thrown into the sinks by the patients. They should be told not to throw in to the sink.

Summary

- Well managed house keeping department can reduce the cost of hospital operation.
- Effective sterilization depends upon the cleanliness of the articles, the degree of heat and the length of exposure.
- Rubber good should never be dried by artificial heat or by contact with the radiator or stove.
- For disinfection of rubber mackintosh use lysol or dettol 1:40 dilution.
- Holes and tears are discovered by submerging the glove filled with air or water.
- Steam under pressure is the best method of sterilizing gloves.
- Cleaning of rubber tubes are boiled for 5 minutes by putting them in the boiled water.
- Sterilization by hot air is the best method of sterilization of glass syringes.
- Needles are sterilized by 10-20 minutes.
- Removal of strains from the linens by using equal parts of hydrogen peroxide and dilute ammonia and moisture the strain until disappears.
- Mosaic floors cleaned with mild alkaline solution such as soda, soda bicarb etc.

QUESTIONS

PART A — ANSWER IN ONE OR TWO WORDS: (One mark)

- 1) State some rubber goods used in hospitals?
- 2) Time period recommended for autoclaving of rubber goods?
- 3) What is the ratio used for disinfection of rubber goods by dettol?
- 4) Which is the best method of sterilizing gloves?
- 5) How to disinfect bedpan?
- 6) Which one is the best method of sterilizing glass syringes?
- 7) What is the time duration to sterilize the needles?
- 8) How to remove the stains from the linen?
- 9) What is used to clean cement floor?
- 10) How to remove rust marks?

PART B — MULTIPLE CHOICE QUESTIONS: (One mark)

- 1) Dusting can be done best by
 - a) Wet Duster
 - b) Dry Duster
 - c) All of the above
 - d) None of the above
- 2) Bacteria grow in
 - a) Clean Places
 - b) Dry Places
 - c) Dark, Moist and uncleaned areas
 - d) Areas exposed to sunlight
- 3) How to identify the holes and tears in the gloves?
 - a) Visual Inspection
 - b) Visual Inspection with good light
 - c) Submerge the glove filled with air in the water
 - d) While wearing
- 4) Sharp instruments are sterilized by hot air sterilizer exposing into temperature at
 - a) Temperature of 160 deg. celcius per hour
 - b) Temperature of 180 deg. celcius per hour
 - c) Temperature of 200 deg. celcius per hour
 - d) Temperature of 220 deg. celcius per hour
- 5) To remove blood stain (thick) from the mattress by means
 - a) Apply a thick paste of starch and water
 - b) Apply lemon juice
 - c) Wash with soap and water
 - d) Wash with hot water

- 6) Blankets should be carefully stored to protect from moth by using
- a) Using Naphthelene balls b) Using insecticides
c) Using camphor d) Using Sandal
- 7) Mosaic floors should be cleaned with
- a) Alkaline solution b) Acidic Solution
c) Water d) Sodium bicarbonate
- 8) Dusting is done by
- a) Before Sweeping b) After Sweeping
c) During Sweeping d) After Mopping
- 9) Exposure to sunlight destroy
- a) Bacteria b) Virus c) Fungi d) Spirochete
- 10) Rubber goods should never be dried by
- a) Artificial Heat b) Natural Heat
c) Air d) Dusting

PART C — WRITE SHORT ANSWERS: (5 marks)

- 1) Explain purpose of cleaning?
- 2) Describe cleaning of rubber mackintosh?
- 3) Enumerate the steps in care of rubber gloves?
- 4) How to care sharp instruments?
- 5) How to clean syringes and needles?

PART D — WRITE IN DETAIL: (10 marks)

- 1) Elicit the good principles of housekeeping?
- 2) Explain the care of good instruments?
- 3) Explain the rules in care of linen?
- 4) Enumerate general instructions for removal of stains from linens?
- 5) Explain the care of patient unit?

PART E — WRITE ESSAY: (20 marks)

- 1) Explain hospital house keeping?
- 2) Explain the care of rubber goods?

