# **PRELIMINARY SECTION**

**1. Course Purpose**

The course is designed to equip the students with knowledge, skills and attitude to enable them manage children suffering from common diseases / conditions and also in growth and development, physical examination, taking history and management of paediatric emergencies.

**2. Learning Outcomes**

At the end of the course the student will be able to:

1. Take the history and carry out a physical examination a child.
2. Discuss growth and development of children.
3. Describe the management of common paediatric conditions.
4. Describe paediatric emergencies and their management.
5. Explain the concept of Integrated Management of Childhood Illnesses (IMCI).
6. Apply nursing processes in the management of children with various systemic conditions.

**3. Course Content:**

Introduction,Paediatric nursing theories-Casey’s model, Ahmann’s theory;factors influencing growth and development; principles and concepts of paediatric nursing;principles of growth and development; nurse’s role;child health assessment:comprehensive history and examination of a paediatric patient, review of normal growth and development of a child, and deviations in these patterns. Effects of socio-cultural factors on child health, The hospitalized child-effects on child, family and community;family centered care,atraumatic care;Impact of illness on family and child, Prevention of illness and accidents in children, Childhood nutrition requirements and related disorders, Homeostasis and metabolic derangements, Child rights, conventions, Adolescent health, Child abuse,child of alcoholic mother and other vulnerable children; Management of common childhood problems, Childhood infections – Bacterial, viral, protocol, fungal, HIV/AIDS, Respiratory problems – asthma, pneumonia, tuberculosis, Cardiovascular disorders; congenital heart disease, pneumatic fever, cardiac failure. CNS disorders, Gastrointestinal problems: - Gastro-enteritis, constipation, Hepatic disorders,structural congenital abnormalities; Heamatological conditions:- Anaemias, sickle cell disease, Bleeding disorders, Leukaemias, Lymphomas childhood solid tumours; Endocrine disorders-diabetes;Genito-urinary disorders- congenital defects:hypospadias, posterior urethral valves, hydronephrosis,nephritic syndrome and others; Musculoskeletal/orthopaedic disorders-club;dermatological disorders;Common genetic disorders; Common paediatric emergencies;paediatric intensive care;genetic counseling;Integrated Management of Childhood Illnesses(IMCI); Emergency Triage Assessment and Treatment(ETAT).Paediatric techniques; diagnostic and therapeutic procedures;Care of terminally ill and end-of-life care.

**4. Reference Materials**

1. Wong,D.L., Hockenberry-Eaton, M., Wilson, D., et al. Nursing Care of Infants and Children; latest edition London Mosby, Inc.
2. Wong’s Essentials of paediatric nursing by Marlyn J.Hockenberry**-2005**
3. Nicki, P. & Barbara, H. M. (2006). *Pediatric Nursing*: *caring for children and their families*. Delmar Publishers. ISBN 10: 1401897118, ISBN 13: 9781401897116.
4. Ball, J. & Bindler, R. (2006). *Clinical Handbook for Pediatric Nursing*. Prentice Hall Inc. ISBN 10: 0131133160, ISBN 13: 9780131133167.
5. Ball, J. W. & Bindler, R. (2006). *Child Health Nursing: Partnering with Children and Families*. Prentice Hall Inc. ISBN 10: 01311133209, ISBN 13: 9780131133204.
6. Kyle, T. (2008). *Essentials of Pediatric Nursing*. Lippincott-Raven Publishers. ISBN 10: 0781751152, ISBN 13: 9780781751155.
7. Behrman, Klieg man, R. Jenso, H (2004) Nelson Textbook of paediatrics 17th edit. Philadelphia. Saunders.
8. WHO.(2005) pocket book of Hospital care for children for the management of common illness: guidelines for the management of common illnesses with limited resources, WHO,WHO press

**5. Learning methods**

The learning will include face to face sessions, there after self- directed where the student is expected to commit him/herself to study. However, the student should find the following learning methods useful in support of the self -study:

* Telephone tutorials with the course lecturer.
* Other consultations with the course lecturer e.g. through emails

**5. Evaluation system**

Final trimester examination 70% of the final score

Continuous assessment tests 20% of the final score

Assignments 10% of the final score

# **CHAPTER ONE: INTRODUCTION TO PEDIATRIC NURSING**

Pediatric is concerned with health of infants, children, & adolescents.

It includes the five stages of development according to Erik Erickson. Thus, Infancy, Toddler, Preschool, School and Adolescent. It focuses on their growth & development to ensure they are given the opportunities to achieve their full potential as adults.

The young are most vulnerable or disadvantaged in society hence need special attention. Children are individuals, not little adults who must be seen as part of the family. Child health needs to be approached from a holistic and family centered approach. There is many challenges to pediatric care in the system: - Costs; Poverty- especially in 3rd world countries. Most causes e.g. morbidity/ mortality in these countries are preventable or easily treatable; Drug abuse & alcohol abuse; Physical, emotional & sexual abuse; and Civil strife – many parts of sub-Saharan Africa. Many contemporary social changes have taken place and these have impacted on children on different ways. Providing paediatric care to children and families requires knowledge of different dynamics that influence it in contemporary society. Examples of such changes include: parenting styles; nature and structure of families; breakdown of traditional family systems; eating habits; Level of activity; information acquisition means ;adoption of western cultures ;technical advancement.

## The child in the context of the family

No other factor in a Childs life has a greater influence than the family ,which is the first and the most important socializing agent in one’s life Successful socialization is the process by which children acquire beliefs ,values and behaviours deemed significant the society, This is a function of parenting and other familial interactions. The family’s organization, structure and function have signicant impact on children during growth and development Nurses caring for children should consider the entire family, rather than just the child, as a client. The Nurse looks at the family from two perspectives: One ,the family is viewed as a context within which the individuals are assessed and managed .the second views is that of a family as a set of interrelated parts which should function harmonously.The assessment is on the whole unit of family as the client rather than as an individual. In either case, the nurse must grasp the interacting aspects of the family, to understand the context within which the individual lives, and to which he or she reacts, or to work with family as a client. Children are members of families, communities, populations and society. This shapes their context, experiences, and opportunities of their lives. Their well-being is inextricably linked to the families, communities & the society they live. Many familial factors impact as children. Divorce; family size, absent fathers, working mothers, sibling position, and sex.

 The nurse should always use different family assessment tools to do a comprehensive family assessment to judge the extent to which the family is meeting its roles in child rearing; based on its stage of development

How the changes have in family: structure, roles among family members, size of family, increased number of divorces/separations impacted on child growth and development?

**Culture and paediatric care**

Culture is defined as learned, shared & interpretive forces that guide human interactions and are transmitted from one generation to the next .There are many cultures of the world that is a complex way interact with paediatric practice. Nurses work in culturally diverse environments which may be great challenge. Culture influences every human endeavour and therefore impact on child rearing patterns .If you work in a diverse (culturally) environment you need to be culturally informed and competent (knowledge & skills needed to transcend cultural boundaries).Culture is more relevant to paediatric nursing because it has a great opportunity to shape an individual’s lifelong perceptions of health care and use of health services. Through children, the health of the population can be changed.

### Cultural Competence

Refers to the acquisition of knowledge and skills needed to transcend cultural boundaries. Some cultures are obvious or marked e.g. Maasai dress others are not. Health care provider may share same culture with patient but health beliefs & behaviours cannot be assumed. The patient’s symptom definition & etiologic explanations can shed a lot of light on cultural belief system. If the care giver and the patient agree on above, then care can be easily formulated, otherwise the caregiver has to give explanations and clarifications to counter any cultural barrier to care. For parents to cooperate in the care of the child, clear clarifications should be given where there is cultural conflict. Some positive cultural practices can also be identified & encouraged e.g. good eating habits .Child rearing practices are diverse depending on the culture.

Nurses need to be aware of their own attitudes and values regarding a way of life and how these influence their attitudes and actions, including health practices. Nurses also ought to be non-judgmental when working with families whose behaviours and attitudes differ from or conflict with their own. This means that for nurses working with families from cultures other than their own, the development of cultural sensitivity is paramount in order to respond accurately and sensitively to their needs and to provide care. Cultural sensitivity means having an awareness and appreciation of cultural influences in health care and being respectiveful of differences in cultural belief systems and values Nurses can be more effective in their work if they adopt a multicultural perspective, which means using appropriate aspects of the family cultural orientation to develop health care interventions Cultural beliefs and practices should be included during assessment. This enables recognition of beliefs and practices that may impede/ facilitate nursing interventions. Nurses should make themselves aware of any specific attitudes regarding the manner of approach to a child in a given culture e.g. the concept of the “evil eye” is common to many cultures throughout the world and serves to explain inexplicable onset of illness in infants/children. Majority culture/ minority culture of the nurse and the patient may bring suspicion because of underlying mistrust e.g. caste system in India, the white Australians and the Aborigines of Australia. Nurses should know the characteristics of the culture/ sub culture of the community in which they practice. They should respect these cultures and work with the community leaders to enhance delivery of healthcare to children.

### PRINCIPLES THAT UNDERPIN PAEDIATRIC NURSING

(a) Care is individualized with high respect for the goals and preferences of each child within the context of his or her family

(b) Each child/family is encouraged to participate in goal setting;

(c) Care is holistic, encompassing physical, emotional, spiritual, mental, sociocultural, genetic, and developmental aspects of each child/family

(d) Care is proactive with attention to prevention of disease and injury through family- centered education, advocacy, and effective communication

(e) Health care is interdisciplinary.

### LEGAL AND ETHICAL ISSUES OF PAEDIATRICS

Nurses are confronted by difficult ethical/ legal decisions especially for nurses taking care of children in critical care conditions e.g. does one resuscitation a child or not? Hence the need to understand some legal/ ethical guidelines that can resolve these dilemmas. Different governments have different legal laws and regulations. Though children have right to informed consent, usually, it’s the legal guardian or parents who take the consent. Children are said to “Assent” i.e. paediatric client has been informed about the procedure and is willing to permit it being performed. However, assent is not legally required but important for child’s cooperation. It may maximize success of procedure and minimize trauma to the child.

## When is informed consent not required?

* Emergency situations – emergency life saving procedure. But should be after attempts have been made to contract parent or legal guardian. Adolescents can consent.
* Forensic examination – where evidence is required .May not requires informed consent but still is vital for child’s assent.

Minors can consent for care in a number of situations

* Where child may avoid care of caregivers were informed e.g. Pregnancy, Drug abuse treatement, contraception, treatement of STIs.
* If minor is considered to be emancipated i.e. legal recognition that a minor lives independently and is legally responsible for his or her own support and decision making.

### Refusal of medical care by parent/Caregiver

Usually, this occurs if health care conflicts parent’s religious beliefs. Parents may refuse to act to the best interest of the child. In such cases, the government may make legal decision of the child. The theory of Parens Patrie is applied. This is a legal rule allowing government to make decision in place of parents when they are unable or unwilling e.g. to provide for the best interest of the child.

Note that the state has an overriding interest in the health and welfare of the child.

Medical neglect is a form of child abuse. The state can also take legal custody**/** guardianship of a child who is in danger.

### Research on children

Appropriate laws, regulations & requirements need to be followed.

One or both parents usually consent to research – based on potential risk vs. benefit to the child .Nurse are advocates of the study participants(children) hence need to ensure that their rights are not violated.

### Confidentiality

Also vital for paediatric care especially for: STI; contraception, Mental healthcare, Drug abuse & alcoholism, HIV testing

### Breaching confidentiality

This can be done in a number of situations. Thus:

* Reporting child abuse
* Mandatory injury by criminal act or weapon.
* Reporting infectious (notifiable) diseases to the local public health department
* When there is duty to warn 3rd party. The duty to breach confidentiality by warming a 3rd party is required when there is a specific threat to an identified person e.g. psychiatric case – patient tells a psychiatrist that he shall kill his girl friend but the psychiatrist doesn’t warn the patient’s girlfriend. Then the psychiatrist is guilty of an offence since he had the duty to warn the 3rd party.

#

**Malpractice and negligence**

For court to recognize a claim of malpractice/ negligence, 4 legal elements must be present:

1. There must be a duty to the client by the nurse
2. The nurse must breach that duty
3. The breach of duty must be the cause of the damage/injury
4. There must be actual damage to the client

**Duty: -** Special relationship created when a person agrees to provide care to a client – during that specific time e.g. shift.

**Child safety**: - Is a big concern because children are very vulnerable to accidents/injuries

**Ethics:** Study of the nature and justification of principles that guide human behavior and that are applied when moral problems arise. Knowledge of ethical principles assists the nurse to make decisions when confronted by dilemmas in ethics e.g. justice, informed consent etc.

**Examples of ethical principles influencing healthcare:**

**Autonomy:** Right to freedom and self-determination. Individuals are not interchangeable.

# **Beneficence:** Principle of “doing good” for another. Competent health care is primary goal of nurses e.g. may emphasize child brushing teeth, though refusing & crying.

# **Non maleficence:** Doing no harm to the client or protecting the client from doing harm to self e.g. not leaving paediatric client in acute distress.

**Justice:** Treating client with fairness despite creed, ethnicity etc.

**Veracity**: Telling the truth about healthcare e.g. diagnosis and treatment especially in terminal illness.

**Fidelity**: Keeping ones promise or word e.g. takes a child to playroom at promised time.

**☺? Critical thinking activity/learning activity**

1. What are the provisions in Kenyan law as regards malpractice and negligence?
2. Cases of malpractice and negligence are very common in Kenya. Identify some recent cases and discuss how they were handled. Which of those cases identified involve the nurse?
3. Which professional bodies do protect the patient from malpractice and negligence in Kenya?

### Ethical decision making

Process of thinking through what you ought to do in an orderly systematic manner to provide justification for your actions based on principles.Its is a rational way of resolving ethical dilemmas in nursing practice e.g. allocation of healthcare resources; euthanasia; genetic engineering; abortion ; research involving fetal life; conflict between duties and outcomes e.g. rescucitating a terminally ill ;conflict rights parent and unconconcous child;withholding truth vs. informed consent clients autonomy vs. safety welfare concerns.Its used in situations in which the right decision is not clear or in which there are conflicts of rights and duties. These are part of nursing practice and all situations are unique and should be given due consideration .Each case should be treated with its own merit

### Ethical decision- making process

This a model framework for resolving ethical issues.Its made of the following steps:

1. Collect information about situation
2. State the dilemma
3. List all possible causes of action for resolution
4. Analyze the advantages and disadvantages of each action.
5. Make decision

### PERSPECTIVE ON PAEDIATRIC NURSING

These are concepts which are central in Paediatric Nursing

1. **Family Centred Care: Paediatric** care involves care of children and thier entire family.Family centerd care considers family contributions and involvement in the plan and delivery of child care.It is healthcare delivery model that seeks to fully involve family in the care of children.The concept gained prominence in 1987 when research showed that children cared together with their families responded better than those cared cared with little involvement of their families.

 **Characteristics of family centered care**

* Policy recognition of need for family in child’s life.
* Enhance professional- family collaboration at all levels of care.
* Exchange of unbiased and complete information bewten family and professionals.
* Incorporate into policy recognition of uniqueness of each family in race, education, creed, culture and economic situations.
* Enhance family to family networking – social support especially families of children with chronic illness/ aged caretakers.
* Ensure home, hospital and community child- health services are of high standards.
* Family centerd care empowers the family in relation to their child care.
* The nurse should always look at how the child functions within the family and how this influences his/her health. Gaps/ deficits of care should be notedand addressed.

# **Atraumatic care:** Care that minimizes or eliminates physical or psychological distress for children and other families in the health care environment.Many interns are traumatic, stressful; painful hence the nurse should recognize them and provide care that minimizes them.

**Principles for the basis for atraumatic care**

* Identify stress for child and family
* Minimize separation of child and care givers
* Minimize or prevent pain

Examples of atraumatic interventions include: Prepare child/family before every procedure especially surgery e.g. allow the child to play with equipment,visit the hospital prior to the surgery and reassurance; Involve caregivers to support the child; control pain by administering analgesics freely and provide social support to the family .

1. **Child Oriented Environment**

Play materials provision- Authorities should make available materials for child play. This includes identifying or earmarking a specific playing room within the vicinity of the ward.

Safety-protection – The ward environment should be safe to the children. The infrastructure, equipment and supplies should not cause injuries to the children and the care givers. The child handling practices and procedures should ensure child safety.

Education Friendly Environment – Children who are admitted in the ward should continue with their education whenever possible. This therefore calls for the provision of education materials relevant to every grade/level of education. Other than material provision, there is need for personnel who will be charged with the responsibility of ensuring that the children learn through guidance.

 Child friendly ward – Childrens’ wards should be attractive to the children. This is possible through paintings of the walls to suit childrens’ interest. Staff working in this areas should also put on gowns or uniforms that are attractive to the children. The daily activities like procedures, the interactions should all be child friendly.

Liberal Visit hours – There should be no restrictions on visiting hours so long as they do not interfere with the ward procedures. This is to ensure that children are visited by all the concerned relatives, taking into account their other commitments.

1. **Case Management**

Case management entails that the sick child gets attended to by the various professionals at the same time or within a short span of time. This is important to describe and measure outcomes for a homogenous group of patients.

It improves patient satisfaction since the care of the patient is synchronized and cordianted by the nurse. Other than this case management decreases fragmentation of care, ensure quality of care with minimal costs and prevents duplication of nursing care.

1. **Role of the Paeditaric Nurse**

Nurses provide quality care in all settings e.g. clinics, physician’s offices, home health agencies, rehabilitation centers, hospice programmes, day care centers and schools .the Primary roles of a nurse include: care giver , patient advocacy health education, researcher and manager/ leader .secondary role include: coordinator ,collaborator ,communicator and consultant . There could be more specialized roles depending on training and country.Nurses may also have some advanced practice roles such nurse practitioner, clinical nurse specialist and care manager

**Challenges of paediatric care in the twenty first century.**

There are many challenges facing paediatric care in this 21st century: increasingcost of paediatric care, embracing information technology, lifestyle diseases, and technology-associated health problems e.g. computer addiction among others.

### CHILD AND FAMILY COMMUNICATION

Effective communication among staff, children, their care givers and thier families can lead to enhanced understanding of child’s condition and active participation of family/ caregiver.Effective communication is very basic/ central component to delivering effective care to children and caregivers.Therefore, nurses need to use effective communication skills in every interaction to: enhance cooperation of family and ensure interventions are likely to be optional because of good rapport.

There are two basic modes of communication: Formal/ Informal and Verbal Non-verbal

Formal is an organized communication with particular agenda e.g. health education during discharge. While informal is when one talks without particular agenda/ proticol.

Usually occurs in day-to-day interactions. On the other hand Verbal communication is messages communication through words/ language .lastly, non-verbal communication is conveying feelings, attitudes and intentions.It enables one to decode verbal communication and transcend the literal content of the message.Its more apparent when emotions cause observable body changes.Observe for congruency between verbal and non-verbal communication. If there is a contradiction, the listener usually believes non-verbal message rather than verbal message.

### Nurse, Child and family communication

Nurses’ ability to establish a therapeutic relationship is related to her communication abilities ie ability for therapeutic communication.It’s a vital tool for history taking, physical examination, health education and maintaining adequate rapport with child/ care giver.It is the basic requirement for family or caregiver centred paediatric care.there are certain consideationst that are vital for effective communication: rapport and trust;ust respect ,empathy and Listening .Listening is so important that it requires special further discussion.

**Listening**

It is providing verbal/ Non-verbal clues that communicate interest.It requires actively attending to what is verbalized, observed, and created by entire communication context.Encourages expression of feelings and inputs. It considers developmental level of children and their emotional behaviour .Use developmentally appropriate language

The four Bs for effective listening:

* Be attentive and eliminate distractions
* Be clear about the message, clarify if necessary
* Be emphathetic, convey concerned caring.
* Be open-minded, avoid prejudices.

Provide feedback e.g. by nodding; reflecting back to client what was said; ask questions to clarify; seek validation from the client to ensure one is talking about the same thing and follow one single idea and explore it further. Conflict management -Nurse should strive for win-win approach so that child & caregiver feel in control & can likely adhere to decisions arrived at.Physical boundaries -Nurse creates & maintains them avoid emotional over- involvement and overprotection e.g. exchanging gifts, personal contacts, sharing personal information. Don’t interfere with relationship between care giver and child.Other skills useful in communicating with children include: observation -Observation skills useful for what clients don’t say e.g. eyes, mouth, body movements, posture etc; Silence-interpreted based on context.e.g. Silent caregiver after diagnosis may indicate the client is experiencing shock/ disbelief; Environment -Environment should reduce psychological stresses and should facilitate therapeutic relationship; Humour

Is healing and helps child cope with illness used when communication is feared/ offensive. Enhances therapeutic interactions. Helps child cope with hospitalization and illness. Use appropriate humours during interactions; Play -Puppets, dolls, stuffed animals, drawing pictures, story telling, engage child with play – closer interaction increases trust in nurse.It also helps child relax and shed inhibitions.Developmental stage should be considered for appropriateness for choice of play eg writing and drawing is good for older children. If children write thoughts, feelings, it becomes easier to discuss them later. Evaluation of drawing/ writing enables nurse understands child’s inner self.

### Communication principles based on developmental level

Incorporate knowledge of gender language developmental level critical to this endeavor.

**Infants:** Allow warm up to strangers; Respond to cries timely; Use soothing & calm voice; Talk to infant directly; Crying, cooing, whining, or body movement, face.

**Toddlers:** Approach carefully – not to cause fear; Intergrate familiar objects in care; Use dolls, story telling and picture books in conservation.

**Pre-school:** Allow choices as appropriate; use play, story telling; speak honestly, simple language, concise; Prepare procedure 1-3 hours before.they are done.

**School age**: use books, diagrams, and videos in preparing for procedure.prepare the procedure many days before.Allow the child to express feelings.

**Adolescent**: prepare them one week before the procedure.provide respect and privacy.use appropriate medical terminologies.use creative methods to explain experiences and procedures.The ideal that they construct should be merged with the real world by listening to them.attentiveness, acceptance, and freedom is important for adolescents and should be provided.do not trivialise information they think is important for them.

### Communicating with the caregiver

Explain equipment & procedures thoroughly .Address the question and concerns of caregivers honestly .Teach caregivers what to expect the child will look like and feel like during treatment .Help caregivers to understand the bigger picture that is the long term/ short term effect of treatment e.g. Orchitis.Teach and allow the caregiver to carry out as many aspects of the child’s care as feasible.Make reassurance a part of family interactions, ask caregivers how they are doing as time passes.

### Principals of effective communication in Paediatric settings

* Talk to caregivers if child is shy or appears hesistant.
* Use objects (toys, dolls, stuffed animals) instead of questioning child directly.
* Provide privacy for older child
* Use clear, specific single phrases in confident, quite and unhurried speech.
* Position – eye level.
* Allow expression of thoughts/ feelings.
* Provide honest answers
* Offer choices only if they exist
* Use a variety of age – appropriate methods/ techniques.

**Cultural impact on communication: Cultural** perspective for the family/ children should be considered.Be non-judgemental of any cultural values, belief of children/ family. If care is planned and implemented with a child/ caregiver it should be congruent with their values system.Nurse elicits this information during assessment that may impact on care.

**CHAPTER TWO:**

# **THEORETICAL APPROACHES TO GROWTH AND DEVELOPMENT OF CHILDREN**

## Growth and development of children

Understanding human development is part of the nursing process. Knowledge of normal behaviour for specific groups allows for individualizing assessment and care plans – identify delays/ abnormal, counselling needs and treatment.It enables the nurse to emphasis on:-

* Promoting and maintaining health.
* Anticipatory guidance related to human development.ie understanding upcoming developmental needs and teaches caregivers to how to handle them to eliminate/minimise their impact on the child.
* Help families and children achieve optimal health through appropriate interventions.

Let us differentiate some terms related to growth and development.

**Growth and Development**: Sum total of numerous changes that take place during the lifetime of an individual.

**Growth:** Physiologic increase in size through cell multiplication or differentiation. Quantitative change. Differentiation – cell structure changes to achieve specific physical/ chemical properties. Seen through weight and height changes

**Maturation:** Changes that are due genetic inheritance rather than experiences, illness or injury.These changes enable children to function at increasingly higher and more sophisticated levels, as they get older. There is increase in competence/ adaptability

### Development: Physiological, psychological, cognitive changes occurring over one’s lifetime due to growth, maturation and learning; and assumes that orderly and specific situations lead to new activities and behaviour patterns.

The different ages and stages relevant to paediatric nursing (Erik Erikson):

* Birth – 1year – infant;
* Toddler (early childhood) 1- 3years;
* Preschool (late childhood) 3-6years;
* School age – 6- 12 years and
* Adolescent: 12- 19/21 years

**Other stages of development according to Erikson include: 20**-45years – young adult / Early Adulthood; 45 - 65years middle age/ middle adulthood; 65 years+ - death later maturity /late adulthood.

**Principles of growth and development**

Provide frameworks for studying human development.Not all are proven by research but they are assumed to be true.

1. **Growth and development are continuous processes from conception to death**. Child is growing new cells and learning new skills continuously.
2. **Growth and development proceed in an orderly sequence;** Maturation follows a predictable & universal timetable e.g. crawl –walk-run very rapid in infancy.
3. **Development is directional:** Skills development proceeds through 2 pathways ie cephalocaudal and proximodistal .Cephalocaudal -Development proceeds from head downwards. Areas close to brain / head develop first- trunk legs – feet.e.g. head control – sitting – crawling – walking.

Proximodistal development.-Proceeds from inside- out.Control of movements closest to body’s centre (trunk/arms) develop before control of movements distant to the body (fingers).e.g. grasping changes from using the entire hand to just the fingers as infant’s get older.

1. **Development is unique for each child:** Each child has a unique timetable for physiological, psychosocial, cognitive and moral development. All stages of development have a range of time rather than a certain point at which they are accomplished. e. g walk, crawl at different ages.
2. **Development is interrelated**

Physiological, psychosocial, cognitive and moral development affect and is affected by one another e. g Nervous system maturation necessary for (language) cognitive development.

1. **Development becomes increasingly differentiated.** Response to stimuli becomes more specific & skilful as the child grows. E. g Infant react with whole body to pain - cry and withdrawal, while older children withdrawal specific part/ extremity affected. E.g. throwing a ball up – younger children throw even the hand. Older ones throw the ball only.
2. **Development becomes increasingly integrated and complex.** New skills gained aand more complex task learned.eg learning to drink, eat eye- hand coordination – grasping – hand mouth coordination.
3. **Children are competent:** Posses’ qualities/ abilities ensuring their survival and proving their development e.g. communicates their needs in an increasingly sophisticated way.
4. **Neonatal reflexes must be lost before motor development can proceed**. An infant cannot grasp an object effectively until the grasp reflex has faded.
5. **Most development skills and behaviors are learned by practice and new skills predominate:** Occur because of strong drive to practice & perfect new abilities.This is especially in early age when cannot cope with many new skills. Pay attention / effort to one skill at a time e.g. walk, talk, and eat from utensils.
6. **Development proceeds from gross to refined skills.** As child is able to control distal body parts like fingers is able to perform fine motor skills.

### Theories of human development

 Human development can be viewed from various perspectives. None of the perspective / theories covers all aspects of development.Hence, for planning of care all these theories are important .Each looks at particular area of human development and has assumptions principles, strengths and weaknesses that can help guide practice.

### The eclectic nature of human development

 Ther are many perspectives of human groth and development and each perspective has underlying theories as can be seen below:

* Psychoanalytic perspectives:Psychosexual (S. Freud); Psychosocial (E. Erikson); nterpersonal (Sullivan)
* Cognitive- structural perspective**:** Moral – Kohlberg; Cognitive – Piaget
* Behavioral Perspective**:** Social leading – Bandura Arbert; Behaviorism – Pavlov, Skinner
* Contextual Perspective**:** Ecology theory – Bronfenbrenner

Let us now start by examining some of these theoris and their contributin to human growth and development.

**Sigmond Freud (1856 – 1939) and psychosexual development.**

He was a Viennese physician who originated psychosexual theory.It focuses on importance of unconscious motivation and early childhood experiences in influencing behavour.This theory postulates two basic biological instincts (life & death) motivate behavour and must be satisfied .These instincts always compete for supremacy. (Freud, 1933) .Life instinctaim for survival hence responsible for activities like eating, breathing, copulation (Life – sustaining) & self-preservation behaviour e.g love, constructive conduct.Death instinctis the destructive force expressed as hate,self centeredness, cruel behaviour , aggression and destructive conduct.These instincts are the source of psychic energy that drive human behaviour. They have 3 components: Id, Ego, and Super ego.

As child matures these components of personality become more rational & reality bound (Freud, 1933).At infancy all psychic energy resides in id with its selfish urges.It obey ‘pleasure principle’ – maximise pleasure and immediate fratification of needs.

Note: Id is manifest as the irrational selfish impulse part of personality (Freud, 1933)

Later ego takes over where there is rational controlling of personality .Operate according to the “reality principal” as realistic ways of gratifying needs are discovered. Characteristic of egoinclude: Memory, Cognition, Intelligence, Problem solving, compromising, separating reality from fantasy.Ego develops throughout life.Super ego / conscience Emerge when one internalises caregivers or societal value, role, morals. Start developing at infancy but become clear in per/school age when child learns socially acceptable behaviour. It strives for perfection not pleasure/reality .Right verses wrong is distinguished.Acts a disciplinarian by creating feelings of remorse / guilt for braking rules & self-praise / pride for obeying rules.

 **Note: According to Freud, the most important life instinct is sex instinct, which changes its character and focus according to biological maturation.**

Freud saw sexuality in form of genital manifestations & any other kind of pleasure seeking behaviour. As the sex instinct psychic energy (libido) shifts from one part of the body to another, the child passes through five stages of development. Each stage is related to specific body part (erogenous zone) that brings primary pleasure to the child during this stage.According to Freud; adult personality is profoundly impacted by how each stage is managed.Body centred sexual drives shifts with maturation.The following are stage of psychosexual development according to S.Freud:

* **Oral phase (birth – 1 year).**– Infants are highly interested in oral stimulation and pleasure. Sucking for enjoyment and relief of tension and for nourishment. Satisfaction from oral needs being met. Attachment to mother because of breast feeding. **Nursing implications** – provide oral stimulation by giving pacifiers, do not discourage thumb sucking.
* **Anal phase (1 – 3 years).** – Child’s interest widen with main one focused on the anal region. Child finds pleasure both in retaining feces and defecating. This part of child’s discovery of self is a way of exerting independence. This phase accounts for some of the difficulties parents experience in toilet training toddlers. The child is learning to control body functions especially toileting. **Nursing implication:** help child achieve bowel and bladder control without undue emphasis on its importance. If possible continue bowel & bladder training while hospitalized.
* **Phallic phase (3 – 6 years)** - Child learns sexual identity through awareness of genital area. Child may show exhibitionism. Oedipus complex (males) or Electra complex (females) – feeling of possessiveness towards the parent of the opposite sex and of rivalry with the parent of the same sex. Fears of loss of genitals, physical injury or loss of body parts. Fascinated by gender difference and Oedipus / Electra complex develops. **Nursing implications:** Accept child’s sexual interest, such as fondling his/her own genitals as a normal area of exploration. Help parents answer child’s questions about birth or sexual differences.
* **Latent phase (6 -12 years)** - Sexual drive is submerged. Appropriate gender roles are adopted. Learning about society takes place. There is no obvious development as those in earlier stages. The child’s libido (energy) appears to be more diverted to concrete things. **Nursing implications:** Help child have positive experiences so that self esteem continues to grow and he/she prepares for the conflicts of adolescence.

### Genital phase (12-20 years).- Establishment of new sexual aims and finding new love objects. Sexual desires directed towards opposite gender, learn how to form loving relationship. Manage sexual urges in societal approved ways.

* In an attempt to describe this phase, Anna Freud stated that: “the atmosphere of adolescence is characterized by ....anxieties, the height of elation or depth of despair, quickly rising enthusiasm, the utter hopelessness, the burning or at other times sterile, intellectual and philosophical preoccupations, the yearning for freedom, the sense of loneliness, the feeling of opposition by the parents, the impotent rages of active hates directed against the adult world, the erotic crushes and suicidal fantasies”. **Nursing implications:** Provide opportunities for the child to relate with opposite sex. Allow child to verbalize feelings about new relationships.

##### General application of the theory to paediatric care.

There are some lessons that can be learnt about growth and development from this theory.

It helps understand others in that every behaviour is meaningful and may indicate inner needs / conflicts e.g pacifiers can be used in infancy if infant is not taking anything per mouth, after painful procedures since pleasure obtained through the mouth. Additionally, it helps understand about toilet training which should start at 1-3years when you should provide potty chair.The sexual behaviour of pre -school, school age & adolescent can be understood in the light of this theory e.g Masturbation, sexual curiosity is normal.Social relationship and observing privacy during examinations vital for school age and adolescence. For school- age and adolescence, encourage them to have contact with friends and answer their questions honestly.

### Erikson (1902 – 1994) and psychosocial development

Erikson recognised importance of biologic factors to development.But felt that environment, culture & society were also important.his psychosocial (epigenetic) theory of development stresses the complexity of interrelationships existing between emotional of physical variables of one’s lifetime. (Erikson ,1963).Erikson agreed with Freud’s idea of personality (id, ego & superego) and about instinct.Believed that development was stage like & resolution of conflict at each stage was necessary for one to move to the ext stage.Freud’s & Erikson’s stages of development are closely linked.

### Difference

Erikson differ with Freud in that he believes children actually adapt & explore their environment instead of being passively controlled & molded by care -givers and society . Erikson also believes that human beings are rational creatures whose action, feelings, thought is controlled primarily by ego instead of id, superego & conflicts between the three components of personality.He thought that lifespan development is made of 8 sequential stages. The five of them describes life from infants through to adolescents. Each stage dominated by major development conflict / crises related to societal demands and expectations that must be addressed or resolved before the individual can prosper to the next stage.The resolution of each conflicts/ crisis might be positive – favourable & growth enhancing or negative – unfavourable, frustrating & making later development difficult. He believed that major conflicts occurring each stage are rarely completely resolved. Instead, they are of primary or dominant importance during a particular stage & then become less important / dominant as other conflicts arise in later stages. Also suggest that conflicts are rarely completely resolved positively. Rather a true resolution predominant over negative during a particular stage. Failure to successfully master a crisis or developmental task doesn’t destine the child to failure since delayed mastery is possible.But difficult at are stage may affect progress through later stages (Erikson, 1963).

The stages of psychosocial development according to Erikson are as follows:

1. **Trust verses mistrust: (birth -1 year, infancy)-**Characteristirised by basic task is established trust rather than mistrust in relation to oneself and others.If infant’s needs of needs of food, warmth, comfort are well met, he learns that the world is predictable, safe, reliable and can be trusted. When care is inconsistent, inadequate and rejecting it fosters basic mistrust. If caregiver don’t provide above, infant get confused, and view environment wich mistrust.This is demonstrated as restlessness, crying, whining, sleeps disturbance, vomiting, diarrhoea (Erikson 1963). **Nursing implications-** have a primary care giver. Provide experiences that add to security such as soft sounds and touch. Provide visual stimulation for active child involvement.
2. **Autonomy verses shame and doubt: (1 – 3 year, Toddler)-** Characterised by Autonomy develops and children discover their new mental and physical abilities,language and motor skills improve. Takes pride in accomplishments and wants to do everything for him/herself. Favorable outcomes are self control and will power. They can also bath, toilet, dress, and eat.Shame occurs if assertiveness and independence are considered unacceptable or ineffective by caregivers.Doubt occurs if children learn to mistrust not only themselves but also others in the immediate environment.If child shows dependency and constant approval for their action then they haven’t resolved this conflict. (Erikson 1963). When care givers are impatient with them, do everything for them, they enforce a sense of shame and doubt. If a child is never allowed to do, eventually doubt his ability, stops trying and cannot do! **Nursing implications:** Provide opportunities for decision – making e.g offering choices of clothes to wear. Praise for ability to make decisions rather than judging correctness of any one decision.
3. **Initiative verses guilt (3 – 6years, Pre-Scholer)-**Initiative occurs when child tries out new ways of combining activities, invents creative ways to use skills and abilities, and imagines what other people or things are like and takes responsibility for their own actions. Characterized by vigorous, intrusive behavior, enterprise and a strong imagination.Learns how to do things, child can initiate motor activities of various sorts on his own and no longer merely responds or participates in actions of other children or parents. A sense of initiative is reinforced when children are given an opportunity to initiate motor play activities such as running, bike riding, sliding wrestling and answering their questions (intellectual initiative). Guilt occurs when caregivers frequently reprimand behaviours reflecting initiative. Children experiencing severe restrictions and belittling feel guilty about their actions and thought and may become passive, reluctant or refuse to participate in activities (Erikson, 1963). When made to feel that their motor activities are bad, that their questions are nuisance, their play silly & stupid, may develop a sense of guilt. **Nursing implications**- provide opportunities for exploring new places or activities. Allow play to include activities such as water, clay modeling or finger paint.
4. **Industry vs Inferiority : (6 - 11 years, Schooler)-** Industry is the mastery of social ,physical and intellectual skills and orientation towards and competition with others ie oeersschool age children want to be the best in everything and constantly compare their efforts with others.Attention and energy is focused to learning academic skills and social roles.Child is more societal/peer focused that family focused. Child interested in learning how to do things well. When encouraged in their efforts to make, to do or to build practical things and are allowed to finish their projects, praised and rewarded for the results, their sense of industry grows. When efforts seen as mischief or as making a mess, their sense of inferiority is enhanced. I nferiority occurs if the child is ridiculed by peers,do not measure up to adult or their skills own expectations or lack certain skills so that they are not always the best ,first ,fastest or smartest (Erikson,1963). **Nursing implications:** Provide opportunities such as allowing child to assemble supplies for a dressing change. Allow them to finish their short projects completely so that they feel rewarded for accomplishment.
5. **Adolescence (12-18 years)** : Identity verses role confusion- Identify is achieving a sense of who one is intellectually, cognitively, behaviourally & emotionally as emerging physical & sexual maturity is integrated with the already existing skills & abilities. To achieve identity, you also require to find your political, social, economic and religious ideology; also adopting an appropriate gender identity making an occupational/vocational choice & adopting behaviours consistent with one’s own self- concept.It’s a vital stage because identity formation affects commitment and decision made later in life. Integrate different images/roles into whole that makes sense. Adolescent develop sexual maturity and learns to establish satisfactory relationship with the opposite sex. Inability to solve the core conflicts results in role confusion. Role confusion occurs when one is not able to acquire a sense of direction, self or place within the world. Negative experiences may lead to unsatisfactory sexual adjustment later & problems such as frigidity or impotence. **Nursing implications:** Provide opportunities for the adolescent to discuss feelings about events important to them. Offer support for decision making

Erikson identified other 3 stages that occur during adulthood as follows:

1. Intimacy verses isolation.
2. Generativity verses stagnation.
3. Integrity verses despair

Each of these stages has conflicts, which require resolution before the next stage.

Erikson’s theory covers lifespan & emphases the importance of taking responsibility for self-development. Also suggest methods of resolving conflicts at each stage.However, it doesn’t consider differences between men & women in relation to environmental & cultural influences.Also doesn’t show how development in one stage affects development in the next stage. Further more it doesn’t state the experiences required to resolve conflicts at each stage. He describes development socially, emotionally & doesn’t say how & why development occurs. He also doesn’t discuss observable behaviours indicating that trust, autonomy, initiative & industry or identify has occurred (Crain 1200, sige/man 1999)

### General application in paediatric care: Shows the developmental crises that children/adolescents face & this acts as basis of teaching caregivers about behavioural expectations. It also helps us realise the importance of societal influences on health/behaviour & that psychological/social development is a lifelong process. Caregiver can be taught how to facilitate resolution of each stage. E.g meeting basic needs at infancy helps development of trust & hence the need to meet these needs promptly. When infant is sick, parents should spend as much time as possible with it.

For toddlers: 1-3yrs, encourage independence with some activities e.g feeding,bathing, dressing, toileting etc.If there is need for restraint explain why love, approval & praise vital just like in all other stages. And for preschool: 3-6yrs, like initiative, are curious & interested in world around them. Let them ask questions, explore & create as they wish.For school- aged:6-11yrs,involvement & success in some activities vital – for self –worth/value .Nurses should provide school – aged child with opportunities for continuing school work if hospitalised or ill, maintaing hobbiues or activities, interacting with their peers and adjusting to hospitalisation. Adolescents (12-18 yrs) should be allowed to be as autonomous as possible, encourage them to take responsibility for their actions, support their life choices, and introduce them to their teens. Provide them with a separate recreation or activity area if in an acute care setting.

 **Note:** **Parental involvement in the care of adolescents is still vital –guidance is critical**

**Family teaching related to Erikson’s theory:** Teach parents to meet infant’s basic needs in timely & appropriate manner.Allow opportunities for toddlers to be independent.Provide preschoolers with a variety of experiences where they can explore, ask questions and create. Encourage school-aged children to interact with peers.Support adolescent choices, be available to listen & offer guidance.

### Other developmental theories-other theorist who have dealt with growth & development include: interpersonal development (Sullivan); cognitive development (Piaget); moral development (Kohlberg);

### BEHAVIOURAL PERSPECTIVE

Posits that human actions and interactions come from learned responses to environmental stimuli. Behavioural theorist study behaviour in labs setting & then applies information to the general population & look for ways to alter / control the environment to change, modify, or teach desired behaviours.Believe that the past or unconscious motives are not the root of behaviour & learning doesn’t depend on – opposite friend maturation.Also believe that children randomly respond to environment consistent with developmental capabilities and rewards or punishment influence behaviour.Behaviour relationship in punishment, pain, disappointment or frustration often is discontinued while behaviour that is rewarded or viewed positively is retained and repeated in similar situations.

Behavioural perspective divided into: Behaviourism (Classified & Operant conditioning) and social learning

**Classical conditioning:** Ivan Pavlov (1849 – 1936).Russian physiologist who established linkage between response & stimuli. Learnt that dog would salivate when-saw food (unconditioned stimuli’s) or saw person who fed it or heard bell ring just before food appeared (conditioned stimulus). The dog had learnt that appearance of person or bell ringing meant that food would follow.This learning to respond to a new stimulus the same way a familiar stimulus was responded to is called classical conditioning. It’s a sign that learning has taken place. Another example. Is when an infant gets excited on seeing a spoon/cup used for feeding her?

**Operant conditioning-**B.F. skinnner (1904- 1990)-Behaviour changes achieved by positive (reinforces) or negative (punisment) consequencesather than just occurrence of a stimuli. Example of positive reinforcers- smiles, praises and special treats/privileges while negative reinforcers include criticism frown and withdrawal of privileges.

**Social learning** by Albert Bandura (1925-) Suggest that other than stimuli ,personality ,Past experience, relationship with the model, situation itself & cognition impact on behaviour change (Bandura, 1977). You imitate what you see, remember and organize through cognition.Children usually think about the behaviour & the consequences (cognition). Bandura believes that behaviour can be weakened or strengthen by reward or punishment (as B.F. skinner) .Bundura also suggest observational learning is also important where children learn by observing others (model) as they generally pursue their interests.In this case there is no punishment, reward or active teaching is provided e.g children who frequently watch through violence are more aggressive than those children who do not watch much through violence. Bandura also find that children tend to model behaviour of children & adult of the same gender more often that of male behaviour of more than female do.

### Application in paediatric nursing care: Reinforcement of positive behaviour & extinguishing/weakening negative ones is possible. The behaviour can be reinforced by praise, reward & weakened by punishment. On education to caregivers should emphasize on reprimanding children for unacceptable behaviour consistently & appropriately e.g father & Mother .Children will model behaviour they see in the parents, even if parent talk to children about not modelling that same behaviour.

### Cognitive – structural perspective

Concerned with how children learn to reason, use language & think rather than what they learn.These theorist believe that cognitive development is the result of interaction between CNS maturation & active involvement with the environment. Children adapt by intergrating new with existing knowledge .Important theorist here include Jean piaget & Lawrence kohlberg.Lets us now look at the work of Jean Piaget as an example of a theory in thie perspective.

**Piaget Jean (1896 – 1980) .**Piaget started studying children in 1920s.Felt that from birth children acted upon & transformed their environment & were shaped by the consequences .This constant interplay is responsible for intellectual growth. Believed that intellectual growth followed an orderly progression based on children maturational level, experience with physical objects interaction with caregivers,other adults/peers , and an internal self – regulating mechanism that responded to environmental stimuli .Stages of piaget theory of cognitive development.According to piaget, cognitive development occurs gradually, sequentially and without regression e.g development moves from single to complex ; concrete to abstraction.Has suggested 4 stages with different phases.There is increased integration and organization as children pass through these stages.Children pass through them at different rates.

1. **Sensorimotor stage (Birth-2years):** Lies foundation for future cognitive functioning.Motor/ sensory abilities used to explore the world. Learning of goal - directed behaviour/ cause- effect relationship takes place.

 **Phases**

1. **Reflective – (Birth-1month):** Predictable, inmate survival reflexes like sucking, grasping present.
2. **Primary circular reactions:- (1-4m)** Perform more complex, respective actions .Look & reach 4 objects in environment.Initiate & repeat satisfying behaviour
3. **Secondary circular reactions: (4-8m) -**Learns from intentional behaviour e.g shake something to hear the sound. Motor skills & vision more coordinated .There is a lot of interest in environment.Recognize familiar objects
4. **Coordination of secondary schemes phase (8-12m):** Develop object permanence, differentiate familiar verses unfamiliar e.g caregiver & stranger direct action to an intended goal e.g through objects, examines them etc.Individual abits of learning about world start to develop.

### Tertiary circular reactions: (12-18m): Interesting novelty .Also understands casuality and seeks help.Inceased exploration and new behaviours

1. **Mental combinations (18- 24m):** childen think before acting .Solve simple problems by trial & error and imitate behavior.They can now predict effects when observing causes.They can also name & locate familiar objects.
2. **Pre – operational stage (2-7years):** This stage is characterized by better use of language. They also have a better understanding e.g past, present and future. Egocentric thoughts and are asily fooled.They also cannot understand the relationship among phenomenon.

**Phases**

1. **Pre-conceptual phase (2-4years):** Inceased use of language use,egocentric thought;symbolic play e.g woods made as car/trunks and mental imagery
2. **Intuitive phase (4-7 years):** Language more sophisticated, decreased egocentrism; incessant questioning; more reality – based play; believe inanimate things have human feelings.
3. **Concrete operations and stage (7-11 years):** Basic properties /relationship between objects / events understood. Can classify objects into categories – shape, size, colour.Understands the principle of conservation i.e. things remain the same even through shape or arrangement changes .See other view points i.e.decrease in egocentrism.Use trial & error to solve problems.Can focus on different dimensions (colour, shape, size) of an object.Understand others intentions.
4. **Formal operations stage (12 & above):** Characterised by systematic & abstract thought.May become idealistic because they think about hypothetical issues.Through inductive reasoning the can construct theories about their ideas.Better understanding of mathematical & principles e.g. proportional, variable e.t.c. Establish personal rules/ values.

Piaget believed that interactims with the environment caused people to organize patterns of thought (Schema) which they used to interpret or make sense of their experiences. E.g children believing sun is alive since its moving using schema.As they grow, they regard other moving objects as alive as well as- demonstrate assimilation i.e. interpret new information in terms of existing information. As they get older, meet animated & in animate objects & learn all objects are not alive. Differentiate living & non-living objects – accommodation i.e revising, readjusting & realizing existing schema to accept new information. Assimilation & accommodation result in equilibrium i.e harmonious relationship between thought processes & the environment. (Piaget, 1963, wadsworth, 1989).In summary of the 4 stages but without phases includes:Sensorimotor B-2years; Pre-operational 2-7years; Concrete operations 7-11years; Formal operations 11-older

 Today, most developmentalists accept Piaget beliefs on cognitive development & have tested most of his propositions.They have demonstrated that development is:

* Discontinous
* Increasingly complex through series of stages

### However the theory is not without criticisms.It underestimates importance of emotions and motivation to learning and important of adult interaction to learning. It also doesn’t acknowledge that

### Cognitive development continues to adult life

* People can advance inl one area of cognition than others.
* Some people never reach higher stages of abstract thought.

 **Application in paediatric care:** Piaget’s theory is vital when communicating/interacting with children at home, school & community settings. Sensor motor**:** Use sight & motor skills to learn about environment. - Give manipulative objects, bright pictures etc.Preoperative-More verbal & limited thought progress, hence you need to explain experiences in plain language.Concrete operations-Mature thought possible but needs to know how they work, relate, change or interact. Formal operations–adolescence-Provide complete & clear information – verbal/writing.Caregivers need to be educated that: Children learn at different rates ;Adolescents may still use concrete operations; Caregivers/family members need to use simple language when talking to young children.and may need to repeat directions several times. Be patient with children’s questions for this is the way they learn the world.Children learn at different paces.

**Moral development by Kohlberg (1927-1987).This theory describes changes in thinking about moral judgement and reflects societal norms and values. Kohlberg was interested in rationale for moral decision than decision itself.Moral development influenced by external and internal factors.**

### Contectual perspective

This perspective adopt a broader focus by viewing human development as a life long process affected by many factors;Individuals / group of individuals;historical, cultural, political, economic, context that one lives in. Ecological theory (Bronfebrenner, 1917-) is an example of a contextual perspective.He offers an organizational framework for examining systems’ influences on human growth and development.Ecological theory considers relationship between environment & individual & how this impacts on human development. Change in environment results to change in the individual and vice versa. These interchange occurs simultaneously and continuous.Children actively create their environment. This theory emphasises the importance of environment though biological factors are also vital. Urie offers an organisational framework for examining the environmental systems influencing human development.Family, peer, government, society impacts are impacted by the individuals. The environment can be viewed as:- **Macrosystem-** laege enduring systems has beliefs, resource, lifestyle e.g poor slums verses rich suburbs.

**Exosystem -** middle system: Social settings that individual do not directly experience

e.g – caregiver work settings, Social network – support system, Educational level, Community decision making, ones neighbourhood.

**Microsystems:** Immediate environment e.g family, peer, teachers, neighbours religion leaders.Importance of Microsystems changes overtime e.g primary socialisation iscarred by Family but can also be carried by school, church, teachers and neighbours

**Mesosystems:** Interrelationship between 2 or 7 microsystems e.g. home, school & peer makes a child’s mesosystem. For example for adult mesosystem – family, employment situation & friends.

**Note: If mesosystems have good relationship, development progresses optimally and vice-versa.**

# **CHAPTER THREE:**

#  **GROWTH AND DEVELOPMENT OF THE NEWBORN**

We are now going to examine growth and development along the different stages that are a conern to paediatrics as was indicated in the earlier discussion of Erikson’s theory of development.Let us start with the earliest stage of the first one month.

**Note: Neonatal or newborn period – 1st 4 weeks/28days of life.**

We are now going to look at various aspects of growth and development of the newborn.

**Physical development:** Genera**l** appearance **-**Head – ¼ body size.May be molded due to delivery process.Caput succedaneum may be present especially after long labour. Caput – swelling of soft tissue of scalp evident within 24 hours after birth. Resolve within daysand may extend across future lines.Cephalhematoma – blood between skill & periosteum –indicates trauma during birth process.Develops in 24-48 hours after birth & doesn’t cross future lines. May take 2-3 wks to resolve.

**Note: Reassurance vital that these characteristics will resolve in wks/ months.**

Cord should be given appropriate care 70% isopropyl alcohol or hydrogen peroxide applied next to the skin. Never pull the cord off or attempt to loosen it. Skin may be motted, acrocyanosis bluish coloration of hand/ feet due to instability of peripheral circulation system.Fontanels (soft spots) occur at junctions or future lines of the skull bones – allow growth & delivery.They close at different times ;Posterior fontanale close in 3 months while anterior close within 8-18 months.Assess neurological system by the neonates response to handling ,newborn’s position and gestational age.Gestational age is determined by use of ballard score – within 12 hours of life using this score, you can classify newborns :Large for gestational age (LGA)90th percentile ;Appropriate gestational age (AGA) (10-90th percentile) and Small gestational age (SGA) (<10th percentile).

**Note: Immaturity influences newborns development and functioning hence care should be taken to reduce it.**

Newborns sleep most of the time –but need for decreased as it grows.Responds to environment/ stimulation is by changing expression – smiling, grimacing, crying. Primi tive, inmate behaviours seen in the newborn are called reflexes –which can localize or generalized.

**Cardiorespiratory:** Has restricted space for lung expansion due to:-Horizontal ribs Weak intercostals, large abdomen, high diaphragm and small airways hence neonates are obligatory nose breathers. Therefore, any obstruction will cause respiratory distress.Respiratory rate is usually 30 x 60b/min. Characteristics of breathing include : abdominal breathing, Shallow ,irregular depth & rhythm and short periods of aprea seen.Irregular breathing common in active or light sleep state. Regular breathing is common in deep sleep state. During 1st breath, heart rates accelerate to 180b/min (for 4hrs) then back to normal range ie 100 when asleep to 150 when awake.

Gastrointestinal system: Slower in newborn than adult .Mature slowly .Stomach capacity of newborn is 60ml – increases later.Peristaltic waves rate decrease with time.Gastroesophangeal reflux is common because of reduced lower esophangeal sphincter function or inappropriate relaxation.Liver functionally immature for 1 year & pancrease works inefficiently – hence poor fat absorption. In uterine life, extra haemoglobin required to carry oxygen since oxygen tension available to the fetus is decreased. After delivery extra Hb not required hence excess cell destroyed by reticuloendothelial system & not replaced.Haemoglobin is broken to heme and Globin .Glbin is converted to unconjugated bilirubin which bind to albumin (has limited binding capacity).Hence, accumulation of unconjugated bilimbin leads to jaundice.Liver also not mature enough to conjugate bilirubin (direct).Physiological or normal jaundice shows a gradual rise in bilimbin of 8mg/dl at 3-5 days after birth. Later, it falls to normal level in 2nd week of life – if persist further investigation required.There are many causes for persisting jaundice: Sepsis, Polycythemia, Infant of diabetic mothers, Fetal – maternal blood group incompatibility and non-specific hemolytic anaemias .Kernictems may result when newborn jaundice causes nuclear masses of the brain/ s.cord to undergo pathological changes accompanied by deposition of bile pigments within them. Occurs at bilirubin toxic levels. May lead to permanent brain damage causing abnormalities in motor function.Phototherapy which use of special high density fluoroscent lights.is used prevents above state. Phototherapy oxidizes the unconjugated bilimbin in the skin, when then becomes soluble in water & extreted in stool & urine maximum exposure newborn naked .However; you need to protect the gonads with surgical mask and eyes using patches to prevent retinal damage.

**Note: Remove patches often. Observe skin under patches for irritation/ break down. Observe skin for pressure areas/ breakdown.Reposition newborn 2 hrly.**

May experience loose stools & increased urine output – possible dehydration and excoriation of skin in the perianal area. Obtain serial bilirubin levels 8-12 hrly during phototherapy to assess treatment effectiveness

**Note: Sometimes a rebound elavation of bilirubin may occur on discontinuation. But should soon return to acceptable levels.**

**Genital urinary system:** Renal tubules unable to concentrate urine because they cannot well absorb H2O, glucose, Na+ & other solutes back into blood. Full concentration possible at 3 months of age.Normal urine output 1-3ml/kg/hr – 2-6 voidings per day.Urine output increases gradually as intake increases.Evaluate renal function if no voiding in the 1st 24 hrs of life. Normal values for newborn urine: Colour – pale yellow, Glucose - -Ve; PH - 4.5 – 8, protein - <5-10mg/dl, RBC - negative, Specific gravity – 1.001 – 1.020; and WBC - negative .Genitals -Pendilous scrotum with rugae,Testes palpable in the lower portion of scrotal sac,If scrotum is destended, use of transillu minator may reveal hydrocele (collection of fluid between parietal & visceral layers of tunica vaginalis).No treatment is required unless it goes beyong one year of life. .Reassure caregivers that is normal & will disappear.Circumcision-When dne on newborn considered elective.May be delayed or not performed in prematurity, illness, distressed body at birth, hemophilia, genitalurinary deformity. Care of uncircumcised newborn-Wash outside the penis to decrease odour/ infections .Smegma -Collection of cells that shed from outer layer of skin & gathers under foreskin – source of odour/ infection of not removed.In uncircumcised male, foreskin remain intact possible till 3 years when its retractable. Attempt to retract fore skin may cause damage .In female genitalia for term newborn – clitorisand labia Minora are covered by Labia Majora.Vermix caseosa may be found between the labia.Blood may be observed in the diaper due to maternal hormones withdrawal at the time of delivery – pseudomenstruation.Reassure care givers.

**Musculoskeletal system:** Term newborns exhibit hypertonic flexion of all extremities.

Muscle tone not well developed, hence cannot support weight of lead. Head lag seen if newborn pulled from supine position.Hands should reach the upper thighs when extended.Intrauterine positioning of newborns of feet may result in a talipes deformity or club-foot. Foot may easily be manipulated to midline; otherwise orthopedic consult considered.Spina bifida should be ruled out examining the base of the spine.New borns gain 5-7 ounces per week and head circumference & length increase by one inch per month.

# **Intergumentary system:** Skin delicate & mottled, acrocyanosis .Observe for:-

Milia: - small white papules on nose, face, forehead & uppertorso caused by plugging of the sebaceous gland; petenchiae:-Small, pinpoint, nonraised, perfectly round, purplish red spots due to intradermal or submucosal hemorrhage.they are normal if found in area of presenting part.Other area – investigate cause e.g. sepsis;Mongolian spot-Irregular dark pigmented area on posterior lumbar region. No clinical significance and are usually noted in newborns of various racial backgrounds;Desquamation-Peeling of skin and the degree depends on maturity .Preterms peel less while post term peel more ;Telangiectatic nevi-capillary hemangiomas commonly called “stork bites” found at nape of neck & bridge of nose.They dDisappear with time;Nevus flammeus **-**Port wine stain .Hemangioma or vascular tumor that will not disappear with time; Erythema toxicum -Transient rash characterized by red mascular base with a white vesicular center.

**Psychosexual development:** Finds satisfaction from oral stimuli, physical contact, being held & cuddled.

**Cognitive development:** Can interact with environment & signal needs & gratitude when those are met. Learning is by habituations & imitations.In twelve days newborns can imitate facial & manual gestures of adults.Can respond to auditory stimuli turn head to find source.Are sensitive to touch & handling.Newborns tend to habituate to noxious stimuli – protects it from overestimulation & frees energy for physiologic demands.

**Psychosocial development:** As caregivers meet newborns needs it develops trust & form attachment & relationships.Caregivers should interact with newborn as much as possible.

**Health promotion & maintenance:** Ophthalmic drops/ ointment administed.Hemorrhage disease of newborn – is due to vitamin K deficiency and you prevent by giving phytonadione within 1 hr of birth.Dose -1 mg im – full term and 0.5mg – preterm .Before discharge screen for: Phenylketorunia (pku) and hypothyroidsim .Ensure immunization is given and give a follow up care schedule

**Anticipatory guidance:** Nutrition –breast feed for 6 – 12m.Cows milk is not good as its designed for a rapidly growing animal – has more protein , fat, sugar, ca++, Na+, Mg+, Sulphur, Phosphorous than human milk.Baby milk doesn’t come till 2nd – 4th day until then, baby gets nutrients from colostrums a product breast produces before milk.Feeding should be on demand feeds, not scheduled.

**Thermoregulation -**Controlled by hypothalamus.Not very effective hence vulnerable to overheating/ underheating .There are many reasons for this poor heat regulation: increased surface area, poor thermal insulation, limited shivering response and increased metabolic rate. Educate on this aspect above e.g. avoid overdressing.Brown fat is the major source heat production in newborn.

**Sleep -**Term newborns have two sleep states deep & light. For deep, eyes closed, no eye movements and no major activity except for occasional startles .Light state is featured by eye movement in 10 seconds interval and motor activity e.g. stretching.newborns sleep for 16-19hrs/day with cycles of 45-50 minutes.Ussually it begins & ends with light sleep.

**Position:** Sulpine/ sidelying but newborns with craniofacial abnormalities & Gastroesophangeal reflux should be positioned prone.Sudden infant death syndrome (SIDS) has been reported as commonly caused by prone sleeping, soft bedding e.g. pillows, blankets, sheepskins, comforters etc.

**Diaper care:** When **c**hanging female newborn, wipe from front to back.This control feaces contamination of vaginal area. Diaper rash – keep them clean, dry and use plain water and absorbent cotton.There is no need to use commercial wipes, unless those used for babies not adults contains alcohol & can dry baby’s skin.There are several causes of diaper rash:-Too much moisture on skin ,changing/ rubbing ,prolonged contact of skin with feaces/ urine ,Use of antibodies (yeast infections) and Allergic reactionto diaper material. Treatment for diaper rash include: changing diaper often ;use clean H2O to clean diaper area;apply thick layer of protective ointment or cream e.g. zinc oxide or petrolatum .Seek medical advice it doesn’t go within 48-72hrs or gets worse – open sores & blisters.

**Newborn screening:** Depends on policies of countries/ states.It could be for:-Phenylkentonuria, Congenital hypothyroidism, Galactosemia, Sickle cell disease, Hearing (done at least within 3 months) .

# **Safety promotion & injury prevention;** Newborns can wiggle themselves into a variety of positions which can become a safety hazard.You can only leave newborns unattended in the crib with side rails .The common sources of injury-drowning ,suffocation ,burns ,falls and motor vehicle accidents .Prevention of accident is very critical through:Never leave baby in bathwater ,Vehicle – secure neonate in rear seat facing backward not front seat,Cot/crib is put away from heat,Cover unused electrical outlets ,Don’t hold newborn while drinking hot drinks,Don’t smoke near newborn- has been associated with otitis media & respiratory infections.

Nurses role in fostering healthy newborns is through health education on the care of newborns .Such topics as immunization, follow-up care, available community resources and breast feeding & general nutrition should be covered.

# **CHAPTER FOUR:**

# **GROWTH AND DEVELOPMENT OF THE INFANT (1M-1 YEAR)**

**Introduction:**

There is rapid growth and development. There are rapid changes taking place that the nurse needs to understand to ensure optimum health (for infant/ family is achieved). The nurses assist the family to give all the care required to the infants

**Physiological development**: Very marked changes taking place. Physical growth, skills development is taking place so that the child can cope with the world.Physical growth in terms of height, weigh and Head circumference.Gross & fine motor skills development occuring in a cephalocaudal (head – toe) & proximal distal (central – peripheral) fashion. Weight changes occur rapidly: 1st 6m of life – weight doubles, (Next 6m 3-5-0z/per week) and in 12m – tripled.Height also change as Rapid: At 1ST 6M –1 inch / month and at 12m – 0.5 inch /month.Head size changes rapidly in infancy – reflects brain growth: At 6m - head circumference increase by 0.5 inches per month.In the next 6m - increase by 0.25 inches per month and at 12m – infant brain 2/3 that of adult . As head grows fontanel close- the posterior fontanel closes by 6-8 weeks while the anterior fontanel closes by 12- 18 months.

## Motor development: Related to physical, cognitive & social development. Includes – gross & fine motor development that helps infant explore environment. It’s marked by: Voluntary behaviours follow disappearance of primitive, reflexes, eg to willingly grasp objects, the infant must 1st lose the involuntary grasp reflex. Probation occurs before supination e.g. children pick up object (pronation) before they can put object into month (supination) .Ability to grasp object proceeds ability to release it.

## Gross motor: Gross motor development – ability to use large muscle groups for: - Balance, Postural control e. g head control, and locomotion e.g. by one month - infant can turn head to one side while prone. Infant head control is judged by presence or absence of head lag – amount determined when infant is pulled by the arms from a supine to a sitting position. At 1m – a lot of head lag. 2m – partial head lag.4m – no head lag & good head control while sitting.After head control is achieved, infants can sit without support.As infant develops, other milestones are realized: - Thus, at 8- 10 months - crawling (pulling self-forward with abdomen touching the floor), Creeping (moving a hand & knees with abdomen off the floor) occurs. Child can also stand at this stage. At 10-12 months the child can cruise (deliberate steps while holding something).Once can stand alone, they will take 1st step.

## Fine motor: Hands and eyes get more used to manipulate environment.Fine motor development – ability to coordinate hand – eye movement in an orderly & progressive manner. These skills develop from primitive grasp reflex that enables infant to hold objects with a tightly clenched fist (1m) to 10-12 months when:- Deliberate movements – put & remove objects from containers,hold and mark a paper,turn pages of a book etc…

## Psychosexual development: Based on child’s need to seek pleasure. According to Freud’s theory, the infants (birth – 1year) are in oral stage and pleasure dominates life. Oral stimulation / sucking are major focus. Feeding or nutritive sucking vital source of pleasure. Feeding & carers touch gets associated. Others some of pleasure – non – nutritive sucking e.g. objects e.g. toys/fingers, pacifiers– may be used to calm the child.

**Cognitive development:** According to Piaget, infant is in sensormotor stage (birth-24months).Knowledge about an object acquired through interactions with the object and use of senses. Major task for the infant is object permanence, where infant learns that an object is not an extension of self and that it continues to exist even when it cannot be seen.

## Health promotion: Caregivers need to know the expected physical, emotional & developmental growth patterns of the infant. Nurse can assist family attain optimal level of health. This can be achieved through: - education, counselling, anticipatory guidance, understanding family’s cultural needs.

**Health screening:** Assessment & detection of any problems e.g. phenylketonuria (PKU), iron deficiency, hypothyroidism and lead poisoning.Advice carer to contact health workers in case of any problem. E.g. fever, poor feeding, vomiting, reduced activity or alertness, appear restless, Inconsolable crying, abdominal movement- unusual jerking of body, unusual skin colour: pale or mottled skin colour; bluish around lips.screening visit clinics activities; physical examination,growth indicator – height , weight and head circumference, anticipatory guidance, parental concerns and immunization

**Vision:** Even newborns have full visual arrays of acuity 20/100 to 20/200.Any problem with vision may affect perception; hence development e.g. infant should be able to follow objects or light.Possible vision problems include: Absent or poor hand – eye coordination by 7 months, Inability to follow objects by 1m, Doesn’t fixate on object, Absence of doll’s eye reflex (movement of head to the right or left in which eyes lag behind & do not immediately adjust to the new position.

**Note: Doll’s reflex-normal response in newborns to keep the eyes stationary as the head is moved to the right or left .This reflex disappears as ocular fixation develops.**

## Hearing: To be detected early to prevent delay in speech development.Assess hearing regularly – see paediatrics assessment. Signs of problems: Can’t follow verbal direction, No response to human voice, Absent babble or voice inflection by 7 months., Can’t turn head towards a sound by 7 months, Lack of startle reflex or blink with a loud sound.,Failure to be awakened due to loud noises in environment.

## Dental care: Teeth eruption begins in 3 - 4 months. Lower incisors – upper central incisors (4-8m) .Dental hygiene – start with eruption of deciduous teeth.Use: clean with wet cloth or soft – bristled brush. Establish routine early in life. Fluoride prevents dental carries. Give if local water lacks adequate (0.3ppm) fluorides content. At concentrations of 0.3ppm of fluoride infant doesn’t require supplements. If needed, they start at 6 months-0.6ppm.Exccess i.e. beyond 0.6 ppm causes tooth staining. Prolonged sugars exposure causes dental caries. Since caregivers are concerned about teeth number of teeth at any given time, the formula is: Age of child –6 = total no. expected teeth. E.g. at 18 months old, 18- 6= 12 teeth are expected at 18 months.Routine visits to dentist are important .First visit – before 2years of age.

## Teething: Eruption of deciduous teeth causes periodontal membrane to become swollen, tender, and red. There is also anorexia, fussiness, drooling, and desire to bite, Low grade fever, Vomiting & diarrhoea. Teaching on teething-To sooth swollen, red gums you can do the following:-Apply frozen teething, or ice cube in a washcloth, give hard rubber toy biting for biting.Also medications like topic anaesthetic and acetaminophen for irritability/ grade fever can be given.

## Nutrition: Since there’s rapid growth nutrition vital.Feeding assessment should be done.Nutritional requirement based on physical activity & rate of growth needed to support life.At birth 120kcal/kg day .Fluids also vital.Introduction of solid foods should be at 4-6m.If done before it can cause allergies. Self – feeding encouraged for autonomy development.Wean appropriately.use of pacifiers to provide sucking – provide pleasures & gratification.They can be nutritive – BF or non – nutritive. Pacifiers (non – nutritive) sucking helps calm. Should have a shape of a nipple.

**Communication:** Helps express needs.Involve cognitive, social abilities. Crying & smiling used by infants. Caregiver should give appropriate response based on need.At infancy receptive language (ability to understand words) better than expressive language (ability to speak). Assess language development during visit to clinic.Caregiver should communicate with infant by smiling, eye contact, talking during feeding & diapers change. Speak to the infants as much as possible when it starts to vocalize.

**Temperament** – Defined as the way a child interact with the surrounding environment. Children are genetically endowed with temperamental characteristics e.g. adaptability, mood, attention span and persistence.These should be understood for the caregiver to provide appropriate and unique care for the child. When combined with caregiver personality, they produce a characteristics pattern of social interaction. Temperament characteristics are behavioural tendencies, not implications of bad behaviour.

### Sleep: Temperament, satisfaction and environment influences sleep patterns. The patterns of being awake in day & asleep at night evolve as child matures.The infants also take 1-2 naps during the day. Night waking occurs every 2-4 hours but disappears later.

Sooth child to sleep.Nurse should understand any concern of sleep patterns & counsel appropriately. Measures to promote healthy sleep bedtime routine established.Room temperature (comfortable).Don’t feed at night or make it brief .Place infant in supine or side lying for sleep. Don’t awaken infant to feed/change diapers.

**Some conditions common during infancy**

## COLIC: Common problem in under 3months .Defined as recurrent episodes of unexplained crying and the inability to be consoled. Onset – 1-2 weeks of age.Subsides spotaneonly by approximate 16 weeks of age. It is not clear what causes colic but postulated that it could be be due to excessive air swallowing, improper feeding techniques e.g. Feeding position, food allergies, and infant behaviour factors.Characteristics of colicky episodes: - Loud, persistent cry, flexing of hips towards abdomen – thought to be due to paroxysmal abdominal cramping.The rule of 3 is used to define colic so that its differentiated from othe forms of crying. States that colic is present if crying occurs during the first 3 months of life, lasts longer than 3 hours per day, occurs more than 3 days in any one week and continues for at least 3weeks.Though it resolves spontaneously, it’s very stressful to the family (fatigued, frustrated, and helpless).

## Management: Rule out other organic / infectious causes, Feed slowly, right amount & upright position & burp frequently. Mother avoids gas-forming foods – onions, cabbage, and dry beans.Swaddle infants to avoid jerky /sudden movements .Responds favourable to vibration & movement, hence car ride used.Walk or rock infant while applying some gentle presence or the infant abdomen. Gentle back messages.Soft, soothing music helps.Quiet; dark room to avoid environment stimulation.Let the infant cry it out in the crib when other measures do not work. Sometimes only fatigue will make it fall asleep. Caregiver .Should remains calm, no self- blame & positive attitude is necessary .Relaxation technique & sometime off is good for caregiver.

**SUDDEN INFANT DEATH SYNDROME (SIDS):**

Unexplained, sudden death of infant under age of 1 year (most 95% occur by 6 months), after all other causes have been rule out. Supine/ side lying is the recommended position since 1992 as prone position is associated with SIDS. Other risks factors include: Infants factors-Premature, LDW, Male gender, Asphyxia, Multiple birth, SIDS in sibling and under 6m of age.Environmental factors include: Cigarette smoke, Prone sleeping, Bottle feeding in crib, Over bundling for sleep ,over heating, soft sleep surfaces and loose bedding.

**Bathing:** No much bathing is required. Don’t leave infant unattended. Sponge bath till cord falls off but keep diapers area clean to avoid diapers rash.Expose only those areas being washed because of cold.Use cotton ball for eyes..Perineal areas are washed last.Clean all body creases, especially neck fold & perineal area. To prevent cradle cap (seborrhoea) a dry, scaly scalp condition). Hair should be washed everyday using a body shampoo .If it occurs: use soft – bristles tooth brush can be used to remove crusts & mineral oil or petroleum jelly can be used to soften the patches.

**Skin and nail care:** Lotions & baby powder not required by infants. Nail clippers are used immediately after bath – nails soft.Powder may cause aspiration pneumonia. Lotion may be hypoallergic & warned by hand first.

**Strangers and separation anxiety:** Stranger anxiety appears in 8-12 months when a child develops sense of object permanence. Mental image of caregiver enables child develops stranger anxiety Peaks at 15-18m & disappear at 2years.Separation anxiety: Occurs when caregiver moves away.Occurs because child doesn’t know if caregiver will return. As separation episodes are repeated, cognitive coping develops.Characteristic of these anxieties include: isolation, frowning, whimpering, crying and clinging. The management includes: stranger anxiety- Visit by friend increased, introduce to stranger,- keep safe distance from strangers ,warm for strangers and stranger should use smooth voice.Separation anxiety-Leave child familiar place.Talk to child before leave.Say goodbye.Leave security objects e.g. toy

## Play: Is described as the ‘work of the child’ It has many advantages.Skills are practised

Learn about environment & people and them.Able to develop sense of mastery, control & predictability .Relationship is enhanced.Play is more purposeful and intended at this stage .Caregiver should actively be involved in the play – enriches the interaction.Nurse should assist the caregiver get involved in infant play as much as possible. Consideration in play: Toys should be developmentally appropriate.As many senses as possible should be involved.Encourage use of hands/feet’s. Expose to few new experiences each day.Praise often.Use age – appropriate toys e.g. suffocations can be caused by large toys.During assessment, inquire about play e.g. safety of environment that child plays – phone accidents avoided.

**Play may help to detect: -** Developmental delays, Neurological problems – coordinative problems, Delayed social skills, learning disabilities and emotional disturbances.

## Safety promotion & infant prevention: Infants have insatiable curiosity about environment.Development & skills refinement is very rapid. Hence, they are at great risk of accident especially at age 6-12 months.Accidental injury prevented by child – proofing the home.

## Note: As the infant’s ability to explore the environment increases daily so do the hazard as the environment e.g. Infant who can stand & cruise (walk) is more venerable than the one who can only crawl.

Common injuries include falls, drowning, strangulation, burns, choking, suffocation, and ingestion of poisonous substances.

# **CHAPTER FIVE:**

# **GROWTH AND DEVELOPMENT OF THE TODDLER (12M-36M)**

**Introduction :** It takes 24 months.There is rapid, unprecedented maturation and change in the life of the child & family.The child is more independent, mobile, verbal & inquisitive.Autonomy, sense of identity continues to develop.More exposed to danger because of increased activity.

**Physiological Development:** Different toddlers achieve different milestones variably – some will achieve verbal milestones faster than motor skills. Developmental task achieved at different paces. Growth rate is slower than infancy. Average weight gains 5 pounds/year. Height increase by 3 inches/year. Slower growth rate leads to physiologicalanorexia.This is due to erratic feeding behaviour and decline in appetite .Required caloric intake increased. Head more proportional to body. This reflects slower brain growth, as extremities lengthen.Chest circumference increased and exceeds abdominal girth. Pot bellied and toddling gait give way to well balanced appearance and gait as bones lengthen and strengthen. Abdominal muscles replace a dispose tissue.Walking starts at 12-15months.Spend a lot of time practicing the newly learnt skills so that mastery can occur. All deciduous teeth are erupted by 30 months of age .Improved eye-coordination enables self-feeding.

**Psychosexual development:**They recognize gender differences at 2 yrs.Explores body parts during toilet training .According to Freud (1957) toddlers are at anal stage .Masturbation is common & should be handled carefully to lessen the child’s anxiety & feeling of shame. They imitate domestic/role activity ie domestic mimicry e.g. takes role of daddy, mummy etc.Gender – specific behaviours & role-related thinking patterns develop.Gender-identity formulated during toddlerhood & rewards for responding in a manner consistent with a specific gender internalizes that identity.Avoid using slung, baby talk or confusing terms .Teach child correct anatomical terms.Provide positive reinforcement when child experiment with gender related roles.Accept manipulation/ masturbation of genitalia as natural, private behaviour of toddler.Respond to quiz with age – appropriate language – language should be under standable.Don’t make toilet training a major confrontational issue in the household. Try to tie in educational aspects when possible. Child usually learns at different times. Don’t compare children as they develop at different rates.

**Psychosocial development:** Psychological tasks here include:-Gaining self-control, developing autonomy, increasing independence .Progress toward mastery and development can be judged by some indicators like tolerating separation from caregiver,withstanding delayed gratification,increased control of bowel/bladder function,interact with others in a less id-centric/ego-centric manner.,utilizing socially acceptable behaviours.,autonomy vs. shame/ doubt develops according to Erik Erickson

**Cognitive development:** Speech skills develop faster.Depends on parental encouragement/ participation (environmental influence) – the impact of regular care taker (e.g. house help) can be great. At 36 months can converse.Use of short sentences & following directions.Can recognize shapes & classify objects based on their use.An object that looks alike have same function & therefore treated equally e.g. everything round is a ball.

**Health promotion:** Nutrition **- e**ncourage self-feeding. Reassure for decreased food intake. Frequent small meals are advisable. Acknowledge toddlers ritualistic needs e.g. same plate, same spoon. Don’t force child to eat – provide praise & positive reinforcement. Sleep **-**2 year old – 12-14hrs sleep per day and a nap in the afternoon. Develop sleep routines .Waking up at night & nightmares are common among toddlers. Dental health:Caregivers need to assist.Use toothpaste sparingly since tendency to swallow – fluoridated. Otherwise use water only.Flossing also done to prevent gingivitis.

**Safety promotion & injury prevention :** Follow traffic rules related to auto- safety Prevent falls – related injury eg screens to open windows/ use window guards .Warned not to run with everything in month etc .Prevent aspiration e.g. parts of toys .Prevent suffocation, burns,drowning ,ingestion of medications, other poisonous substances, .Keep syrup ipecac at home..Promote gun safety .If gun in house:-Keep gun locked up & unloaded.Store bullets away from the gun.Supervise child while in bath tabs .Instruct child never to go near water alone etc.Alcohol kept out of reach .Smoking (passive) eliminated .Adults have to smoke away from children

**Screening:** Immunizations, Dental health, Heart & weight, BP, Hb, Vision/ hearing

Some behaviours/ issues common vital in toddlers

Some common behavours/issues in toddler age

**Negativism:** An expression of toddlers search for autonomy.Resents given directions and or not being allowed to explore what is desired in an expanding environment. Delights in doing opposite & says no to what requested.Caregivers is frustrated. Pass by the age of 30 months.

**Ritualism :** Ritualism – need to maintain sameness routines formed that give security & safety.Child experiences stress when these are disrupted & may regress (return to earlier, safer more familiar behaviours).

**Discipline:** Limit setting and consistently (both parents) applied discipline is vital explain the reason for discipline. Show love and support.

**Sibling Rivalry:** Intense feelings of jealousy between siblings. Often seen when an infant is born into a family with a toddler. Toddler devastated because they compete for attention and fear loss of love or abandonment.It should be managed by pay some attention to toddler, Maintain toddler’s rituals , Others e.g. grandparents can assist in care of toddler , Movement from crib is made several months in advance. And Set limits and apply them consistently etc.

**Temper tantrums:** Outward explosive reactions to inward stressful or frustrating situations that are a normal part of toddler life. Between 2-3yrs the child faced with new rules, fears, and environments. They need to express their feelings, wishes, frustrations but have no language skill to do this. These new experiences coupled with child’s quest for autonomy may erupt as tantrum. It’s a way they say “I have needs; I am important, need some control”.Characteristics: **s**creaming, crying, falling into the floor, banging the

head ,flailing the arms ,breath holding which may cause fainting ,kicking the feet,ignore tantrums unless they pose some danger e.g. head banging.You can prevent by scheduling the toddler, allow choices, reward good behaviour and stay calm.

Note: Tantrums are a normal developmental response of toddler and disappear at four years. Therefore, the caregivers need to be reassured

**Toilet training:** Accomplishing bowel/ bladder control parts of the toddler’s achievement of autonomy/ independence. Myelinization of spinal cord & development of sphincter control occurs at 12-18months hence toddler ready for toilet training between 18-24months.Readiness for toilet training indicated by:Cognitive awareness of elimination eg diaper wetness.Follow direction and communicate understanding of elimination needs to the caregiver (pulls on diaper, ask for diaper change),remain dry for longer periods of time (more than 2 hrs),independently dresses & undresses,Sit, squat & walk well,bladder control more difficult than bowel control.Assume positive reinforcement / praise when the child controls the bowels/bladder and do not scorn the when it wets itself.Both night/day dryness should be achieved by 5 years, otherwise look for pathological causes. Stress affects toilet training in that it nterferes with toilet training by precipitating regressive bowel/ bladder continence. These are temporary & reinforcement, gentle support; encouragement will assist toddler regain a sense of independence and success.

**Play:** Described as “work of the childhood”. Important because the child learns about environment, enhance fine & gross motor development .Toddlers play alongside, but not with other children (parallel play). Demonstrate little attention to the feelings of play partners and may grab toys etc.Play may serve the following functions: cognitive development – learn about objects, solve problems; social development – fantasy play & acting roles; problem solving – use of excess energy, assist in coping with anxieties. Select age – appropriate play objects that cannot cause injury.

# **CHAPTER SIX:**

# **GROWTH AND DEVELOPMENT OF THE PRE-SCHOOLER (3-6 YEARS)**

**Introducton:** The rate of physical growth & changes decreases .Cognitive/ social skills getting refined.Developmental tasks here include:-establish control of body systems e.g. toilet, dress, feed self,tolerate longer separation by the caregiver,closer interaction with adults/ other children ,language is more sophisticated

**Physiological development:** Rate of growth slower than infant/ toddler, Weight gained at 2pds/year, Heigh changes by 3 inches per year such that by 5 years the child is ½ adult heights. Becomes slimmer, taller – reassure caregivers. Excessive activity/ overexertion – damage growing tissue, hence adequate rest and nutrition is vital at this stage. Body systems continue to mature & stabilize .By 3 yrs – all 20 deciduous teeth .Permanent teeth start erupting by 6 yrs. Muscles & bone growth continues as maturity is not yet. Handedness established by end of pres-school. Bladder bowel control achieved (including night control).But lack of concentration may cause accidental self - soiling by the preschooler.Gross & fine motor skills like walking, running & jumping well established. By 3 years can ride bicycle. Other motor skills well developed – dance, skating, dancing, and swimming etc.Eye – hand coordination refined. Fine motor like lace shoes, do simple buttons, draw shapes e.g. square are more developed.

**Psychosexual development:** Distinguish boys & girls’ features .Freud described this period as oedipal/ phallic – child experiences subconscious conflicts and intense attraction & love for parent of the opposite sex.Child also feels competition with the same sex for the attraction/ affection of the other parent. This called: - Oedipus – preschool boy attraction to the mother. Electra- preschool girl attraction to the father

Its normal competition/ romance. Resolution comes as child identifies with the opposite sex.They start to copy behaviour of opposite sex.Sexual curiosity displayed & many questions are asked related to gender.Answer questions correctly .Teach children about private parts which should not be touched by “strangers”. Many caregivers fail to give the right information on sexuality; hence confusion occurs as child grows.

**Cognitive Development:** Continues to be seen in the ability to speak e.g. At 3 years – vocabulary of 500-900 words 3/9 of a sentence .At 4 years – 1500 words – 4/5 of a sentence .At 5 years – 2100 words – 6/8 of a sentence **Psychosocial Development:** Sense of initiative & guilt (Erik Erickson) is a major achievement. Conscience (Superego) starts to take shape .Rewards/ punishment vital for them to understand acceptable/unacceptable behaviours. Limits set & followed closely. Play is more dramatic, imaginative and creative.3 year old want to please caregiver, less sibling rivalry hence time for additional child (if indicated). At 4 years:Increased aggressive behaviour ,Rivalry with older/ younger siblings ,Can run few errands,5 years old – helps in house chores,Parent seen as source of security & reassurance

**Moral Development:** Is inKohlberg stage 3 (conventional level) of moral development. The child tries to please others/ seeks approval. Has concern for others .Spiritual development:Imitate religious practices of their parents. Doesn’t comprehend religious gestures. The child views God has a friend.

**Health promotion:** Nutrition - At 3 years the child can eat table foods. Maintain a balanced diet. Children may be choosy (picky- eaters) as they explore the world. Caregivers shouldn’t make meal time a powerful struggle, because pre-schoolers can go on “feeding strikes” and “food jags”. Childhood obesity: It’s on the increase related to parental obesity before child is 3 years .Has many effects: Physical effects – Hyperlipidemia, DM – Type 2, pancreatitis , gall bladder disease and increased blood pressure. Psychological effects e.g. Low self esteem especially for girls. Components for treatment: Physical activity, Nutritional diets and behavioural changes – teach need for healthy life **Sleep/ rest:** Bedtime routine important .Avoid caffeine, sugar at night.May provide a quiet activity e.g. reading a story .Common preschool sleep disturbances include: Nightmares, sleep terrors, talking in the sleep, Sleep walking .These are self- limiting problems

**Play:** Enjoy group play. Engage in imitative, dramatic and imaginative play.3 year – still egocentric play.4 years – Interactive play .5 years – Impulse control is complete & group sports can be useful. Literacy:Establishes interest at this stage and most enjoy books with lots of pictures

**Television/ media:** Has positive and negative impact .Not a substitute for education/play but some programmes can reinforce learning, promote creativity and enhance cognitive growth.TV watching should be controlled 1-2hrs/day Guidelines for TV viewing: Viewing 1-2 hrs, Control what child watches .Watch with children especially new programmes or select a video with known content .Provide feedback to networks about children’s programming. Establish good dental habits that shall last lifetime. Major dental problem is dental caries. Primary teeth should be preserved so that permanent teeth will have room to form correctly and the dental arch will not be narrowed. Dental carries may lead to loss of primary teeth & dental arch alteration which compromises permanent teeth development. Brushing & flossing vital .Sugary snacks avoid. Use fruit, vegetable or cheese instead. Rinse mouth in case sugary snack are used.

**Dental Health:** Night grinding .Some children grid their teeth at night. Common in preschoolers – thought to relieve tension, calm child to sleep. But in cerebral palsy – grinding occurs due to jaw muscle spasticity. If excessive, see health care provider.

**Safety & injury prevention:** Less prone to falls than toddlers since they have better motor skills. But increased activity and skills, still pose a danger to them e.g. playing near streets. Are less reckless & can obey rules e.g. limits can be set and followed. But its time to imitate & adults should show adequate modelling.Common health problems of preschoolers: Otitis media, Colds, GIT disturbances

**School:** Prepare the child for school in a number of ways: - Show that school environment is adventure & fun, introduce child to social settings before, Set a “pseudo school routine” before the actual start, Stay with child in the 1st day, if possible. There are no absolute indicators for readiness to start school.

**Discipline & Limit:** Toddler use tantrum to get what they want .for pre-school; limits should be set and enforced so that the child can learn acceptable behavior.Punishment should be applied if a child crosses these limits.

# **CHAPTER SEVEN:**

# **GROWTH AND DEVELOPMENT OF THE SCHOOL-AGED CHILD (6-12 YEARS)**

**Introduction**

It an important stage for establishing self -esteem, sense of belonging, and feeling of competence. Child moves from egocentric thought to experiencing world through peers and school environment. Today’s child can experience the world beyond the classroom e.g. through internet, electronic mail, educational videotapes and cables television etc.

 **Physical development:** Hormones are influencing a lot of physiological change taking place. Brain and skull slow down growth. Weight increase by 5pds/year while height increases by 2 inches /year.

**Note: Growing pains:** **Occur because long bones grow faster than attached muscles affects 15% of schools aged children.**

Motor skills e.g. balancing, catching, throwing , jumping ,running are refined better .Girls tend to have better dexterity of fingers and hands ( fine motor skills) .While boys have greater number of muscles cells than females – hence better in gross motor skills e.g. throwing / running.

**Note: About 50% of schools aged (6-10yrs) have an innocent heart murmur not clinically important. Heard because of the Child’s thin chest wall. Respirations: 20 breaths /min**.

## Dental: Shed dental teeth and permanent appear. Start from 5yrs to adolescent except for 3rd molars (wisdom teeth).1ST permanent teeth appear by 6yrs – central incisors and first molars. Replacement rate is 4 deciduous teeth /year. Boys loose teeth later than girls. Flossing and brushing vital ie 2 times/day with soft bristled toothbrush which changed after every 2-3 months. Immunity develop well due to exposure to micro organisms – healthiest days of one’s life.

**Psychosexual development:** Freud called this stage latency where tere is identification with same sex parent by modelling their roles and behaviours .Also observes and learns from media, caregiver interactions and children of same gender.Last years of school aged period called prepubescence –2yrs before puberty .May be characteristised with as breast tissue development and menarche in females. In puberty secondary sexual characteristics begin.

**Cognitive development**: Less egocentric as was in pre-school age. Are more open and flexible in thinking as the interact with the ideas of their peers. The child is in concrete operations stage (Piaget) and portrays such characteristics as classification, conservation and reversibility. Vocabulary expands from 2,000-50,000.Language becomes a tool for communication and socialization.

**Psychosocial development:** Peers become a great socializing agent from caregiver. Behaviour is confined to pleasing friends and much of the time spent with peers to give the necessary support .Erickson called this stage – ‘industry vs. inferiority’ where there is competition and the great need to succeed. Child should be assisted to develop a positive sense of competence especially when he/she does not meet the expectations of peers, teachers and caregivers.Self concept**:** development of self esteem critical now. It is influenced by: -physical appearance, athletic activity, academic achievement, approval from caregiver and comparison with peers .caregiver educated on how they should respond to failures on inadequacy of their children especially on their weaknesses .

**Health promotion & maintainance:** Nutrition: the following needs to be done on nutrition: balanced diet; Break fast is emphasized as very crucial for academic and physical performance; nutrition education be part of curriculum; help them make choices for themselves but help them build appropriate health eating habits which they can carry to adult life and lastly fast foods should be avoided as obesity a possibility.

**Sleep/rest:** Promote adequate sleep .Thus for 6yrs-10hrs, 12yrs-8/9hours of sleep is adequate for good academic performance & physical growth. Lack of sleep may lead to irritability, nightmares/night terrors, less common in school aged children. But somnambulism / sleep -walking occurs in 15% of school – aged. More in boys than girls. These experiences are usually not remembered in the morning.Associated with nocturnal enuresis which the child out grows by adolescence. Somniloguy (sleep -talking) occurs at any age across life span. Not associated with any healthy concern

**Dental health:** Brush x2 / day and at least floss once bed time. The should be assisted because they lack dexterity. Dental check up done by paediatric dentist. Malocclusion –where permanent upper and lower teeth do not approximate, leaving then crowded or uneven .Referral to orthodontist is important .If braces are used, frequent flossing / brushing necessary.Evulsed(teeth that has been knocked out) tooth should be picked, rinsed in water and placed in its socket and a dentist contacted immediately.

### Safety and injury prevention: Major cause of death in this age is accident – hence the need for accident prevention. The reasons for this increase are increased independence; desire to have peer approval, increased involvement in physical challenging activities. Examples of accident include motor vehicles and firearm injuries.Safety rules:avoid talking to strangers, don’t accept rides from them ; avoid guns ,don’t assume a gun is not loaded; medicine kept out of children reach ; teach escape route in case of fire ; caution when crossing street, obey traffic light and bikes , skates board – wear helmet, elbow and knee pads

### Immunizations: Ensure that all the appropriate immunization is received, including boosters, common boosters include –dipheria, tetanus, Pertussis, Mumps, measles and Rubella (MMR). MMR – Booster required at 4-6 yrs or 11-12yrs. some lose this immunity in later ages

### Schools: The school should enhance physical, intellectuals and social development eg teachers should be role models

### Homework: Caregivers should actively participate in their children’s homework

### Play: Appropriate plays should be formulated but avoid limit those that encourage sedentary life e.g. computer games .Physical activities should be encouraged to sedentary life discouraged. Even children with physical limitation should be encouraged to participate using his abilities

# **CHAPTER EIGHT:**

# **GROWTH AND DEVELOPMENT OF THE ADOLESCENT (12-21 YEARS)**

#

**Introduction:** Adolescents start to focus on who they are; their uniqueness .It’s time for exploration, excitement and discovery, sometimes confusion and despair occur. Adolescence is second to infancy in terms of the amount of changes one experiencing both physically and psychologically. This stage can be divided as:

* Early 12-14 (prepubertal) –middle school
* Middle 15-17 (pubertal) high school
* Late 18-21 (post-pubertal) – post high school.

These levels may also relate to educational levels as seen above.

### Physiological development: Extensive physiological changes are taking place which affect psychosexual, social, cognitive development of the adolescent. These changes affect adolescents’ experiences with families, peers, and others in the social world .Body image and self esteem is also affected. It is important to differentite the term puberty and adolescence stages: Puberty- State of physical development (12-16yrs) for male and 10-14yrs for females, when secondary sexual characteristics begin to appear , sexual organ mature , reproduction possible , growth spurt begins. Adolescence:- Begins with puberty and ends when individual is physically and psychologically mature and able to assume adult responsibilities.The duration of this stage vary culturally and individually .

**Note: Puberty lies within adolescence period. Before puberty somatotropin (growth hormones) regulates body functions but after puberty, gonadal hormones responsible for most of the changes. Adolescent growth spurt [AGS] last for four and half years when the body assumes an adult appearance. Boys begin spurt at 13, Girls at 7.5-12years.**

These physiological changes may cause worry and embarrassment if they are not congruent with the peers. They may comparatively come earlier/later in which case counselling needed.

**Psychosexual development:** According to Freud, physical changes in puberty re-awaken the sexual and aggressive energies felt toward parents during early child hood .To effectively cope, adolescent need to re-direct these newly re-emerging energies from parental relationship to non- familial relationship – friendship, love, interest and career endeavours .Hence, they need detachment or separation from parents and may result to conflict with parents. The psychological changes in adolescence are attributable to physiological changes. The way an individual and others respond to these adolescence changes is vital. The changing body appearance seriously affects their self –concept –body image and self esteem.

**Health promotion:**  General nursing inteventions: Many adolescent not willing to seek health care because of financial concern, accessibility, characteristics of health care providers and confidentiality issues. Hence show respect, competence, warmth, compassion and understanding. Effective communication is vital to gain trust of the adolescents e.g provides. Caring environment, individualize care, strengths and weaknesses acknowledged, treat them with dignity –know them individually, assessment geared to promotion health improving it , relationship with family vital to establish and maintain – hence the need to involve family . Involve them in their care as much as possible. Help them take responsibility of their health as you guide them to make appropriate decisions. May need teaching a decision making .Environment and confidentiality are vital consideration when interacting with adolescent –e.g. May seek health care away from home .Hence consent may not always be sought from parent in case of underage (legally).The goals for adolescence health promotion: immunizations, nutrition,dental health, sleep / rest and activity, risky behaviour, safety, violence, motorvehicle,s exual activity, homosexuality, contraceptives, suicide, menstrual problems, pregnancy, chronic fatigue syndrome, STI, drug abuse & alcoholism and obesity

# **CHAPTER NINE: PEDIATRIC ASSESSMENT**

**Introduction:** Children undergo physical cognitive and social changes as they mature.-the nurses must be aware of these changes while continually reassessing what is considered within normal limits.

**Physical growth:** Parameter indicative of physical growth include: weight, length, height, and head circumference. The parameters can be normal/ abnormal depending on age.

**Health history:** In paediatric history, the historian is usually the caregiver, hence its important to know the relationship with the child.Include child with Hx taking depending on age/ development e.g. adolescents, school age .

**Components of paediatric health history**

**Biographical data:** The following components are important: Name of child & legal guardian care; Address and phone number - child or/and guardian. Source of information- other than the caregiver, other sources include: Medical/ school records, diaries, clinic notes etc.

**Client complaint:** Usually given by care giver – for infants, toddler & pre-schoolers whose age & mental status prevent them from offering genuine information? Older pre-schooler, school age & adolescent able to describe their complaint.

**Past Health history:** Birth history:Prenatal history – Planning, date of start of clinic, number of children/ abortions, medication. Illnesses in pregnancy.Labour/ delivery -gestation, labour duration, C/S or vaginal, analgesic age, Birth weight and length of neonate, Agpar score, where baby born i.e home/ hospital .Post natal: If went home with baby together?, Hospitalization days ,Breathing/ feeding problems early in life ,Medicine received, Bottle or breast feeding and fever after delivery.Medical history: hospitaization or OPD treatments.Injuries/ Accidents: eg repeat trauma may indicate abuse.Childhood illnesses:e.g. measles, mumps, rubella, chicken pox, pertusis.Immunizations status need tlo be confirmed.

**Family health history:** Inquire about age & health status (if dead, age, cause of death) of child’s mother, father, siblings, grand parents, ant & uncles.Family disease – like alcoholism, asthma, congenital disorders, mental retardation, diabetes mellitus, seizures, Sudden infant death synrdome need to be elicited etc.

**Social history:** Work environment - Schools, day care facilities – how much time spent there, academic performance. Home environment -potential exposure to lead – pregnancy and young children. Note that lead affects brain development & nervous system.Child’s Personal habits – check activities that the child enjoys, stress coping, temper tantrums and discipline measures used.

**Health maintenance activities:** Sleep-Naps, share bedroom etc.Diet should be tailored to child’s developmental level .Safety-use methods used for child proofing the environment

**Nutritional assessment -**Good nutrition is vital for optimal health and disease prevention. Appropriate nutritional habits should be built early in life.Nutritional assessment the basis of anticipatory guidance, identification of at risk individuals, referral as need be. There are various methods used to assess nutritional status:

* History of dietary intake
* Laboratory data
* Anthropometric data
* Physical examination

**Dietary intake and history:** Records of dietary intake e.g. food diary 24 hour recall.Type and amount of food information gotten. Know about liquids given. Dietary history depends on age. Quiestions relate to what is expected at that age e.g. balanced diet,fast foods/ snacks, dental care, Frequency ,adequacy.

**Note: Remember the different nutritional needs are based on age of the child.**

**Lab. Evaluation:** The tests that are ordered usually are albumin & pre- albumin .They reflects adequate calories & protein intake .Serum albumin – reflect previous month’s food intake.Pre-albumin reflects previous one week intake .Complete blood cell cont (Hb, hematocint & RBC indeces, iron status and cholesterol.

**Anthropometric data**

Measurement of parameters e.g. Height , weight, skin folds etc.Physical growth measured by weight, ht/length, skin fold thickness, arm circumference which indicate body fat stores, nutritional status and skeletal muscle mass.mDecrennnasedmmmmscle tone

**Physical examination:** Physical examination of all systems can indicate nutritional status eg in musculoskeletal system poor nutritional status will be indicated by reduced muscle tone, flappy muscle,bowing lower extremities, frequent fractures and weakness.in cardiovascular system- palpitations, swelling, cardiac enlargegement , changes in blood pressure, edema heart murmurs and tachycardia.

**Development assessment:** Used toassess developmental functioning.The purposes is to:-validate normal development, detect problems early, basis for anticipatory guidance and as identify caregivers’ concerns .Many tests can be used for developmental assessment e.g.

Carey – Revised infant (4-8m)- for sleeping patterns sand temperament

Denver Articulation screening test 2.5 – 6yrs)- intelligent and articulation

Denver II (Birth – 6 yrs) - Neuromuscular development)

Early language (Birth – 3 yrs)- Expressive and receptive components of speech

 Good enough – Harris drawing test ( 5-17 years)- drawing ability

Developmental profile II (B – 9 rs) – physical, Social & academic skills.

**Caution during testing:** Child’s performance can be affected by: Current illness, fear/ anxiety, deafness and blindness.Early detection of any abnormalities will leads to appropriate intervention and assistance

How do you make paediatric assessment successiful?

The following considerations are important in facilitating paediatric assessment

* Use game playing and distraction to increase cooperativeness e.g. small toys, wind up musical toys, humming/ whistling.
* Demonstrate procedure on a doll, stuffed toy or even the caregiver prior to performing them on the child.
* Explain procedure
* Warm equipment
* Invasive procedures should be done last e.g. ear inspection.
* Interview older children separately
* Caregiver present during assessment
* Room should be warm and quiet
* Provide comfort measures after painful procedures etc

**Assessment of different aspects of the paediatrci client**

**Vital signs:** Obtain these paramaters at beginning of assessment or during assessment of systems i.e blood pressure, pulse, respiratory, pulse – indicate the child’s basic physiological status.

**Temperature:** Oral, rectal, auxiliary & tympanic temperatures taken.Depends on age, condition, development stage.Rectal temp.– good for all ages but if diarrhea is there , no use < 2 yrs.Rectal perforation is also possible.Axillary temp. – all age but not very accurate & may not detect early changes in temperature .Oral temperature requires cooperativeness of the child.Taking of tympanic temperature is controversial.

**Respiratory Rate:** Obtained early in assessment when child is cooperative. If child crying, measurement becomes inaccurate and you need to retake it. Observe the expansion of the abdomen in infants and toddlers – chest muts may not be visible.

**Pulse:** An apical pulse is taken especially for children <2 yrs, all those with cardiac problems and those on digitalis preparation.Place stethoscope on precordium. Children over 2 years you can take the radial pulse .Tachycardia is indicative of fever, anxiety, dysrhythmias or medications.

**Blood pressure:** Choose correct cuff size.

You can use the following formulae in determining normal blood pressure in children who are one year and above:

Systolic = normal (80mmHg) + (2 x age in yr). Normal diastolic is usually 2/3 of systolic pressure.

**Physical growth:** Weight: Scale used depends on age of the child.Neonates usually lose 10% of Bwt by 3rd – 4th day after birth which they regain it by 2 weeks of age.This is called physiological weight loss – This is due to loss of extracellular fluid & meconium.Length/ Height –Length is measured for children <2yrs. May place child on supine position & measure head to heel. Other childrens height is measured just like in adults’ .Head circumference- For children <2yrs or a child with known or suspected hydrocephalus.Tape measure is used. It is placed anterioly just above the eyebrows and around posterioly to the capital protuberance. Normal growth size – 1-1.5cm/ month for 1st year. Small head circumference may indicate prematurity.Other problems could be microcephalus and hydrocephalus. Chest circumference –Measured till up to 1 year. Not useful by itself but compared with head circle to know about overall growth.Tape measure placed around chest at the nipple. It should be measured at end of exhalation from birth-1yr. Head circumference is initially bigger than chest circumference, after wards it is vice – versa.

# **CHAPTER TEN: FLUID AND ELECTROLYTE ALTERATIONS**

**Introduction**

Physiological factors responsible for fluid and electrolyte differences between children and adults include: Percentage and distribution of body water; body surface area; rate of basal metabolism and status of kidney function.Infants and children have a higher amount of body water than adults: Infants (80%); children(65% ); Adult( 50%) of body weight.Intracellular and extracellular fluid distribution also differs: 40% body water in newborns is extracellular fluid while 20% body water in adults is extracellular fluid. Extracellular fluid is lost usually faster.

**Note: Children reach adult water distribution at about the age of 5 years**

During vomiting, diarrhea, haemorrhage, ECF water is lost first. Therefore, children are more at risk for fluid alteration because a higher percentage of their body weight is water and more of that water is located in the extracellular compartment.Infants/children have a relatively greater body surface area than adults. Therefore, insensible water losses through the skin and lungs are higher in children.Infants and children also have a higher Basal Metabolic Rate (BMR). ONE to higher BMR, fluid intake per kilogram of body weight per day must exceed the per kilogram fluid requirement of an adult.Further, their bodies cannot regulate homeostatic changes as quickly as adults due to immature liver/kidney, hence more H20 to excrete a given amount of solute.Acid-base buffers: Substances that either release or absorb hydrogen ions to maintain a stable blood pH. Any condition that alters a child’s intake, elimination or need for H20/electrolytes has potential to cause imbalances. Common alteration: DH2O, Age, Edema and Burns

**Dehydration**

Due to the extracellular fluid loss. Large portion of child fluid in extracellular spaces (than adult) hence more susceptible to dehydration. Dehydration if not corrected can lead to hypovolemic shock and death.Types

1. Hyptonic: Na+ loss is greater than H20 loss hence serum Na+ falls below 130 MEq/L

Hence:Intracellular becomes more concentrated and body responds by moving fluid from extracellular spaces to intracellular spaces.Though this re-establishes osmotic equilibrium, it increases fluid losses and can lead to shock.

Causes: Inappropriate IV therapy, Gastroenteritis, Nephrosis, Adrenal insufficiency, not replacing gastric secretions

1. Isotonic DeH2O (Dehydration): Loss of Na+ and H20 equal, hence serum Na+ levels remain normal.Fluid loss both extra and intracellular. Since there is no osmotic variation, much loss comes through extracellular spaces.It is the most common type of DeH20 in children.Reduces plasma volume leading to hypovolemic shock.Losses are replaced by IV fluid high in Na+ to prevent a drop in Na+ serum level.Na+ is maintained at 130 MEq/L .Below 130 MEq/L – hypotonic DeH2O.
2. Hypertonic DH20: Loss of H2O is greater than the loss of Na+.May develops in infants who are treated for diarrhoea with high concentration fluids.Na+ goes beyond 150 MEq/L and serum osmolarity will increase. The body compensates by pulling H20 from intracellular spaces to intravascular compartment, hence intravascular volume is maintained and shock is less apparent. But it is the most dangerous type because the fluid replacement strategy is much more difficult to determine and manage.May result from sense vomiting and diabetes insipidus

**Incidence and Etiology:** Any procedure or illness that requires prolonged NPO status can result in DeH20.Infants or young children are the most vulnerable to DeH20.Conditions causing DeH20: Vomiting, Diarrhea, Burns, Hemorrhage, Nasogastric suctioning and drainage loss (excessive), NPO status or inadequate fluid or food intake due to illness, Overuse of diuretics or enemas, Adrenal insufficiency – ADH

**Clinical manifestation:** Depends on degree.Generally the following sysmptom will result: Weight loss, Rapid, thready pulse, Blood Pressure, Peripheral circulation, Urinary output, Specific gravity, Skin turgor-elasticity, Dry mucous membranes, Absence of fear, Sunken fontanel in infants.Clinical dehydration depends on weight loss.Thus:

* Mild - < 5% weight loss
* Moderate - 5-10% weight loss
* Severe - > 10% weight loss

**Diagnostic evaluation:** Based on clinical manifestations from physical examination, history and laboratory tests.

Therapeutic management: Depends on degree. The aim is to correct fluid/electrolyte imbalances and treat the underlying cause eg. Gastroenteritis

Oral rehydration therapy: For mild to moderate DeH20.Should contain:Glucose (20g), Na+ (90 MEq/L),K+ (80 MEq/L),Bicarbonate-Chloride (30 MEq/L).Caregivers need to know that the fluid contains the above concentrations.Don’t use fruit juices, soft drinks etc since they have high CHO and electrolyte .ORS can be made at home.Type of DH20 determine treatment e.g. Isotonic dehydration five isotonic fluids e.g. normal saline, ringer (RL) actate, Dextrose 5% in H20, Hypertonic solution – 10% glucose in H20, Dextrose 5% in RL Hypotonic H20. Oral route preferred but IV used if not possible or in severe state.Rate of fluid replacement depends on degree of DeH20. It is based on the child’s weight and clinical manifestations.Calculating Fluid loss from weight loss

1Kg of body weight loss = 1L of water

Therefore: 1Kg of weight loss = 1000mls of fluid loss

e.g. America Academy of Paediatrics recommends:

Minimal: <3% - 10ml/Kg ORS per stool

Mild: 5% - 50ml/Kg ORS in 4 hours after each loose movement

Moderate: 6-9% - 100ml/Kg ORS

Severe: >10% - a) Emergency

 b) IV, 40m/s/Kg/hr until child improves

 Then, 50-100ml/Kg ORS

1. Reassess oftenly

The IMCI guidelines are preferred as they are generally utilized in the clinical area.

**Nursing Management.**Assessment: Reduced perfussion – Skin pale and fray, cold skin, increased capillary refill time.Also check heart rate, BP and pulse (peripheral). Skin – dry and loose i.e. loss of skin turgor. This results in tenting of skin when pinched.Mucous membrane e.g. absence of tears (5% of weight loss). If below 18m, to check fontanel (anterior).epressed/sunken. Intake and output assessed – urine, stool, enesis, wound drainage etc.Semi-electrolyte results reviewed.Family teaching is important – Sign and symptoms, administration of ORS. Judging the state and knowing when to seek medical help e.g. after 4 hours rehydration with no improvement, inability to retain fluids, urine output reduction and change in mental alertness

**ACUTE GASTROENTERITIS:** Diarrhoearal disease of rapid onset with or without accompanying manifestations e.g. nausea, vomiting, fever, abdominal pain.Inflammation of the membranes of stomach, intestines.Usually self-limiting but prolonged disease; cause DeH20 (morbidity and mortality)

**Incidence and Etiology;** Common in children attending common facilities e.g. day-care centres, schools and other institutions.Etiology: Viruses, bacteria and parasites eg Rotavirus, Shigella, a) Criardia lamblia, Norwalk virus, Salmonella, Cryptosporidium, adenovirus, Camphylabacter, entamoeba histolytica, eschirichia coli, clostridium difficile, and yersinio.

**Pathophysiology:** Viral – poorly understood, but thought to cause damage to the epithelial cells lining intestines. Bacterial gastroenteristis: Destroy mucosal cells hence reduce SA for fluid/electrolyte absorption; Penetrate musoca and submucosa – necrosis, ulteration and may enter systemic circulation; Organism produces enterotixins that stimulate secretion of fluid and electrolyte from small intestines. Enterotoxins also interfere with surface area of upper intestine e.g. shigella, enterotoxigenic, E.coli

**Clinical manifestations:** Depends on causative organism

General Sign and symptoms include: diarrhea, nausea, vomiting, abdominal pain, weight loss, fever, and DH20 and electrolyte imbalances.Others: malaise and lethargy

**Diagnostic evaluation**Based on history and physical examination and lab tests.Hydration status should be assessed.

**Therapetiutic management:** Depends on degree of dehydration. Aim is to replace fluid and electrolyte. Therefore, adequate caloric intake and fluids are appropriate.Use of antiemetics is not recommended because the vomiting/diarrhea are body’s means of eliminating infecting organisms.Use of antibiotics, not necessary unless in <3 months e.g. who may get salmonella bacteremia.Shigella and salmonella infections are self-limiting usually).Parasitic infections e.g. metronidazole use.Nursing interventions include: Administer oral rehydration solution to replace fluid and electrolytes: administer and monitor IV fluids as prescribed – IV therapy based on degree of DeH2O; check urine specific gravity shortly if increasing in DeH2O; weight taking, daily same time, in order to monitor effectiveness of rehydration; maintain intake/output by evaluating hydration status and effectiveness of fluid replacement.Evaluation:Child has signs of normal hydration e.g. presence of tears, improved skin turgor, moist mucous membranes.Family Teaching on :- preventing, most effective treatment – Careful handwashing after diapering, toileting, before feeding, eating, food preparation; change diaper for acidic stool frequently to prevent urination of skin; wash perineal area with soap and H2O after each diarrhea; apply protective ointment to bottom; teach caregiver about when to contact healthcare provider e.g. blood in diarrhea, child doesn’t urinate for >6 hours, cries and produces no tears etc.

**BURNS:**Great advances have been made with the treatment of burns in the last 50 years, hence better survival of these children. Burns usually result from accidents that could be prevented. Hence, a nurse needs to further teach caregivers preventive measures.

**Incidence and Etiology:** depends on cause:

* Thermal – most common in children; mostly from flames, explosions/flash, scalds, contact with hot objects
* Electrical
* Chemical
* Radiation – over-exposition to UV rays

Determination of cause of burn is vital because some result from child abuse.

**Pathophysiology:** Burns **r**ange from minor local injury to burns with multisystem involvement

 All systems are affected. In the first 24-48 hours the following happens in respective systems:

 Cardiovascular: decrease in cardiac output due to increased capillary permeability and vasodilation, increase in metabolic acidosis hematocrit.Renal ststem: decreased blood flow to the kidneys resulting in decrease in urine output, increased creatinine. GIT-decreased performance of GIT, decreased acid production in 48-72 hours, later increseas in production which cause complications of peptic ulcers may result in increased acid production and the risk of stress ulcers, decreased GIT motility.Metabolism; rapid protein breakdown and muscle wasting, increased metabolic rate from nitrogen loss and stress of injury, increased heat loss through damaged skin, increased blood glucose levels due to insulin resistance and breakdown of glycogen stores; delayed growth and maturation from need to use energy to repair burned tissues

**Clinical manifestations:** Severity determined by depth and surface area.

Categories of burns based on depth of tissue destruction:

**Superficial (1st Degree):** Epidermis, painful (very)/ red, heals easily in 5-10 days, no systemic effects and no scarring.

**Partial thickness (2nd Degree): u**pper layer of dermis, bright red, moist, Painful (extremely), sensitive to cold air, blistered, heals in 14-21 days with some scarring if deep dermal layer involved.

**Full thickness (3rd and 4th Degree):** Epidermis and dermis and subcutaneous tissue, form eschar (thick leather-like dead skin), whitish , leathery.dry appearance, less painful, scarring, and contractures may form.

**4th degree** – tendons, bones and muscles involved. Usually electrical burns. Requires skin grafting, skin flaps, possible amputation to full heal.

**Estimation of percentage Burns**

 **Adults (rule of nines) Child (rule of sevens)**

Head: 9 28

Trunk: 36 28

Legs: 18 each 14 each

Arms: 9 each 7 each

Perinium: 1 2

**Diagnostic evaluation:** Clinical manifestation and physical examination

**Therapeutic management: The aim of the treatment targets:** ABC: Fluid rescusitation and respiratory management, Pain management, Wound cases, Nutritional support and psychological management.

**Respiratory management**: Airways. Oxygen if needed especially in upper body burns, facial bruises and smoke inhalation burns

**Fluid Resuscitation**: Especially in 1st treatment – prevent hypovolemic shock due to increased capillary permeability.Ringers lactate usually used. Child body weight and % of burned area determine fluid volume and rate of administration.

**Parkland Formula for calculationg resuscitation needs:** 4 mls of lactated Ringer solution x Kg of body weight x % total body surface area burned divided into one-half of total 1st 8 hours post-burn; quarter next 8 hours and then quarter the next 8 hours

Foley Catheter is inserted to determine urine output measurement.Signs of recovery: having regained capillary permeability and urine output and decreased IV fluids to avoid fluid overload and pulmonary edema

**Pain management:** Burn pains – Acute and Chronic.Pain compounded by performing procedures on the wound e.g. dressing. Fears and anxiety increase pain perception. Major burns – narcotics e.g. morphine. Minor burns – acetaminophen. Given before any painful procedure. Other pain-alleviating procedures – Behavioural interventions (imagery, relaxation, hypnosis, music therapy)

**Wound Care:** After stabilization.Aseptic technique.Clean and debrided – removal of dead tissue (very painful).Wound soaked for 10 minutes and then washed from inner to outer edges using firm, circular motion (cut dead tissue with forceps).Apply antimicrobial cream e.g. silver sulfadicizine; others: silver nitrate, magenide acetate (suitamylon cream).Hydrotherapy can be used to soften dead tissue. Dressing Ded x ½ /day.Grafting:4 full thickness burns (autograft) taken from unburned area of child’s own skin.After graft heals, pressure dressing applied to avoid contractures formation and minimize scarring (uniform pressure important for these dressings).

**Prevention of impaired mobility:** Increased risk to impaired mobility, contractures due to: Increase bed rest, Muscular atrophy and shortening, Stiffening of burned tissue, appropriate pstition and exercise to prevent the above, e.g.: Range of motion exercises e.g. use toys perfumed x 3/day.Analgesics also important.

**Nurtitional support:** Burned child require 2-3 times the normal calorie.Diet: Increased proteins 23% of total calories, Multivitamin leading to C & A increase.Psychological support: Play therapy.Counseling leading to increased self-esteem and family financial concerns.Family Education: Nutrition and diet;daily dressing and skin care; exercise (range of motion exercise) elasticized garments.Prevention of burn injury: Smoke detectors; escape route keep hot items away e.g. hot liquids and chemicals kept out of reach.

# **CHAPTER ELEVEN: GENITAL URINARY ALTERATIONS**

**URINARY TRACT INFECTIONS**

**Classification of urinary tract infections (UTI)**

Lets us now classify urinary tract infections.

Lower rinary tract infections e.g cystitis and urethritis and Upper urinary tract infections e.gPyelonephritis.

**Incidence/ etiology of urinary tract infections**

Most common problem of genitourinary tract. UTI in newborns approximately is approximately 1%. At 1year – more girls than boys are affected. More common in uncircumcised more than circumcised boys.The bacteria commonly involved include Escherichia coli which is common in GIT and perianal skin.Others include Klebsiella , Enterobacter,Proeteus spp, and Pseudomonas. These later four are associated with complicated UTI, often in children with chronic conditions that alter urinary tract eg neurogenic bladder in spina bifida. Virus, fungi (eg candida) may cause UTI.

**Pathophysiology:** Short urethra in female increases vulnerability while long urethra in males decrease vulnerability. Structural anomalies e.g. neurogenic bladder, vesicoureteral reflux common in children with spina bifida, urinary catheters, urinary stasis, and obstructions may predispose to UTI.

**Clinical manifestations:** Vague in young children,Older child,Malodorous urine,Dysuria (diff & painful urination),urinary frequency ,fever,vomiting ,diarrhea,irritability ,poor feeding ,loss of appetite ,flank pain,avoidance of urination and hematuria**.** Infants mayportray with the following features**:** malaise, malodorous urine, irritability/ colic, Jaundice neonates, fever, poor feeding, poor weight gain, vomiting & diarrhea.

Let us duscuss specific infections affecting the urinary system.

**PYELONEPHRITIS**

This can be acute or chronic. Pyelonephritis is a bacterial infection of the renal pelvis, tubules, and interstitial tissue of one or both kidneys.Let us now start with acute pyelonephritis.

**ACUTE PYELONEPHRITIS:** Upper UTIs are associated with the antibody coating of the bacteria in the urine. Bacteria reach the bladder by means of the urethra and ascend to the kidney .Children with acute pyelonephritis usually have enlarged kidneys with interstitial infiltrations of inflammatory cells. When pyelonephritis become chronic, the kidneys become scarred, contracted and nonfunctioning.

**Clinical manifestations:** The child with a cute pyelonephritis presents with chills, fever, leukocytosis, bacteriuria and pyuria and flank pain. Symptoms of lower urinary tract involvement like dysuria, and frequency are common

**Diagnostic evaluation:** A ultrasound study or CT scan may be performed to locate any obstruction in the urinary tract. Urine culture and sensitivity tests are performed to determine the causative organism so that appropriate antimicrobial agents can be prescribed.

**Therapeutic management:** Children with acute uncomplicated pyelonephritis are usually treated as out patient, if they are not dehydrated, not experiencing nausea or vomiting and not showing any signs or symptoms of sepsis.Pharmacological therapy for outpatients, a 2 weeks course of antibiotics is recommended because renal parenchymal disease is more difficult to eradicate than mucosal bladder infections. Commonly prescribed agents include: ciprofloxacin, gentamicin, or a third- generation cephalosporin. These medication must be used with great caution of the patient has renal or liver dysfunction. A possible problem in acute pyelonephritis treatment is a chronic or recurring symptomless infection persisting for months or years. A follow up urine culture is done 2 weeks after completion of antibiotic therapy to document clearing of the infection.

**CHRONIC-PYELONEPHRITIS:**Repeated bouts of acute pyelonephritis may lead to chronic pyelonephritis.

**Clinical manifestations:** The child with chronic pyelonephritis usually has no symptoms of infection unless an acute exacerbation occurs. Noticeable signs and symptoms include:fatigue, headache, poor appetite, polyuria,excessive thirst ,weight loss.Persistent and recurring infection may produce progressive scarring of the kidney, with renal failure.

**Diagnostic evaluation:** The extent of the disease is assessed by an intravenous urogramand measurement of creatinine clearance and bun and creatinine levels.

**Complications:** Complications of chronic pyelonephritis include; ESRD (end-stage renal disease) from progressive loss of nephrons secondary to chronic inflammation and scarring; hypertension and formation of kidney stones.

**Therapeutic management:** The choice of antimicrobial agent is based on which pathogen is identified through urine culture. If the urine cannot be made urine free, nitrofurantoin may be used to suppress bacterial growth.Important nursing management.

The child may require hospitalization or may be treated as an outpatient. When the child is hospitalized, fluid intake and output are carefully measured and recorded. Unless contraindicated, fluids are encouraged (3 to 4 days) to dilute the urine, decrease burning on urination, and prevent dehydration. Nurse assesses the child’s temperature every 4 hours and administers antipyretic and antibiotic agents as prescribed.Nurse educates the parents or child on prevention of UTIs by consuming adequate fluids, emptying the bladder regularly and performing recommended perineal hygiene. Nurse emphasis the importance of taking antimicrobial medications exactly as prescribed. Now let us duscuss an example of lower urinary tract infections.

**CYSTITIS**

It’s the inflammation of the bladder.

**Pathophysiology:** Gram negative organisms that enter the urinary bladder, the major organism is the Escherichia coli. Normal flora in the bladder initiates the inflammatory reaction that affects the inner wall of the bladder. Depending on severity may cause hemorrhagic cystitis i.e. bleeding through the bladder walls.

**Clinical manifestations:** Cystitis is characterized by severe irritable voiding symptoms (day and night frequency, nocturnal, urgency); Pain and discomfort (suprapubic pressure, pain with bladder filling, suprapubic or perineal pain and pressure) markedly diminished bladder capacity.

**Assessment and diagnostic evaluation:** The diagnosis is made by excluding other causes of the symptoms. Urine culture and sensitivity is done. Urinalysis will also be done.

**Therapeutic management:** Treatment strategies include use of medications that target pain and discomfort. Pharmacologic therapy involvesTricyclic antidepressant medications (doxepin and amitriptyline) which have central and peripheral anticholinergic actions may decrease the excitability of smooth muscle in the bladder and reduce pain and discomfort. Use of the appropriate antibiotics.Nursing management involves focus on health promotion. Ensure that the child empty the bladder regularly. Wipe the perineal from front to back. Take adequate amount of fluids. Avoid caffeine, chocolate, because they cause bladder irritation. Urethritis is also an infection of the upper urinary tract.

**URETHRITIS:** It’s the inflammation of the urethra. It’s usually an ascending infection and may be classified as gonogococcal or non-gonococal. Non-gonococcal urethritis is usually caused by Chlamydial trachomatis or ureaplasma urealyticum.

**Diagnostic evaluation:** It’s very difficult to diagnose since the bacteria is in the urethra tissue and not in the urine. Culture of split urine collection is done.

**Therapeutic management:** Use of antibiotics like tetracycline, or doxycycline and erythromycin. Nursing Management is the same as in cystitis. Prevention of urinary tract infections is very important.what general education should you teach your client on preventive measures?

**General patient education on preventing recurrent urinary tract infections**

* Hygiene: Shower rather than bathe in tub because bacteria in the bath water may enter the urethra.After each bowel movement, clean the perineum and urethral meatus from front to back. This will help reduce concentrations of pathogens at the urethral opening and in girls the vaginal opening.
* Fluid Intake: Drink liberal amounts of fluids daily to flush out bacteria.Avoid coffee, tea, colas and other fluids that are urinary tract irritants.
* Voiding Habits: Void every 2 to 3 hours during the day and completely empty the bladder. This prevents over distension of the bladder and compromised blood supply to the bladder wall.
* Drug therapy: Take medication exactly as prescribed.

**INGUINAL HERNIA & HYDROCELE**: These conditions aresimilar in clinical manifestations and treatment.Inguinal hernia is a scrotal or inguinal swelling or both that include abdominal contents.The incidence is 10-20: 1000 live births. Common in boys than girls 4:1.Incidence increase with prematurety & Low bith weight. Those receiving dialysis due to increased abdominal pressure are also at higher risk. Infantile Inguinal herniais diagnosed in first month of life. Hydrocele occurs in 6% of full term boys.

**Etiology:**  Inguinal hernia occurs when abdominal contents exit Peritoneal cavity & protrude into processus vaginalis (a fold of peritoneum that precedes the testicle as it descends through the inguinal cal into the scrotum) .An incomplete or abnormal obliteration of the processus vaginalis at birth allows peritoneal fluid/ abdominal contents to enter the scrotum which result in hydrocele/ hernia. Processus vaginalis follows same descending pathway of the testes into the scrotum.common clinical manifestation include:

* Inguinal hernia – cause bulge/swelling in scrotum/ groin – size increase with increased abdominal pressure.
* Pain if strangulated – possible necrosis & perforation – irritability, vomiting, abdominal distension, tachycardia.
* If hydrocele is present: Scrotal swelling is painless & doesn’t change in size/ shape when abdominal pressure increases with by cough, cry, not reducible & easily transiluminated.

The diagnosis is made through physical examination of scrotum, anginal area.Differentiated by; hermia – boggy, reduced by pressure & reducible (usually) while hydrocele – fluid filled, feel tense and not reducible.

**Therapeutic management**: Inguinal hernia herniorrhapy is done outpatient basis.For hydrocele it resolvess within 1 year of age-spontanouesly. If not, means hermia present & repair same – hydocelectomy.

**ACUTE GLOMERULONEPHRITIS**

This is sudden inflammation of glomeruli within the kidney which results in acute renal failure.Glomerulus gets damaged, hence referred as intrarenal acute renal failure. It may affect glomeular capillaries or membrane.

**Incidence/ Etiology:** Rare in <3yrs and peak at 7 years. More common boys: girls 2:1.Infectious agent is usually in the body 2-3wk before clinical manifestation.It could be bacterial (streptococcus group A-commonest) E.g. acute post streptocccocal glomemlonephritis or viral.

**Pathophysiology:** Viral or bacterial agents invade body. Immune system produces antibodies against them.Antibody/ antigen reaction in the kidney glomeruli forms immune complexes and inflammation occurs. End result is scared/ damaged glomeruli.Membrane permeability altered by immune response – protein leak into urine.Glomeruli filtration rate decreases. Sodium and water are retained and oedema occurs.

**Clinical manifestations:** hematuria, dependent & periorbital edema, diminished urinary output, proteinuria, Increased BP, fatigue decrease glufiltration, increased serum Na+ level & increase K+ levels,BUN & creatinine increase, low grade fever and urine becomes blood- tinged, smoky or tea coloured.

**Diagnostic evaluation**: Based on clinical manifestations above, physical examination, immunologic tests to detect streptozyme and Serum complement

**Therapeutic treatment:** Depend on degree of kidney damage.The aim is to treat source of inflammation, maintain fluid & electrolytes and maintain BP within normal range

For a child with normal BP & urine outputs, you can manage at home.Those with oedema, increase Bp, oliguria, hematuria are hospitalized because acute renal failure may occur.If there is generalized oedema diuretics need to be used. Increased BP use antihypertensives. Dietany restrictions based on degree of BP & edema eg Na+, K+, fluids.

**NEPHROTIC SYNDROME**

Characterized by heavy proteinuria(>3.5g/day in adults or 40mg/m2/hr in children), hypoalbuminemia(<2.5g/dl), edema, hyperlipidemia and hypercoagulability, plus or minus hypertension.

**Types:**

* Idiopathic (primary) – due to glomerular disease of kidney. The most common type.
* Secondary – renal malfunctioning due to systematic disease, drugs or toxins e.g. hepatitis, systemic lupus erythematosis, lead poisoning, child cancer therapies – put stress on the renal system.
* Congenital nephrotic syndrome - Infants with nephrotic syndrome within 3 months of life are considered congenital.The common cause is the-Finnish type congenital nephrotic syndrome. An autosomal recessive disorder,common in Scandinavian descent pop.(1:8000 incidence) in which there is a mutation in NPHS1 gene located on chr 19 which encodes nephrin protein.

**Etiology :** More common in males than females ie 2:1.It commonly affects those aged between 2-6yrs.Idiopathic type is thought to be immune response while the other is caused by infections,drugs and toxins as dicussed above.

**Pathophysiology:** Theinflammation process from immune response or disease makes glomeruli to become permeable to proteins (protenuria).Fluid shift from intravascular to intestinal space which subsequently leads to odema/ ascites, hypovalemia

**Clinical manifestations:** Mild edema initially around eyes and lower extremities, Generalized edema later with devt of ascites, pleural effusions, genital edema, Anorexia, irritability,abd pain & diarrhoea are common, Hypertension & gross hematuria are uncommon, Common in males than females (2:1), Commonly btn ages 2 and 6 years.

**Diagnostic evaluation:** Dependent upon proteinuria.Urinalysis shows protein, red blood cells, serum album, serum cholesterol, triglycerides, creatinine, hematocit, platelet count.

**Therapeutic management:** The aim of management to reduce protein, oedema and prevent infection.The mainstay of treatment is corticosteroids e.g. prednisolone which decrease inflammation and loss of proteins hence restoring oncotic pressure and promoting dieresis .The period of treatment is usually 4-8wks. Relapse is a possibility. Immunosuppresants e.g. cyclophosphanide, chlorambucil and cyclosporine are used. Antibiotic may be required incase infection due to excessive use of steroids.Diuretics like frusemide can be used but because they can cause a decrease in Na+ K+ & decrease hypovolemia monotoring electrolytes closely is important. Decrease salt intake because of edema & increased blood pressure. Diuresis-IV chlorothiazide(10mg/kg/dose BD) followed by furosemide 30 min later (1-2mg/kg/dose bid). IV 25% human albumin(0.5g/kg/12hr. Check complications:symptomatic volume overload,hypertension,heart failure. Steroid resistant patients-cyclosphosphamide(2-3mg/kg/2hr as a single dose in 8-12 wks. Complicated nephrotic syndrome-high dose pulse methylprednisone(30mg/kg bolus every other day up to 6 doses. ACE-I and Angiotensin II blockers helpful as adjuvant therapy to reduce proteinuria in steroid resistant patients.

**Nursing considerations:**  Maintain fluid & electrolytes, administer medication and prevent infection and skin breakdown. Mild-moderate edema may be managed as out patient, with low sodium diet,oral diuretics may be used. Severe symptomatic edema,including large pleural effusions,ascites or severe genital edema should be hospitalized. Fluid restriction necessary if child is hyponatremic. Swollen scrotum-elevated with pillows to enhance the removal of fluid by gravity. Reducing excretion of urinary protein, Reducing fluid retention in the tissues, Preventing infection, Minimizing complications related to therapies.

**HEMOLYTIC UREMIC SYNDROME**

This is an acute renal disease that often lead to acute renal failure

**Incidence/ etiology:** Uncommon and affect usually children aaged 6m-3yrs old. Around 80% of them are under 4 yrs. The exact etiology is not determined but is associated with: bacterial toxins, viruses and chemicals.The common causative organisms are**:** E.coli, Shigella, Rickettsia, Coxsackievirus, Echo virus, Adenovirus, Salmonella and Pneumococci.

**Pathophysiology:** Its complex. Bacterial invasion of GIT and multiply causing vomiting diarrhea, and peristalsis reductrion. Endotoxin produced by bacteria also damage capillary walls through inflammation and surrounding vessels get occluded.This process can also occur in renal system.Damage to endothelial lining of the affected tissue swell & platelets move there.This causes clot formation & intravascular coagulation – decrease blood flow in renal system.Rennin produced which increased BP.Platelets, RBCs damaged causing thrombocytopenia. Involvement of the renal system causes decrease glomerular filtration which decrease urine output & acute renal failure with increased BP occurs.Note that inflammation & clot can occur in any system but common in:gastrointestinal system,respiratory system and genitourinary as examples.

**Clinical manifestations:** Involves a triad of acute renal failure, thrombocytopenia and anemia (hemolytic).In the early stages of the disease process there is diarrhea/ vomiting, URTI, irritable, lethargic, anorectic, anemia, platelet decrease bleeding, bruising pumpura and high blood pressure.

**Diagnostic evaluation:** physical examination will reveal hepatosplenosmegally, increase BP and edema. Full heammogram also need to be done.

**Therapeutic management:** Symptomatic is the main approach to management.If renal failure & electrolyte imbalance hasd occurred, hemo-or peritoneal dialysis especially for anuric children, oliguria, high BP & experiencing seizures. Treat the increased bloop pressure. Treat metabolic acidosis with bicarbonate therapy as kidney are not able to buffer acids .Institute fluid restricting if necessary.

**RENAL FAILURE**

Condition that affects kidney and hence its functioning.It can be acute or chronic.

**ACUTE RENAL FAILURE (ARF):** Sudden onsets of impaired renal function.Most children with ARF regain function. ARF classified according to part o renal system affected, thus we have pre -renal, intra- renal and post- renal failure.

**Etiology /incidence:** ARF is uncommon but can be life threatening.Pre- renal – sudden decrease in renal blood flow or perfusion to kidney.Common cause include; DH2O, hypovolemia,shock, sepsis, renal artery obstruction and perinatal asphyxia.Intra renalis due to damage of kidney tissues . Causes of intrarenal ARF include: antibiotics e.g. aminoglycosides & other nephrotoxic medication, contrast dyes, ureterovesical obstruction, hemolytic uremic syndrome, glomerulonephritis, pyelonephritis and other injection. For post renal, it’s due to obstruction of urine at some point between kid & uinary meatus. It’s on outflow obstruction that cause “back-up” of urine and put pressure on endothelial lining & ultimately diminishing renal function. Causes can be utero or post natally e.g. posterior ureteral valves, ureterovesical obstruction – an obstruction at junction of the ureters into the bladder; ureteropelvic obstruction-obstruction at the junction of the ureters into renal pelvis; neurogenic bladder – without innervations; wilms tumor – a nephroblastoma or solid mass which is the common renal tumor in children and renal calculi.

**Clinical manifestations:** electro & fluid imbalance, metabolic acidosis, dehydration, Pallor, lethargic, anorexia, vomiting and seizures.

**Diagnostic evaluation**: Through history, laboratoryevaluation and physical examination.

**Therapeutic management:** The aim is to restore renal perfusion and correct electrolyte and fluid imbalance .Management modalities include: fluid & Na+ restriction if increased, dialysis if there is congestive heart failure or severe increase bloop pressure. Metabolic acidosis and hyperkelemia need to be corrected.

**CHRONIC RENAL FAILURE (CRF):** Progressive disease. Irreversible damage has taken place for 50% renal function & the condition has lasted for at least several months.If considered permanent/ irreversible – end stage renal failure (ESRF) is diagnosed.Chronic renal failure first progresses to uremia (where toxic nitrogenous waste products, blood urea, creatinine build up in system) and if not reversed thee patient will to ESRF.

**Etiology:** It is associated with prematurity, nephrotoxic medications e.g. aminoglycosides, renl obstructions, glomemlonephritis, and pyelorephritis. Immunological dysfunction may also cause injury to renal system. Pathophysiology is variable and depends on cause.

**Clinical anifestations:** Fluid & electro imbalanace , dehydration oedema, metaborlic acidosis and systemic increase in blood pressure, anemia, Pallor, fatigue, anorexia, vomiting, slowed linear growth, organic failure to thrive, renal bone disease/ osteodystrophy.

 **Diagnostic evaluation:** Is through history, laboratory evaluation and X-rays of long bones to detect any osteodystrophy.

**Therapeutic management**: the aim is to restore & maintain fluid & electrolyte balance.For edema restrict fluid amd use diuretics ,increase in blood pressure use antihypertensives,restrict proteins , vitamin D supplement used to boost ca++ levels to deal with bone disease. If above treatment fail renal transplantation is done

**STRUCTURAL DEFECTS**

Let us now look at one example of structural defect.

**CRYPTORCHIDISM:**

Cryptorchidism or undescended testicles, is the failure of one or both of the testes to descend into the scrotum. At full term birth, less than 3% of the males’ population is affected .In utero; the movement of testes is initiated by androgenous hormones. Failure to descend may be related to hormonal deficiency or mechanical problems such as a narrow inguinal canal, a short spermatic cord, or adhesions.

**Clinical manifestation**: Since proper fuction of the testes depends upon a temperature cooler than 98.6F, failure to descend leads to decreased function and eventual atrophy of the cases with an inguinal hernia on the involved side.

**Therapeutic management:** Orchiopexy is the preferred treatment. The testis is surgically brought down into the scrotal sac and kept in position by any approprieate different traction devices such as a button on the outer scrotal surface or an elastic band attached to the thigh. Choice of the device is up to the surgeon. If the testis cannot be positioned the surgeon may elect to remove it to minimize the risk of malignancy. If cryptorchidism persists into adolescence, sterility may result. Risk of malignancy is elevated if atrophy occurs.Nursing management involves: Preoperative assessment reveals an empty scrotum with unilateral or bilateral testes palpable in the inguinal canal. Preoperative prescription need to involve the use of a tension device. Post-operatively the nurse checks the device for proper tautness. Bed rest is maintained until the tension suture is removed, usually in a few days.Analgesics, ice packs are often used to relieve pain and thus enable the child to tolerate keeping his leg extended.

# **CHAPTER TWELVE: GASTROINTESTINAL TRACT (GIT) ALTERATIONS**

The chapter discusses some alterations affecting upper gastrointestinal system.

**CLEFT LIP & CLEFT PALATE:** Cleft is an elongated opening tissure. Cleft lip and palate is the most common congenital anomalies of newborns. One may have one or both affected. Development of lips, nose, muscles & palate is affected. The degree to which these structures are incomplete/ malformed depends on type, severity and placement of the clefts.

**Prevalence and etiology:** The incidence rate is 1:5:1000. Cleft of lip without palate more common in males cleft of palate alone more common in females.The etiologies include:genitical, environmental factors – alcohol (mother) maternal age, vitamin, deficiencies, phenytoin, diazepam and folic acid.

**Pathophysiology:** Cleft lip caused by failure of the nasal & maxillary processes to fuse between the 5th & 8th week of gestation.Cleft palate is due to failure of the palatine plates to fuse between 7th – 12th weeks gestation.

**Clinica manifestations:** Cleft lip can occur on one side or both sides.Cleft palates can occur on the hard or soft palate.Diagnosis is usually made at birth by inspection and palpation.

**Therapeutic management:** Surgery is done.Closure of lip at 3months while palate at 1 year for effective feeding/ speech development. Some long term difficulties may occur eg speech difficulties, malocclusion ie abnormal teeth eruption, hearing problems from reccurent, otitis media due to abnormalities of eustachian tube.Nursing aspects of the management include: imbalanced nutrition – e.g. poor feeding/ BF ; interruption in bonding ; risk of injury & infection; pain related to surgical procedures; deficient knowledge related to the disease,treatment and prognosis; psychological care of the caregiver; protect operative site after surgery ; small metal strip (loganbow/ butterfly adhesive placed overs the upper lip & taped to the infants cheecks to prevent tension on suture line.Pain medication given because of pain.Teaching is important on feeding ,care of operative site, offer small H2O after feeding to discourage bacterial growth and inform caregiver that more surgeries might be required as the child matures.

Let us now move on and examine some alterations of the lower gastrointestinal system.

**Intussusception:** Its where **o**ne segment of bowel telescopes/ invaginate into the lumen of an adjacent segment of intestines.Most frequent cause is intestinal obstruction in infants/ young children .It peaks between 3rd – 9th month.twice as common in boys as girls.

**Etiology:** Usually not identifiable .Sometimes polyp, foreign body or viral infection.

**Pathophysiology:** Bowel telescoping/ invagination causes walls of bowel to press on one another compromising blood flow.Involved intestines get inflamed, edematous and bleeding occurs and appear in stool.Later complete bowel obstruction occurs with susequent abdominal distension and vomiting .If not treatment is instituted necrosis and perforation occurs.

**Clinical manifestations:** Four classical manifestations include: colic, intermittent abdominal pain (sudden), vomiting – early and red currant jelly- like stools.But these are present only in 50% of those with disease.Others present with sausage- shaped mass felt right upper Quadrant. Later other symtoms set in: listless, lethargic, weak, thready pulse, shallow respirations and increase body temperature.

**Diagnostic evaluation:** Barium or air contrast enema – but invasive & radiation exposure; abdominal ultra sound and X-ray non specific but more show intra peritoneal air (perforation).

**Therapeutic management:** Non – surgical hydrostatic reduction using barium, a water soluble contrast agent or air enema (air insufflations – blowing air into a cavity).Air & H2O use safer than barium because of bowel perforation risk.Air is 90% successful while water or barium is 65-85% successful. If there is perforation, peritonitis, shock occurs.If the above doesn’t work; surgical intervention to reduce (manually) intussusceptions.Nursing management includes: NPO status, Monitor vital signs for worsening state, - reassure caregiver who may worry due to suddenness of disease onset and surgical care pre-operative care. Family teaching**:** Caregiver to observe signs of intestinal obstruction/ recurrence eg abdominal pain, abdominal distenson, blood in stools and bile stained vomiting.

**HIRSCHSPRUNG’S DISEASE (HD):** Also called congenital aganglionic megacolon.Motitlity disorder due to absence eg parasympathetic ganglion cells in colon hence no peristalsis & feces accumulate proximal to defect – bowel obstruction. Most common cause of distal bowel obstruction in the newborn that but may not be diagnosed until infancy or childhood. Common in males x 3 -4 than females.

**Etiology:** Has some genetical link in 7% of cases. Aganglionic segment located oftenly in recto-sigmoid area. Affected area unable to transmit coordinated peristaltic movement/ waves. Proximal to the defect, fecal matter accumulates & distension occurs. This causes hypertrophy & dilation (megacolon).

Patients can be classified by the extension of the aganglionosis, as follows:

Classic short-segment HD (75% of cases) - Aganglionic segment does not extend beyond the upper sigmoid, Long-segment HD (20% of cases), Total colonic aganglionosis (3-12% of cases)

**Clinical manifestations**: In new born, failure to pass meconium, within 24 hrs – 48 hrs after birth, abdominal distension, bile starved vomiting, refusal to feed and intestinal obstruction. In infants & children you notice chronic constipation (initial), abdominal distension, poor weight gain, episodes of explosive passage of stools, vomiting , ribbon – like or pellet shaped foul – smelling stools.The major danger is development of enterocolitis ie the inflammation of small and large intestines.Enterocolitis present with: onset of foul – smelling diarrhea, abdominal distension, fever, may perforation and sepsis .It si a major cause of death in hours – 30% of cases.

**Diagnostic evaluation:** History, physical examination ie rectal exam shows no stools in rectum & a tight sphincter .Rectal biopsy – absence of ganglionic cells confirms diagnosis. Barium enema can also be done.

**Therapeutic management**: Client goes through twostages of operation.Temporary colostomy in normal bowel.In the second stage the aganglionic segment is resected & normal bowel anastomosed to the rectum.Temporarily colostomy is closed.The operation is done at 6-15 months of age. One stage correction has also been done with good results .Pre up & post operative care just like any other patient undergoing GIT surgery. Eg Pre-operative care**-**Clean bowel – saline enema, NPO, NG tube insertion and antibiotic to decrease flora.Post **-**operative care-NG tube care, Assess bowel sounds and observe abdominal distension.

**ANORECTAL MALFORMATIONS:** Arrest of rectal descent resulting in absence of an anal opening & occur during 4th – 16th week of gestation. Examples of these malformations include: anorectal agenisis (imperforate anus), rectal atresia and anal agenesis .More common in males. Etiology uncommon – associated with other congenital anomalies of UT, esophangus & intestines. Anus and rectum embryonic origin is cloaca (precursor of anarectal & genitourinary structures).

**Clinical manifestations:** Low defects – normal appearing anus, anal membrane and deep and dimple.High defects – flat perineum, absence of anal dimple.If meconium is noted in the urine, a fostula is present between the bowel & the urinary tract.

**Diagnostic evaluation:** Physical examination and radiological imaging of abdomen eg fistula detected.

**Therapeutic management:** Depends on degree of malformation eg Anal stenosis – will require repeated manual dilation of arms. Other defects – require surgery e.g create opening and anal dilation to prevent stenosis .other therapeutic approaches include: stool softeners, fiber, adequate fluid which prevent constipation.

**GASTRO -ESOPHAGEAL REFLUX DISEASE (GERD):** Most common disorder of infants’ .Its defined as return of gastric contents into the lower esophagus through the lower esophangeal sphincter.Physiological GERD is a common occurrence in many healthy infants. Improvement seen in 6-12m as the infant matures. Esophagus elongates & lower esophangeal sphincter moves down the diaphragm decreasing the chance of reflux.Pathological GERD is one that manifests with esophangitis & its complication (structures), malnutrition, Respiratory disorders – apnea, pneumonia, and respiratory injections.

**Etiology and prevalence**: Occurrence is 5:1000. In boys its x3 than girls. Common in premature babies and those with neurological impairement. The etiology is not well known. But postulated to be delayed maturation of lower esophangeal neuromuscular junction.Impaired local hormone control mechanisms are also implicated.

**Pathophysiology:** Loer esophanngeal sphincter is a physiological barrier to reflux. Its innerated by vagal nerve and any defect in nerve transmission results in appropriate relaxation. Delay in gastric emptying due to hypomotility in duodenum may enhance GER.

**Clinical manifestations:** Vomiting (non-bilious material) & regurgutation – most common clinical feature.Others include: esophangitis causing irritability & crying; bleeding – anaemia – meleana; refusal to feed as infants associate feeding with pain and malnourishment. Possible complications include: apnea, choking spells, recurrent aspirations pneumonia. Frequent respiratory infections also occur.

**Diagnostic evaluation:** History, Physical examination and observe feeding habits.Other tests include: Upper GI barium – rule out anatomical abnormalities e.g. esophangeal structures, pyloric stenosis, intestinal mal rotation); Upper GI endoscopy; Esophageal pH study – catheter inserted via nostrils to distal 1/3 of esophagus & left for 18-24hrs -measures pH of distal esophagus which indicates episodes of reflux .

**Therapeutic management:** Dietary modifications, positioning and medication are used.Dietary modificationsinvolves small frequent feedings ,thicken formula with cereal which will increase calorie and decrease times of emesis .Position-Its controversial but flat prone or head elevated prone position for infants with GER but puffy bedding materials should be eliminated from infants bed. Supine the most appropriate position for infants.Medicationscan be used such asantacids; prokinetic agents that increase gastric motility e.g. metoclopramide, cisapride; H2 antagonists and proton pump inhibitors to reduce .Surgical intervention are not common because drugs are usually effective .but it can be indicated in repeated pneumonia, poor wt gain, recurrent esophangitis with structure , severe apnea, failure to respond in 4-6weeks and operation usually is usually called nissen fundoplication.

**CONSTIPATION:** Difficult passage of stool or infrequent passage of hard stool, associated with straining, abdominal pain or withdrawal behavior.Frequency of bowel movement varies widely among children. Hence, frequency not adequately diagnostic. Infants may stay for 3 days without passing stools. Common in male children in early childhood female’s children in adolescents.

**Etiology:** It can be organic or non-organic/ functional .Organic factors include:dietary eg decreased fiber, decreases fluid intake, increase dietary intake. Structural disorders of GIT eg hirschsprung’s disease, intestinal strictures; metabolic and endocrine disorders e.g. hypothyroidsm, DM, lead poisoning; neurogenic diseases eg cerebral palsy, myelomeningocele; medications e.g. opiates, antidepressants, anticholinergics, antacids. **Non-organic/ functional factors include**: These are the mostcommon .Examples of Non-organic causes include: Fear of bowel movement due to previously painful experience e.g. due to hard stool/ anal; strictures/ tissues; magical thinking –characreristc of toddler – cause fear of toilet e.g. do poos have brain? And suppression of defecation e.g. on staffing school – facilities may not be adequate or to the standard expected.

**Note: Infants rarely get constipated because of consumption of excessive milk. In toddler its more common because of toilet training practices e.g. forced training may cause withholding**.

**Pathophysiology:** Constipation is self perpetuating because when stool is retained the distension & sensory feedback are less effective in initiating defecation. More water get re-absorbed, stools get harder and bowel movement is painful. Later, the two anal sphincters are compromised. Sensitivity to rectal distension and control of rectal evacuation is diminishing and child loses the urge to have bowel movement.

**Clinical manifestations:** Hard stools pass at regular intervals or as large masses after days, abdominal pain/ distenstion, irritable, loss of appetite and pulpable fecal mass on physical examination.

**Diagnostic evaluation:** Physical examination, history– Rule out organic cause’s .Get information about dietary history, stool pattern and medications x-ray – enlarged colon.

**Therapeutic management:** cleanse bowel using enemas, orals & suppository; establish bowel movement pattern and modify diet – increase fluid & fiber e.g. whole grain bread, cereals, fruits, vegetables, bran. Nursing management and family teaching include**: d**ietary modification, administration of enema and establishing regular pattern of defecation eg a child sits on toilet after meal for 5-10min.

**APPENDICITIS:** Inflammation of vermiform appendix .Most common condition requiring abdomen surgery in children.Anatomical location of the appendix tends to vary.

**Prevalence and etiology**: The prevalence is 4:1000. Increases in males than females .Etiological factors include: Poorly understood but thought may include obstruction of appendix, enteric systemic infection, 30% of cases is due to infection and trauma. Rare in 3rd world, due to high fiber diet.

**Clinical manifestation:** Abdominal pain – Initially vague and poorly localized, later settles at right lower quadrant, anorexia, nausea and vomiting. Pain usually precedes anorexia, nausea or vomiting. Nause and vomiting that precedes abdominal pain is due gastro -enteritis, diarrhea and constipation.

**Diagnostic evaluation.**Diagnosisis a major challenge because of vagueness of symptoms .Anatomical position of appendix is variable, hence may induce symptoms in urinary tract.Challenging because symptoms can be a typical ,hence misdiagnosis which causes increase in incidence of perforation, abscess, wound injection & mortality.Rebound tendermen may be elicited through palpation though not good for children.Muscle rigidity – tenseness of muscles of the tender area.Guarding – involuntary contraction of abdominal muscles caused by fear of impending pain.Others diagnostic indicators include increases WBCs. Rule out other causes of abdominal pain e.g. constipation,UTI,acute gastroenteritiss and peptic ulcer disease.Delay in diagnosis cause 30%-60% perforation.In younger children ,the thinner appendiceal wall progress to inflammation faster than adults.

**Therapeutic management:** Appendectomy is the preferred intervention.Postoper – NPO status till bowel sounds back, IV fluids, antibiotics 7-10daysa and NG tube suction. Complications:Peritonitis, Paralytic ileus, Intestinal obstruction

**Inflammatory Bowel diseases:** Chronic disorders featured by inflammation & ulceration of Small and large large intestines. Ulcerative colitis affects colon & rectum.Chrons disease involve entire GIT especially ileum (Regional enteritis)

**Incidence & etiology:** Increasingly becoming common.20% of ulcerative colitis and 25/30% of those with chron’ disease is below 20 years.Peak onset is late adolescence.Male & female affected at the same rates.Etiological factors implicated include: unclear, implicated factors include: infectious agents like virus, bacteria, autoimmune, genetical factors and environmental factors e.g. smoke.

**Pathophysiology:** Bowel responds to an environmental trigger to release local mediator e.g. histamine causing marked vasodilation which may lead to ruptures, ulceration and bleeding. Deeper ulcers may lead to fistula into bladder and /or vagina. Healing lesions may lead to scar tissue i.e strictures & bowel obstruction.

**Clinical manifestations:** Ulcerative colitis: rectal bleeding, diarrhea, abdominal pain. Diarrhea onset is insidious. Urgency to defacate, abdominal cramping & tenderness, anorexia, Weight loss, low grade fever, mild anaemia.Some extra intestinal features especially with chrons disesase include growth failure, arthritis and skin lesions

**Diagnostic evaluation:** Endoscopy – sigmoidoscopy, colonscopy, Radiological exam, Biopsies and barium enema .Laboratory studies include: anemia, hypoproteinemia and fluid/electrolyte balance

**Therapeutic management:** Pharmacotherapy to decreased inflammation and decreased immune system.To decreased inflammation – corticosteroids, aminosalicylate/ sulfasalazine. Metronidazole given for perianal complications .Cyclosporine given for immunosuprresant effect.Nutritional support**:** adequate calorie, restrict milk, fiber & highly seasoned food as they are poorly tolerated, vitamins & minerals replaced because in chron’s disease fat soluble vit. ADE K deficiency may result .TPN – severe cases, surgery especially in complications such perforation, hemorrhage, conventional treatment has failed and there is an intractable bleeding (diarrhea).Colon/ Rectum removal – proctocolectomy provides a permanent cure.Permanent ileostomy is created at same time.Remissions & excerbations characterized the disease. Nursing considerations include: Continued guidance of families in terms of dietary management; coping with those factors that increase stress and emotional liability; when indicated preparing the child and parents for the possibility of diversionary bowel surgery; Nurses have an important role in preparing children and children families to administer nasogastric feedings. The Childs and family member’s anxieties should be acknowledged and they should be given adequate time to demonstrate the skills necessary to continue the therapy at home in needed.

Absoption of food substances may be disturbed and therefore our next session we look at some alterations associated with absorption.

**CELIAC DISEASE:** This is also called gluten – sensitive- enteropathy. Which is a permanent intolerant to glutten, the protein component of wheat, barley, rye and oats.Second to cystic fibrosis as the most common cause of malabsorption in children?

**Incidence and Etiology:** Genetic disorder occurring among all races.prevalence is 0.1: 1000 births.coincides with introduction of food containing gluten.

**Pathophysiology:** Exact mechanism by which glutten damages the mucosa is unclear.However, it’s postulated that immunological response is involved. Gluten is made of two proteins – glutenin and Gliadin. Gliadin, the harmful protein elicits an immune response. This causes the villi to flatten out & atrophy leading to decrease in the absorptive surface area. The effect on absoption is in this order: fat, protein, CHO & fat – soluble vitamins ie A D K.

**Clinical manifestations:** Anorexia, irritability, listlessnes, weight loss, abdominal distension, steatorrhea- large amount of unabsorbed food with fats stools, bulky, foul smell, greasy, partly colored & float because of fat.Later signs include: Protuberant abdomen, loss of subcutenous fat, muscle wasting secondry to hypoproteinmia, growth retardation, osteoporosis, delayed menses/ puberty.

**Diagnostic evaluation:** Bowel biopsy – reveal atrophy of villi deep cypts on intestinal mucosa.These lesions return to normal after dietary restriction of glutten this confuses the diagnosis. Serologic tests – defect antigliadin & antiendomysial antibodies.

**Therapeutic treatment:** Glutten – free diet. Education on this diet is the major management modality.The nurse, dietician, caregivers need to get involved.Wheat, rye, barley, oats replaced with rice, corn and, millet. Specific nutritional requirements may be used to correct deficiency states e.g. fat soluble vit. Ca++, folate & iron.

**LACTOSE INTOLERANCE:**

Inability to digest lactose (disaccharide) in human/ cows milk; formulas, cheese, ice cream.May also be found in other foods.baked foods, biscuits, pan cakes and cakes.

**Etiology:** Deficiency or absence of lactase enzyme in small intestine required for the digestion and absorption of lactose.It can be congenital or acquired. Congenital is very r are while acquired is d due to gradual loss of lactase from early childhood to late adolescent. This loss may be caused by diarrhea diseases (rotavirus), AIDS etc.

 **Pathophysiology:** Inability to digest lactose caused by absence of lactase.Undigested lactose move into colon where its broken down by bacteria to release hydrogen, methane, carbon dioxide. Solutes also increase in colon which increase osmotic pressure causing watery diarrhea.

**Clinical manifestations:** After ingestion of lactose you get explosive watery diarrhea, abdominal distention, pain, and excessive flatus.

**Diagnostic evaluation:** Hydrogen – breath test:- Measures amount of hydrogen left after fermentation of undigested & unabsorbed carbohydrates ie lactose.

**Therapeutic management:** Reduce or eliminate lactose from child diet.Milk products may be pre-treated with microbial lactase.

**POISONING:** Poison – substance that harm the body. Can occur through ingestion, inhlation, skin exposure eye contact etc. Ingestion – most common cause. Poisoning is the fourth cause of death in toddlers & preschoolers due to curiosity .Children take it accidentally while adolescent intentionally, hence have higher fatalities.Some substances ingested Kerosine, Gasoline , Paint thinner, Turpentine , Perfume , Cologne , After shave lotion etc.

**Clinical manifestations:** Depends on specific poison. E.g. corrosives (toilet loven cleaners, ammonia burnt in mouth, throat, stomach, edema of lips, pharynx, tongue vomiting etc) eg panadol poisoning causes nausea, vomiting, jaundice, confusion, and somnolence right upper quadrant upper abdominal pain.

**Diagnostic evaluation:** Identify type & amount of exposure .Physical examination and history will help identify the poison.Laboratory analysis of the emesis is critical.

**Therapeutic management:** Vary according to type, amount, time elapsed since exposure to poison. Priority paid to ABCE (Stabilization of the child) of life support.After which gastric decontamination can be done .Gastric emptying using lavage or emetic most effective when doen within 1 hr of ingestion.Syrup of Ipecac used for inducing **v**omiting occur within 20 min & last several hrs. But its contra indications in <6 months children, Already vomiting individuals , decrease consciousness patient, impaired gag reflex and ingested acids, alkalis, sharp object, hydrocarboans.Gastric lavageused within 1-2hrs of ingest but Contra indicated in corrosive and gag reflex depressed patient.Complication may occur: aspirationand perforation.Normal saline used.Activated charcoal: Effective in most oral poisonings when given alone or following ipecac/law.Decreases the amount of toxic agent available for absorption by gastric mucosa by 75%..Use 2 hrs after poisoning .Major concern: Vomiting occurs, in 15% of children – increase risk of aspiration & pneumothorax.Antidotes e.g.Nalaxone – narcotics, N-acetylcysteine – panadol, Flumazenil – benzodiazepines, EDTA for lead, Bicarbonate for – Antidpresants should be used as appropriate.Nursing management is that the best **s**olution to childhood poisoning in prevention .

Nurse discusses these prevention measures**:**

* Store chemicals out of reach of children;
* Return toxic substances immediately after use to safe storage
* Store products in their original containers. Never put potentially harmful products in food/beverage containers.
* Refer medications by their proper names.
* Buy products with child proof caps
* Avoid having poisonous plants at home.
* Have symp of ipecac but administer consulting a health care practitioner/ poison control centre.
* Keep contact of poison control centre.

**HEPATITIS:**

Is inflammation of the parenchymal tissues of the liver. Majority ie 90% of hepatitis are caused by five viruses; Hepatitis A virus [HAV]; Hepatitis B virus [HBV]; Hepatitis C virus [HCV]; Hepatitis D virus [HDV] and Hepatitis E virus [HEV].Cyclomegalovirus, Epstein Barr virus and Herpes simplex virus may occationary cause hepatitis.Hepatitis A: Highly contagious and is transmitted through fecal oral route .It is usually acute and mild and has no carrier state. It affects under 15 years old.**Hepatitis B** transmission is potential route through exchange of blood or any bodily secretion or fluid HBV. Infection occurs in children and adolescents in the following high risk situations: infants of mothers who are chronic carriers ; those who have received transfusions ,children involved in intravenous drug abuse ,institutionalized children,pre- school in endemic areas.**Hepatitis C** : A blood borne virus transmitted parentally. Cirrhosis and hepatocellular carcinoma may develop in children with HCV infection.**Hepatitis D**: Occurs in parents already affected with HBV it requires the function of HBV.HDV infection occurs primarily in hemophiliacs and intravenous drug users .**Hepatitis E:** It is epidemic or externally transmitted. Transmission may occur through contaminated water and there is no carrier state.

**Clinical features:** The clinical manifestation for most types of viral hepatitis are similar except for a more rapid, acute in type A and slower, more insidious onset in type B, and A may present with flu like symptoms.

**Diagnostic evaluation:** Diagnosis of Hepatitis is based on history, physical examination, serologic markers, and liver function test .The diagnosis of Hepatitis is confirmed by detection of antibodies or antigens in response to the specific virus. No liver function test is specific for Hepatitis.Serum aminotransferase [AST, ALT] levels are elevated.

**Therapeutic management:** Management includes treatment of symptoms.Allow children freedom to rest when they want –to regulate their own pace.Allow children to choose foods they prefer especially during initial stage when anorexia is severe. Hospitalization is required if coagulopathy or fulminant hepatitis develop.Nurses consideration: The emphasis is on encouraging a well balanced diet and a realistic schedule of rest and activity adjusted to the childs condition .The parents are cautioned about administering any medication to the child since normal doses of many drugs may become dangerous because of the livers inability to detoxify and excrete them.Hand washing reduces the risk of hepatitis transmitted in any settings.In children with HBV infection who have a known or suspected history of illicit drug use, the nurse should help them realize the association between drug use and HBV.

# **CHAPTER THIRTEEN: RESPIRATORY ALTERATIONS**

Respiratory alterations can be acute or chronic.We start this chapter with an examination of common acute conditions.

**NASOPHARYNGITIS:**Common account for 80% school missed days

**Etiology**: There are many infectious agents that can cause this disease eg viruses (90%) usually rhinoviruses.Other viruses include respiratory syncytial virus, adenovirus, influenza virus, coxsackievirus, parainfluenza viruses.Bacteria e.g steptococcal infections are the major causes of nasopharyngitis.

**Pathophysiology:** Nasopharynx – positioned behind the nasal cavities and is bordered by soft palate & the skull. Tissue swelling and exudates formation occurs. Exudates – (fluid, cells, other substances released from the body.Nasal congestions caused by edema secretions impede air flow thro the nasal passages.

**Clinical manifestations:** Nasal stuffiness, rhinitis, sneezing, nasal discharge, coughing, sore throat, fever, irritability, malaise, nausea and vomiting and poor appetite.

**Diagnostic evaluation:** History and physical examination - afebrile and normal WBC seen

**Therapeutic management**: Management is usually done at home. For viral nasopharynx there is no specific treatment. Require supportive management eg non – Asprin Analgesics; saline nasal drops every 3/4hrs particularly before feeding infants to relieve nasal congestion. Decongestant nasal drops/cough suppressants for older children eg dextramethophan. Older children can gaggle saline solution.Note that antibiotics are not effective .Health education is critical .Bulb syringe may be used to sunction secretion from infants nares.Admnister adequate fluids.Nasal congestion forces mouth breathing which impedes coordination e.g breathing, sucking, swallowing. Hence feeding is very challenging.The remedy is you feed slowly & rest during the feeding .Prevention of spread is vital – use facial tissues to wipe secretions,hand wash after sneezing / nose blowing also helps reduce spread of infection.

**TONSILLITIS & PHARYNGITIS:** common co- morbidities of childhood. Tonsillitis is inflammation of palatine tonsils.

**Etiology:** viral infection but can also be bacterial. The bacteria involved include GPA beta – hemolytic streptococcal in 20% of the cases. If untreated – scarlet fever, otitis media and suppurative infection in the surrounding tissues occurs.Other complications of untreated streptococcal infection include rheumatic fever, meningitis and glomerulonephiritis.

**Pathophysiology:** Tonsils are important for lymphoid tissues in oropharynx protection.Tonsillitis are inflammation of palatine tonsils. Adenoiditis- inflammation of pharyngeal tonsils/adenoids.

**Clinical manifestations:** sore throat , difficult in swallowing ,fever, nasal congestion – mouth breathing and drying of mucus membranes aggrevates pain associated tonsillitis/pharyngitis.Others especially if beta – hemolytic steptococcal infection is involved include: headache, abdominal pain ,vomiting, diarrhea and cervical adenopathy.

**Diagnostic evaluation:** Visual inspection of the throat. Throat culture & rapid streptococcal screening specific etiology.

**Therapeutic management**: For viral infection supportive care is instituted.warm saline gargles soothe inflamed mucus membrane, antipyretics which are non – Aspirin. Bacterial infections antibiotics – e.g penicillin / cefuroxime. Tonsilectomy with/ without adenoidectomy can be done under the following conditions:

* Recurrent streptococcal infection.
* Hypertrophied tonsils to affect eating/breathing.
* The child should be 3yrs or older. Increased blood loss may occur in younger children. Tonsils may also re-grow if child very young.

**Note: Adenoids, if enlarged can block air flow through nasal passages**.

Nursing consdieations: Postoperative care: Lie via abdomen or side which increases drainage of secretions.No coughing or blowing nose oftenly as it may disrrupt clot formation. Examine secretions/ emesis for bleeding (fresh). Analgesic-for pain postoperative. Soft diet and non carbonated/ acidic drinks.

Family teaching is important on -Promote increase fluid intake/ rest, administrater analgesics/ antipyretics, seek medical attention if there signs of bacterial infection and pre-operative and post-operative educating e.g. bleeding.

**OTITIS MEDIA (OM):**

Is theinflammation of middle ear.Can occur as acute/ chronic/; infectious/ noninfectious, occur with/without effusion. Bilateral OM is present in (50%) of the cases.There are several types of OM: Acute, OM with effusion (Exudate araising from inflammation) and chronic OM.Acute otitis media:Pathoagen invade through eustachian tubes.Has a sudden onset & short duration and is painful.Om with effusion: Inflammation with fluid behind tympanic membrane & without signs of infection. Its ussualyy asymptomatic.Chronic OM: Inflammation go for >3months with/without effusion.

**Incidence/ etiology:** Common childhood disease. Common in 6-18 months old children. Acute OM is often caused by streptococcal pneumiae, haemophilus influenza and moraxella catarrhalis. Usually common in cold seasons when influenza & respiratory synacytial virus is prevalent.Approximately 93% of children with Acute OM have Sign and symptoms of URTI. Also viruses can cause OM with effusion such as para- influenza and rhino virus.Allergic rhinitis & sinusitis also predispose. Also cleft palate & decreased immune function; passive smoking are other predisposing factors.

**Pathophysiolgy:** Child below 3 years is more vulnerable to OM because have eustachian tube that are wider, shorter, straighter than those of older child & adults. Also eustachian tubes are horizontally positioned.Hence; these anatomical features allow micro organisms & nasopharngeal secretions easy access to the middle ear.This lead to inflammation with/without infection. Exudates/ fluids produced and impede middle ear’s ability to transmit sound. Enlarged lymphoid tissue may obstruct flow of drainage from middle ear pressure in middle ear increase and rapture of tympanic membrane may occur.

**Clinical manifestations:** Children who areverbal will express pain.Non-verbal/ preverbal children will express pain by tugging/pulling ear.Others include: fever, diarrhea, irritable, vomiting, URTI may be present.If conductive hearing impairment is present, child in attentive to voices/ noises.

**Diagnostic evaluation:** Otoscopic exam in AOM shows tympanic membrane as red and bulging. Serous/ purulent fluid visible behind tympanic membrane.Pneumatic otoscopic assessment of tympanic reveals decreased movement .May be absent with chronic OM. Culture with sensitivity testing is conducted ,if drainage in the external canal is present so that to institute appropriate antibiotic therapy identified.

**Therapeutic management:** For Acute OM – antibodies eg amoxil, cefaclor, co-trimoxazole (Bactrim) for 5-10days. If poor compliance expected, give single dose of IM ceftriaxone (Rocephin). Response within 2-3 days but effusion (serous fluid) takes months/weeks to clear. There are possible complications: conducive hearing loss & related speech problem; abscess formation in the tissues adjacent to the middle ear, meningitis and septicemia. Follow-up for 2 to 4 weeks or earlier depending on the state is important. Recurrent OM i. e episodes occurring within 6m need prophylactic antibiotic treatment treat URTI early and influenza/ pneumoccal immunizations.

Tympanostomy (surgical incision in the tympanic membrane to drain fluid) is indicated if an episode of OM with effusion last longer than 3-4m & associated with loss of at least 20 decibels.These tubes that are used facilitate drainage/ increase ventilation. Ear plugs used when swimming to prevent water entry. Family education include avoiding second hand smoke prevention irritates eustachian tube; avoid horizontal position during bottle feeding and adequate breast feeding .

**ACUTE EPIGLOTTITIS:** Acute epiglottises or acute supraglottitis is a serious obstructive inflammatory process that occurs principally in children between 3 and 7 years of age, and can occur from infancy to adulthood. The responsible organism is usually H. Influenza; LTB and epiglottises do not occur together.

**Clinical manifestations:** The onset of epiglottitis is abrupt and rapidly progressive to severe respiratory distress. The child usually goes to bed asymptomatic to awaken later complaining of sore throat and pain on swallowing. The child generally insists on sitting upright and leaning forward, with chin thrust out, mouth open and tongue protruding. Drooping of saliva is common because of the difficulty or pain on swallowing and excessive secretions.The child is irritable and markedly restless, and has an anxious, apprehensive and frightened expression; the voice is thick and muffled with a froglike croaking sound in inspiration. The child seldom struggles to breathe, and slow quiet breathing provides better air exchange. The throat is red and inflamed and a distinctive large cherry – red, edematous epiglottis is visible on careful inspection.

**Therapeutic management:** The course of epiglottitis may be fulminant, with respiratory obstruction appearing suddenly. Progressive obstruction leads to hypoxia, hypercapnia and acidosis followed by decreased muscular tone, reduced level of consciousness and when obstruction becomes more or less complete a rather sudden death. Endotracheal intubations or tracheostomy is usually considered for H. Influenza epiglottitis with severe respiratory distress. It is recommended that, the intubations or tracheostomy and any invasive procedure such as starting an intravenous infusion, be performed in the operating room. The epiglottal swelling usually decreases after 24hrs of antibiotic therapy and epiglottis is near normal by the third day. Intubated children are generally extubated at this time. Children with suspected bacterial epiglottis are given antibiotics intravenously followed by oral administration to complete 7 to10 day course.Nursing considerations include: Epiglottitis are a serious and frightening disease for the child family and health professionals. It is important to act quickly but calmly and provide support without unduly increasing anxiety. The child is allowed to remain in the position that provides the most comfort and security and parents are reassured that everything possible is being done to obtain relief for their child.

**PNEUMONIA:**

Acute inflammation of pulmonary parenchyma (functional tissue of an organ as distinguished from supporting and connective tissue). Associated with alveolar consolidation. It either a primary disease or a complication of another problem.Usually occurs in infancy or early childhood.

**Etiology:** Viruses like adenovirus; cytomegaloirusr and influenza are involved. If bacterial, should be in older children, preceded with viral infection of upper respiratory system.

**Pathophysiology:** Toxins/ pathogens damage pulmonary mucus membranous and cause accumulation of debris and oxudate in airways.This lead to ventricular/ perfusion ratio abnormalities.Pneumonia can be :-lobar pneumonia wher one or more lobes are involved or interstitial pneumonia– alveolar walls & interlobular tissues are involved and lastly bronchial – diffuse involvement of bronchi & lung fields.

**Clinical manifestations:** cough, malaise, Pleuritic pain, fever, anorea, tachypnea, wheezing, headache

**Diagnostic evaluation:** Sputum culture, physical examination, WBC in bacterial pneumonia increased e.g. neutrophils and chest radiographs – determines extent & location of the involvement.

**Therapeutic management:** Depends on etiology. For viral causes supportive. For bacterial – Antibiotic required. Treatment can be done at home. Oxygen therapy & chest phsysiology may be needed pastoral peas drainage. IV fluids for hydration as increasesd metabolism increase water loss. Antipyretics for fever and inhalants might be used for bronchodilation.Family teachingon giving adequate liquids especially water; change child position every 2hrs to promote drainage and antibiotic administration as required.

**ASTHMA:** Characterised by chronic inflammation, bronchoconstriction & bronchial hyperresponsiveness.

**Incidence & Etiology:** Common paediatric illness. It’s an increasing problem .It can be idiopathic or allergic

**Pathophysiology of the llergic type:** Antigens e.g. dust mites, medications, poles, dust, emotional stress, physical stress and food preservatives. The cause increase IgE, mast cell and macrophage, basophils, esinophils. Degramulation of mast cells causing release of histamine, interleukim II, SRSA, PGDs and Bradykinin. Bronchoconstriction, mucosa, oedema & increase mucus production occurs. Airway obstruction/ air trapping follows and ventilation / perfusion alterations result.The ultimate response is increase work of breathing ,hyper capnia ,hypoxemia,respiratory failure & death.

**Clinical manifestations:** Expiratory wheezing, chronic cough, dyspnea (hortness of breath & difficult in breathing); recurrent chest tightness; Tachypnea; Chest pain; Nasal flaring; orthopnea (increase in difficult breathing when lying flat) older children may sit upright with stimulators in hunched – over position with their arms braced; iaphoresis and cyanosis.

**Diagnostic evaluation:** History, physical examination, pulmonary function studies. Peak expiratory flow rates/ PEFR determine extent of child asthma. PEFR –fastest speed at which air is forced from the lungs during expiration. (Peak flow meter) used in liters/ min in acute episodes it’s lowered because of impaired expiration & air traping.

**Therapeutic management:** Avoid triggers; regular peak flow monitoring ; Medications e.g. (Nebulizer); Short acting B2 agonists that live ; terbutaline; systematic corticosteroids; ipratropium bromide (atrovent) oxygen therapy; anticholinergic brochodilators; B2 agonists; antimuscarinic bronchodilators; depends on severity & frequency of symptoms; rapid access to healthcare vital in emergencies; family education ; sleep important; avoid being with those with respiratory infections; relaxants exercises & yoga.Nursing management interventions include: identify child at risk; education e.g. use of PEFR meter & interpretation of data;Nebulizer – aerolized,Metred dose inhaler – inhalation; Exercise with asthma is under control; B2 agonist can be used prophylactically before physical exercise to decrease exacerbations ; Triggers – child specific – avoid then – worsening of symptoms should not be noted.

Respiratory alterations are among the most common problems in paediatrics.Preventive measures will play a big role in enhancing the wellbeing of children.

**General Preventive measures in respiratory alteration**

* Control environmental hazards e.g. 2nd hand smoke, air pollution, allergies.
* Minimize risk of infection by immunization and infection control practices e.g. contact control.
* Genetic counseling e.g. cystic fibrosis has 25% chance of getting a child with a similar problem.
* Prenatal care – decrease prematinty which is highly vulnerable
* Anticipatory guidance e.g. SIDS prevention
* Health education – creates conducive environment for the child.

# **CHAPTER FOURTEEN: CARDIOVASCULAR ALTERATIONS**

This chapter discusses some conditions that arise due to disruption in normal development during intrauterine life.

**CONGENITAL HEART DEFECTS:**

**Introduction:**

Congenital heart defects occur in approximately 8:1000 live birth (American Heart Association, 1999).There are a minimum of 35 types of recognized defects. Range from mild e.g. patent ductus arteriosus to complex anomalies e.g. hypoplastic left heart syndrome – a variety of deformities characterized by lack of development of the left ventricle secondary to mitral valve atresia or aortic atresia.Left ventricle is small, hypoplastic & not capable of anycardiac function. An infant may have a combination of defects.Majority of the defects are repaired in the first year of life. More complex defects require staged repairs – more than one surgery is required for final correction. Even in staged repairs – done in 2-4yrs.Mild isolated defects may never require surgery e.g. slight vulvar incompetence. Because the heart of a child is the size of the child’s first, intracardiac or open heart surgery can be complex. To support the child during surgery cardiac pulmonary by-pass (CPB) is implemented.CPB not a treatment used during open H+ surgery only, for the repair of many congenital defects as its is a mechanical pump & artificial oxygenator that provides for a short period, substitution of the heart & lungs.Unoxygenated blood removed via venom cannula & delivery of oxygenated blood back to the heart via aortic cannula.The work of the heart is performed by the bypass pump.Let now start by discussing some congenital heart conditions .

**PATENT DUCTUS ARTERIOSUS (PDA):-**Direct connection between the main pulmonary artery & aorta. In fetus, ductus arteriosus needed for survival.In preterm, a PDA is a common feature depending on developmental maturity.In term newborn ductus begins to close within 12 hours & closed by 2-3 wks. Thereafter, called PDA if not closed.

**Incidence:** In mature infant the rate is 5-10% while in premature infants its 45%.

**Pathophysiology:** There is left to right shutting of blood .High pressure aorta blood flow into low pressure pulmonary artery/ pulmonary circulation.The size of PDA & pulmonary vascular resistance is important to determine the degree of shutting. If resistance is low – high shutting & vice versa. Congestive heart failure may result from high pulmonary blood flow.

**Clinical manifestations:** Depend on size of shunt. For small PDA it may be asymptomatic .For large PDA signs of congestive heart failure may be present .eg tachycardia, diaphoresis, edema, decreased pulses, wheezing, refractions, orthopnea, ascites, decreased urine output, exercise intolerance and poor weight gain.

**Diagnostic evaluation:** Auscultation reveals murmurs in lower left clavicle.Echo cardiogram – studies structures & motion of the heartie sound waves are studied. Transducer enables recording of waves on a strip chart.

**Therapeutic management**: NSAIDS egindomethacin given as it inhibits synthesis of prostagladins which are responsible for a number of cellular connections. Maintains potency of the ductus arteriosus in premature infants. Surgical closure for term symptomatic (CHF) infant if indomethacin is not effective here. Prognosis is ussually good.

**TETRALOGY OF FALLOT (TOF)**

Made of four components:

1. Ventricular septal defect (VSD) - abnormal connection between the right and left ventricles .Defect can be located in various positions along the septum. Very common congenital heart defect comprising of 20% overall. Small VSD (75-80%) close in 2 years.
2. Pulmonary stenosis - Narrowing of pulmonary valve and obstruction to blood flow from the right ventricle to the lungs. Obstruction can be at:-valve (vulvar), just before pulmonary valve itself (subvalvar), above valve (supravalvar), varying places along the pulmonary artery.
3. Right ventricle hypertrophy – due to resistance to pumping blood through the pulmonary artery which is stenosed/ narrowed.
4. The aorta overrides the ventricular septal defect (VSD) but this is of little clinical significance but part of these anatomical features of this defect.

**Incidence:** Most common cyanotic defect accounting for approximately 10% of all congenital heart disease.

**Pathophysiology:** Large VSD lead to equal pressure in left and right side.Amount of pulmonary blood flow (hence cyanosis) depend the degree of pulmonary sterosis. Minimal obstruction – described as ‘pink tet’.

**Clinical manifestations:** Depend on degree  of pulmonary stenosis .Varying degree of cyanosis. Loud systolic murmur is noted at birth. Hypercyanotic episodes called “tet spells” occur due to some activity e.g. crying, feeding and defecating.

**Diagnostic evaluation:** Boot-shaped heart caused by hypertrophy of right ventricle is observed on x-ray. Echo- cardiogram – demonstrates clinical features of TOF & is the best diagnostic tool.

**Therapeutic management:** Surgical correction .Manage hypercyanotic symptoms ie hyper spell – place infant in knee –chest position. For older children they can squat .This decrease systemic venous return of unoxygenated and increase systemic vascular resistance is hope of decrease right-left shunt allowing blood to flow to the lungs. Oxygen therapy.Phenylephrine used to decrease vascular resistance .Surgical repair at 6-12m widen right ventricular outflow tract & close VSD.There are some possible complications : residual VSD – leaking, pulmonary regurgitation , arrhythmias , Decrease cardiac output ,cardiac failure and sudden death .

**Acquired heart disease:** Diseases processes or disorders that develop after birth & affect functioning of the heart & cardiovascular system e.g. Kawasaki disease, infective endocarditics & acute rheumatic fever.We shall discuss one of these diseases.

**ACUTE RHEUMATOID FEVER (ARF):** Leading cause of acquired heart disease in developing countries. Advent of penicillins have reduced the incidence.

**Incidence & Etiology:** Approximately 10-20 million new cases occur yearly in developing countries.Usually seen in age group susceptible to gp A streptococcal infection i.e. children aged 5-15yrs. ARF follow an untreated or partially treated gp A streptococcal pharyngitis (sore throat). Group A streptococcal can produce infection in any body tissue but rheumatoid specifically follows throat infection. Incidence has been decreasing due timely identification and availability of antibiotic therapy. But morbidity remains a risk factor due mitral stenosis (progressive) & chronic vulvar disease.

**Pathophysiology:** Exact pathogenesis of ARF is unknown. Generally, it’s thought to be auto immune response to untreated group A streptococci. Pharyngitis in genetically predisposed individuals. Autoimmune response specifically affects heart, CNS, joints. In the heart it causes pericarditis, myocarditis, and valvutis can occur. Valvulitis usually affects the mitral valve. Valvulitis is responsible for mitral regurgitation. Aortic valve can also be affected and develop insufficiency. However, aortic insufficiency without mitral regurgitation is uncommon in ARF. Myocarditis & pericarditis in isolation shouldn’t be considered rheumatic in origin because they are never encountered in the fever without vulvar involvement. Polyarthritis of ankles, knees, hips, shoulders. This unlike other forms of arthritis doesn’t result in permanent disability. Central nervous system manifestations present late even years after initial illness. Inflammation changes in CNS result in chorea (Sydenham’s chorea) which is featured by involutary, purposeless movements of extremities .Vulvar regurgitation can progress to stenosis, hence requiring replacement with artificial valve.

**Clinical manifestations:** These are **v**ariable .Non descript febrile illness & antecedent GPA streptococcal throat infection. But some children have no history of fibrile illness or pharingitis.Manifestastion of valvulitis is the most significant feature- with mitral regurgitation – systoli murmur and aortic insufficiency – diastolic murmur. Others include: Polyarthritis that is migratory i.e. moves from one joint to the next.It presents with tenderness, pain, swelling, heat, limited movement on affected joints.Erythrema marginatum ie a distinctive, fine, pink rash noted on the trunk & extremities (Never on face), pronounced with heat.It is seen with carditis/ polyarthritis .The subcutaneous nodules are firm, painless over the extensor surfaces of the elbows, knees & wrists. These always occur with carditis, never in isolation. Arthralgia & fever are frequently present but are non-specific for rheumatic fever.

**Diagnostic evaluation:** Use clinical manifestation**,** Lab studies – gp A streptococcal infection through culture but throat culture might be –ve since the child might have recovered by time the fever is suspected. Asymptomatic children might be carriers of strept hence +ve culture may result. Blood tests also good to test strept infection i.e. antistreptolysin o-titer (ASO) & anti-DNASe B are obtained together.

Echo cardiogram: Good for vulvar disease eg mitral regurgitation.Echo should be obtained for any child suspected to having rheumatic fever because mitral regurgitation & aortic insufficiency might be silent.

**Therapeutic management:** The aim of treatment in the acute phase is to **e**radicate organism and decrease inflammation process. Use oral penicillin as the initial treatment.

Aspirin – antiiflammation because polyathritis is not responsive to ibuprofen/ acetaminophen.High doses used ie 100mg/kg day then reduced decrease 70mg/kg/day. After acute phase, disco ASA. Administer antacids because of ASA gastric effects.Bed rest required till inflammation resolves.Restrict activities because of aortic insuff/ mitral regurgitation.

**Secondary prophylaxis**

Oral penicillin 250mg BID or a monthly IM injection of penicillin.This is done for at least 10 years or more.Its important because of recurrence which can induce severe cardiac damage. Compliance is very difficult as many clients feel it’s not necessary to continue the treatment. Aortic and mitral value replacement require in adulthood.Nursing management aspects include: Unless there is severe heart failure, acute rheumatic fever is managed as an output. Timely identification vital for recurrence prevention. Throat infection treated timely & full dose taken avoid under treatment.Vigilance for Sign and symtoms of the disease. Follow up is vital

**Psychosocial issues for children with heart diseases**

If a child is born with a heart problem, it may affect attachment and bolding as the child may be taken away by health staff.Parents feel grief at their loss of an anticipated healthy baby.After shock, the family thinks of incorporating that child to society. However, faced by problems of defining restriction on the child cause withdrawal from the peers.As the child leaves home to school, there is the dilemma – do parents telll teachers? What is the reaction of teachers? Might this mean limited capability of the child to the teacher? Teenagers may not disclose the condition to the peers. As adolescents gain independence they must be able to assume their own care – some care givers don’t allow self-determination to develop, hence the children don’t develop life skills. Teenagers need to be encouraged to care for themselves in terms of taking medicine, limiting on activities, paying attention to their body’s cues and being the primary historian during following clinics. Sibling rivalry – due to extra attention the child with heart problem gets.Support (social) for the family should be identifiable e.g. church, other families, social workers, therapist etc, and financial counselors – because of financial problems.Multidisciplinary team is best placed to develop appropriate care plan. Approximate exercise that can be tolerated must be chosen.Some congenital develop defects are minor & place no physical limitation. Restriction is usually for children who have pulmonary hypertension, QT syndrome and exercise induced ventricular tachycardia

The impact of parental stress, hospitalization, and cyanosis and child temperament may affect child’s development. May also have behavioral problem e.g. adolescents with heart problems may not take it well that they cannot do what peers can do.

Conclusion :Pediatric heart diseases imposes physiological, psychological & social concerns & perceived severity of these concerns influences coping of outcome.Nurses assist these families resolve and adjust to all these issues.Problem need to identify early & intervention applied.

# **CHAPTER FIVETEEN: IMMUNOLOGIC ALTERATIONS**

**JUVENILE RHEUMATOID ARTHRITIS:** This condition is also calledjuvenile chronic arthritis (JRA). Inflammatory autoimmune diseases causing many forms of arthritis in children.

 **Incidence /aetiology:** Most common pediatric connective tissue disease with arthritis being the principle manifestation .Incidence rate is 1:1,000. Prognosis-80-90% with JRA recovers and has no functional limitations. 10% become adults with functional limitations.Increase risk for functional limitations in children with poyarthritis and prominent systemic manifestations.Peak age of inset: between 2-4 years in girls; between 10-12 in boys.Overall, girls are more affected than boys Etiological factors include: unknown .Thought that there is interaction of genetical, environmental and immunogenetic factors in susceptible individuals with a trigger factors being viral/bacteria infection.

**Pathophysiology:** T cells activation triggers development of antigen –antibody complexes, which cause release of inflammatory substance called cytokines in targeted organs e.g. skins and joint. Synovial membranes swell and joint effusion occurs. Chronic inflammatory evolves into erosion of articular cartilage and other symptoms of inflammatory.

**Classification:** Classified according to symptoms at onset of disease: hence, systemic, polyarticular and pauciarticular. Systemic type: fever, rash that is migratory-macular /papular, Arthralgia /myalgia. Arthritis – Objective arthritis defined as joint swelling or effusion or two of the following: warmth, pain on motion, limited range of motion. Fatigue and malaise; lymphadenopathy ; Hepatosplenomegally;tachycardia and carditis are other symtoms for systemic type.Polyarticular onset: Arthritis in many joints –5 or more especially knees, wrist, ankles, proximal interphalangeal joints of fingers neck & temporomandibular joints are involved. Low grade accasional fever .Pauciarticular: Arthritis in few joints (4 or <) esp. knees, ankles. There is also inflammation of eyes, especially in anti-nuclear antibody positive pre-school girls.

**Diagnostic evaluation:** Characteristic features observed: onset before 16 years .Arthritis observed objectively at least 6 weeks duration. Defined subtype (by onset C/features).Ensure you exclude other conditions e.g. rheumatic disease, Infection arthritis, inflammatory bowel disease and non-rheumatic conditions of bones/ joints.

No specific laboratory test for JRA.Tests reflecting inflammation are non- specific for JRA But used to monitor disease e.g. Erythrocytes sedimentation rate( ESR); increase C- reactive Proteins (CRP); increase WBC ,decrease Hb and increased platelet pauciarticular. Anti-nuclear antibody (ANA) and Rheumatoid factor (RF) are the in a number of cases. ANA is also positive in systemic lupus evythematosus .Hence not specific for JRA. Positive RF –linked to Adult rheumatoid arthritis. In children associated with poor prognosis, rheumatoid nodules.

**Note: Rheumatoid Factor is positive in 70% of rheumatoid cases but it can also occur in TB parasitic infection, leukaemia and connective tissue disorders.**

X-ray –shows soft tissue swelling, joint effusion, Narrowing of joint spaces, Increase bone destruction fusion, Bone scans can rule out malignancies and MRI also used to evaluate joint /soft tissues

**Therapeutic management:** Multidisciplinary team - nurse, child/family physician, occupational and physical therapits, social workers are required in management.Drugstodecrease inflammation given eg NSAIDS, Aspirin, corticosteroids, cytotoxics eg methotrexate (folic acid antagonist). NSAIDS are 1st line in treatment (initially ASA and prednsolone) but many sides effects may result.NSAIDS- Decrease inflammatory and antipyretic e.g. indomethacin, tolmetin, ibuprofen, naproxen, NSAIDS usually cause GIT pain /bleeding ,Reyes syndrome – may in children exposed to flu virus, hence shouldn’t be administered if a child has got this virus .Newer NSAID-Cox-2 inhibitor have fewer gastrointestinal side effect .Slow acting anti rheumatic drugs (SAARDS)e.g. salfasala zine may be used in combination with NSAIDS.Etanercept (Enbrel )-Works by blocking TNF-alpha(inflammatory substance).Cold /heat applied for pain ..Exercise –therapeutic exercise for increasing strength and endurance e.g. swimming, walking, biking .NB: Activity should not be very strenuous. Balanced diet and healthy weight important. Increase weight put more pressure on joint and movement become more difficult. Increase calcium to (3-4) servings daily for strong bones .Decrease fat and salt vital of child on corticosteroids.

# **CHAPTER SIXTEEN: ENDOCRINE ALTERATIONS**

The endocrine system is one of the systems that regulate the body functions, the other being the nervous system.

We start by looking at one of the commonest and serious metabolic disorders**.**

**DIABETES MELLITUS (juvenile):** Islets of langerhans fail to produce adequate insulin hence carbohydrate and lipid metabolism impaired.Type I DM (insulin dependent DM) is 2nd most common chronic disease of childhood within USA & Europe. Type 2 – usually affects those above 40 years old.

**Incidence/ Aetiology:** Type 1 is autoimmune disease that occurs in genetically predisposed individuals. Environmental factors e.g. viruses, chemicals, have been known to play some role.Beta cells are damaged .Islet cell antibodies, insulin autoantibodies can be measured before clinical appearance. Males and females equally affected. Peak onset at 11yrs – girls and 13yrs – boys’.

Features for these children suffering from type 2 DM include: may have a relative with DM; are inactive and overweight/ obese.Mechanism & causative factors of type 2 DM in childhood not very clear. Median age for type 2 is 12-14years.If glucose exceeds 150-180mg/dl – renal threshold – its excreted in urine (glucosuria)- Polyuria due to osmotic shifts (DH2O).Polydipsia – increase thirst .Polyphagia- increase anger due to less glucose use.

In type 2 DM, pancreas produces enough insulin but for unknown reasons the body is unable to use the insulin effectively – called insulin resistance. After several years, insulin production decreases. The clinical results are the same as for type 1.

**Clinical manifestation:** Type 1-Polyuria, Polydipsia, Polyphagia, Weight loss, DH2O.In some individuals – abdominal pain and vomiting occurs misdiagnosis possible.

**Diagnostic evaluation:** Classic triad of symptoms ie Polyuria, polydipsia and polyphagia. The glucose levels are usually > 200mg/dl. DKA – Diabetic ketoandosis may present.An acetone odor to breathe resembling nail polish remover or rotten apples.

**Therapeutic management:** Involves many parties – child, caregiver, health care practitioner, nurse, nutritionist & mental health professional.The goals are to achieve normal growth & development; optimal glucose control; minimal complications and positive adjustments to the disease.Insulin management:SC or via portable pump. Usually 2-3 times/day.Ther are many types of insulin: Short-acting **-**Regular – onset – 20-30min, Peak 2-4hrs, and duration 6-8hrs. Lente **-**Interned acting, Onset – 2-4hrs, Peak 8-12hrs, and duration 12-20hrs. Ultra lente **-**Long acting, Onset 3-5hrs, Peak 10-16hrs, Duration 18-24hrs. Dose based on child needs. 0.75-1.0 u/kg/day >1yr child,1-1.7u/kg/day – adolescent.Blood glucose monitoring: Home based glucose monitoring is common.Lancing (use lancet) fingertips or forearm, thigh to obtain blood sample.Place blood sample on a testing strip in a glucose meter.Nutrition **:** Known as medical- nutrition- management (MNT).No food, as previously thought is automatically excluded.Typical meal plan include: 50-60% of the calories – from CHO (grains, breads, fruit, milk, vegetable); 10-20% - protein (meat, egg, legumes) ; 20-30% - fat.Exercise : potentiates the hypoglycaemic effect of insulin & may assist to control glucose.Increased levels of activity – increase meals in the plan or decrease dose of insulin.

Adequate education is needed for the client/child & the caregiver. The skills taught should be understood if the child/family is to have adequate home self mamnagement of the disease. The goals for each client are highly specific – consider them.Consider developmental stages as you teach skills to the child e.g. Urine testing – 4-6yrs, Blood testing – 4-8yrs, Insulin injection 8-10yrs, Nutrition decision 10-14yrs, Mgt decision 12-18yrs. Being different or restrictions imposed by the disease can have divestating psychological impact. Hence psychological care is extremely important.eg future obstetric limitations.

**What is the difference between diabetes mellitus and diabetes insipidus?**

**What is the role of ADH in regulation of body water?**

# **CHAPTER SEVENTEEN: CELLULAR ALTERATIONS**

 **Introduction:** Cancers refer to group of diseases in which there is out of control growth and spread of abnormal cells. The tumor/-mass can be –benign (slow non invasive growth) or malignant (progressive) .The progressive one can be localized (mass) or dessiminated e.g leukemia/lymphoma. Cancers are a leading cause of death of children 1-14yrs.Differences between child & adult cancers:Most carcinoma in adult is of epithelial origin while in children the common lymphoma and sarcoma originate from primitive embryonic origin.Environ factor vital in adult cancer while in child cancer they are not.Routine screening is critical eg in breast cancer, in children it’s not recommended unless there is genetical predisposition.Preventable in adult while there are few preventive strategies in children.Often localized at first in adult while metastatic disease is usually present at diagnosis.Less responsive to increase responsive treatment for adults and good response in children.Less than 60% cure rate while a child will have more than 70% cure rate

**LEUKEMIA:** Most common childhood malignancy in less than 15yrs.Describes SP of malignant dxs in which normal bone marrow elements are replaced by abnormal immature lymphocytes(blast cells).Types in children:

* Acute lymphocytes leukemia(ALL)
* Acute myelogeneous leukemia(AML)

**ACUTE LYMPHOCYTES LEUKEMIA (ALL)**

**Incidence /etiology:** Account for80% childhood leukemia & approximately 1/3 of all childhood cancers. Approximately 3000 cases per year in USA with peak being at 2-5yrs.

**Etiology**: It’s unknown but certain agent increase risk.Such agents include viruses, irradictions, toxic chemicals exposure-benzene and genetical predisposition.

**Pathophysiology:** Single lymphoid cell undergoes malignant transformations & proliferation. In the bone marrow of an individual with all the invasions of these malignant lymphoblasts or immature white cells causes “growing out” of normal red blood cells ,WBC pancytopemia (WBCS,RBCs & platelets) and immunosuppression.

**Clinicai manifestations:** Depends on affected organs but some include fever, bone pain, pallor, bruising. Enlargement of organs infiltrated by blast cells ie splenomegally, hepatomagally and kidney enlargement; increased metabolism and weight loss; bone marrow suppression because of “crowding out”.Disturbance of WBCs lead to **f**ever and increase infection while that of RBCs lead tooxygen carrying capacity –tachycedic, weakness, malaise, dyspitea, anaemia and pallor.Platelets are also affected leading to increase bruising/petechiae, nose bleeding, bleeding gums and hemorrhage

**Diagnostic evaluation:** Bone marrow aspirates .Finding of 25% of abnormal lymphoblasts in the bone marrow diagnostic. Childs WBC count and age at diagnosis vital for prognosis. Best – WBC < 5000/mm3 at age 2-10yrs and worst at WBC- 50000/mm3 at 2->10years. Lumbar puncture done to asses CNS involvement.Chest x-ray for mediastinal mass detection.Laboratory test for detection of liver & kidney involvement.

**Therapeutic management:** Systemic chemotherapy in three phases. Induction phase-Aim to reduce the tumor to an undetectable level – a state called remission.During remission there is no evidence of leukemia on - 95% achieve remission lasting few weeks then relapse if treatment is stopped. This indicates existence of undetectable blasts and necessity of continuing with therapy.Remission induction achieved by use of: chemotherapeutic agents eg vincristine (oncovin), L-asparaginase (Alspar), Prednisone, Anthracycline e.g. doxorubicin.treatment is done in OPD once stability achieved.Ttreat anaemia bleeding & infection.On starting chemotherapy, purines are released from destroyed leukemia lymphoblasts - increase uric acid which can lead to renal failure- called tumor lysis syndrome.This complication prevented by IV Na+ bicabonate to aikanalise urine to ph 7-8. Allupurinol (zyloprin) given to aid excretion of uric acid through kidneys, preventing obstriction & failure. Tumor lysis syndrome usually occur in children with greater tumor burden i.e WBC >500000/mm3 or extensive lymphadenopathy.Most chemotherapeutic agents don’t cross BBB. Leukemia cells can cross. CNS prophylaxis given intrathecally into CSF during lumbar puncture. Radiation to brain/spinal cord may be used. The second phase is consolidation which aims at eradicating any residual leukemia cells. Starts promptly once remission is achieved. Chemotherapy given in high doses and requires hospitalization .Intrathecal therapy & radication to other extramedillary sites done at this time. Intense phase lasting six months.The third (maintenance phase) maintains control of the leukemia with chemotherapy administered IV, ORAL, 1M. Intrathecal may administration may continuefor 2 1/2 – 3yrs .If remission is maintained during this period treatment discontinued electively.Remission achieved is 95% of children & 5yrs survival rate are now 80% .Child & family should be encouraged to continue the whole course of chemotherapy.Some children may relapse therapy or poor prognosis.Bone marrow transplant is a option for ALLtretment.But a compatible donor should be available.

**MALIGNANT LYMPHOMAS**

These are neoplasms arising from cells of the lymphoid tissue cells. There are of two main types;1). Hodgkin disease (HD) and 2). Non Hodgkin Lymphoma (NHL)

**HODGKIN DISEASE.**

This is a neoplastic disease that originates in the lymphoid system and primarily involves the lymph nodes. It predictably metastasizes to non-nodal or extralymphatic sites, especially the spleen, liver, bone marrow and lungs.

Classified histologically into 4 main types:1.Nodular sclerosis, 2. Lymphocyte predominant, 3. Mixed cellularity, 4. Lymphocyte depleted.

5.Nodular lymphocyte predominance –

Rare in pediatric age groups Different from NHL in that it develops from one single site then involves other body parts. Related to some form of infection, associated with erpstein bar virus (EBV).

**Clinical Features:** Asymptomatic enlarged cervical or supraclavicular lymphadenopathy most common presentation of Hodgkin disease. Other systemic symptoms are; fever, weight loss, night sweats, abdominal discomfort, anorexia, nausea, pruritus.

**Therapeutic management**: The primary modalities of therapy are radiation and chemotherapy.

**NON HODGKIN LYMPHOMA**

Its Classification is confusing in terms of morphology, immunological, physiological. Histological- there is starry-sky appearance and majority of cells involved are B cells, while in HD, there is presence of read stein berg cell.

Working classification on clinical basis is as follows; Low grade malignancy, Intermediate malignancy, High grade malignancy

Mainly in paediatrics, based on cell type, pattern of involvement (diffuse or nodular)

**Clinical Features:** Mainly due to mass- infiltrates, causes pressure, drains resources of the body, suppresses BM, liver, lungs, CNS. Hence cause obstruction, dysfunction.

Lymphadenopathy – in HD usually painless,rubbery, mobile, may come and go esp. with antibiotics, asymmetrical. In NHL it tends to persist, Weight loss, Fever, Sweat at night, bone pains, fatique, anorexia, Pruritus, unexplained generalized symptoms, Unexplained hepatosplenomegally, Jaundice may or may not be there, Opportunistic infections, CNS features-nerve palsy, papilledima, headache, suggest infiltration; common in NHL

 **Treatment principles**

Know histology, stage and physiology. Radiotherapy –an adjuvant therapy, Chemotherapy – mainstay in children, has intent to cure. Similar to leukemic therapy protocols. Surgery. Combination of all treatment modalities.

HD – mainly chemotherapy and radiotherapy

NHL - mainly chemotherapy

**BURKITTS LYMPHOMA**

Lymphoid proliferative disorder. Described by Dennis Burkitts in 1958 in Makerere, Uganda Considered age- 4-8 years, geography- tropics, high temperatures, high mosquitoes, gender – more boys than girls, involvement- jaw mainly, 2nd abdomen. It is a rapidly growing tumour Related to EBV. It rapidly regresses with cyclophosphamide treatment.

Important to consider the following: Mandatory CSF, Avoid surgery, Observe complications.

Treatment – chemotherapy.

Distribution: Nyanza, Western, Coast, Eastern, Nairobi, Rift valley, Central.

**WILM’S TUMOUR**

Commonest tomour in Kenya among pediatrics. It accounts for about 14-18 % of all paeds. tumours. Arises from primitive cells of the kidney, Incidences varies world wide. Congenital conditions associated with this tumour are: aniridia, unilateral organomegally, hypospadias, horse shoe kidney,GUT congenital abnormalities. More than 90% of cases usually before 6 years of age. Peak age 2 - 4 years.

**Clinical Features;** Abdominal mass, Hematuria, Pain, May be associated with blood pressure or acute abdomen in cases of rupture. Nausea, vomiting, wasting

**On Examination;** Pallor may be present, Generalized wasting, Mass in the flank, Usually the mass does not cross the mid-line, grows down and out.

Diagnostic Evaluation/Investigations: Total blood picture, Urinalysis, Liver function tests, Renal function tests, Uric acid, Chest x-ray, Abdominal x-ray, scan, Intravenous urogram

**Staging:**

**Stage 1**- tumour confined to kidney, not involving the capsule of the kidney (one side)

**Stage 2**- confined to one kidney but infiltrates to the capsule.

**Stage 3**- surrounding tissues are involved with the tumour.

**Stage 4**- parenchymal organs involved (lungs, liver)

**Stage 5**- opposite kidney is involved. Two types of stage 5

* **Stage 5 synchronous**- tumour starts in both kidneys at the same time.
* **Stage 5 dysynchronous**-first kidney involves the other by spread.

Management principles: All modalities are involved. Primary- surgery with complete resection of the tumour, this usually followed by chemotherapy, radiotherapy. The younger the children, surgery may be sufficient unless there is metastasis

**Prognosis:**

* Depends on the stage and histological type.
* Stage 1 & 2 - curable
* Stage 3 – cure rate about 50%
* Stage 4 – cure rate is low and variable
* Stage 5 – nearly nil especially the synchronous.

# **CHAPTER EIGHTEEN: INTEGUMENTARY ALTERATIONS**

 **Diaper dermatitis:** Also called “diaper rash”. Acute inflammation process occurring in the diaper area. Usually due to primary irritants (contact dermatitis). Rashes may also appear due to other conditions e.g. candidiasis.

**Incidence & etiology:** This is most common irritant dermatitis of childhood.Any child wearing diaper is at risk but peaks at 9-12months – this may be related to transition from breast feeding to bottle feeding and introduction of solid foods. Increase acidity of urine/ stools. In the USA the incidence is 7-35%. Introduction of ultra-obsolete disposable diaper has led to decrease in incidence.Decrease use of diaper in underdeveloped countries has led to decreased cases of diaper dermatitis.The etiological factorsresponsible include **:** Exact cause is unknown . Multiple factors thought to be involved: environmental factors e.g. urine pH, stool consistency, frequency of urine and stool .Type of diaper used – cloth diapers that are covered by tight fitting plastic pants reduce air circulation and create increased moisture within the diaper area.Hygiene related factors: infrequent diaper changes,inadequate cleaning and drying of the diaper area, failure to use appropriate topical barriers to protect the skin, other associated factors:bottle feeding, prematurity and intestinal carriage of candida albicans. Presence of atopic dermatitis and biotin deficiency also predispose.

**Pathophysiology:** Skin breakdown due to prolonged exposure to chemical & physical irritants. Wetness & warmth increase damage caused by friction.Stratum correum is damaged which further increases the susceptibility to irritants.Increased pH, fecal enzymes, & bile salts irritate the skin.

**Clinical manifestations:** Primary irritantdiaper dermartitis appear as shiny erythema covering the diaper area. There redness and inflammation. Skin folds are spared because the rash affects skin in direct contact with the diaper. Vesides, papules & scaling may appear in severe/ cases.

E.g. Candida diaper dermatitis:-Acute onset of erythematons papules beginning in the perennial area and progressing to cover the perineum. Papules coalesce & form a well-defined area of erythema with scalloped borders.

**Diagnostic evaluation:** Characteristic rash in the diaper area. Since rashes of other origin may appear in diaper area, the specific appearance is important in diagnosis.

**Therapeutic management:** Keep skin dry, protected & free from infection. Most cases are minor and respond quickly to this approach. Change diaper frequently. Good diaper hygiene. Super-absorbent dispensable diapers (prevent wetness & provide pH control) are better than cotton diapers.Barrier cream also used. Protect skin from moisture and chemical irritants e.g. use white petroleum & zinc oxide products can be used.Note: Baby powder & other OTC products e.g. baking soda and aboric acid not used since cause further irritation & toxicity in case of inhalation. Low-dose steroid cream e.g. 1% hydrocortisone for severe inflammation (don’t use more than x2wk).Diaper dermatitis due to candida albucans requires tretment with antifungal agent, typically Nystatin (Mycostatin) cream/ointment.Some products may have a combined steroid/ antifungal e.g. clotrimazole & betamethasone.

**ACNE/ ACNE VULGARIS**

Acne vulgaris (Acne) a common disease of adolescent .Its chronic and may persist – adulthood. Result to skin lesions and emotional disturbance for the adolescent.

**Incidence/ Etioogy:** Approximately 85% of 12-25yrs old develops it.Highest incidence at age 16-17years for girls and age 17-18 in boys.More common in males.The etiology is not exactly clear. Associated with increased androgens & sebum production occurring usually during puberty. Familial tendency exist.Other associated factors include: emotional stress, heat, humidity, increased friction, oil-based cosmetics, menstrual cycles and steroid administration.

**Pathophysiology:** Involves pilosebaceous follicles which are most abundant on the face, chest & upper back. Acne associated with increased production of sebum (complex lipid that help keep skin hydration).Production peaks in adolescents & decreased by 20s due to adrenalcortical maturation.In individuals with Acne, epithelial cells lining the follicle change & become more cohesive – leading to accumulation of sebum.Keratinized material develop from the lining cells.Exact trigger of the process is not clear. It due to obstruction that the acne lesions develop. Propionibacterium acnes (p. acnes) are anaerobic normal flora of the skin that colonise the pilosebaceous follicle.The bacterial use sebum as nutrient for growth. Propionibacterium acnes believed to contribute to the development of acne by producing free fatty acids/ enzymes that trigger inflammation response & damage to the follicle wall.

**Clinical manifestations and types:** There are twocommon classifications:

* Comedonal acne: Obstructive & non-inflammatory comedones common.
* Inflammatory acne: Characterized by inflammatory, Papules, pustules & nodules.

Many individuals with acne have both types.Comedone – characteristic lesion of non-inflamamtion acne. Lesions closed (white heads) or open (black head-due to oxidation of melanin). Lesions may get inflamed when follicle wall ruptures, leaking sebum, hair, p. acnes & cells into demis causing form action of papules, pustules, nodules & cysts.

Acne scars – pits/depressions but hypertrohic scars may result.Psychological aspects accompanying acne – low self esteem, decreased self-confidence, and depression.

## Therapeutic management: Based on client’s age & appearance of lesions on face, neck & back.Appearance of acne in prepubertal age may indicate an endocrine problem further evaluation important. Topical – benzoyperoxide, retinoids, adapalene, azelaic acid, & antibiotics.Oral – antibiotics, oral contraceptives & isotretinoin.Improvement starts 4-6wks after starting use.The severity of acne & the characteristic type determine the selection of treatment. Adjunct therapies include: Comedone extraction and Steroid infections .Treatment should be individualized as much as possible.Psychological care vital.Nursing management include: Common myths associated with skin care need be dispelled e.g. acne is caused by dirt.Picking & squeezing the lesions not advisable as can cause secondary infection & scaring.Support (fx support & social/ support) are vital for adolescent, though the treatment regime take long.Cosmetics & moisturizers containing oils should be avoided.

# **CHAPTER NINETEEN: SENSORY ALTERATIONS**

 **Hearing impairment:** Hearing impairment is a general term indicating disability that may range in severity. A deaf person is one whose hearing disability predates successful processing of linguistic information through audition with or without a hearing aid.

Hard-of hearing-person who generally with the use of a hearing aid, has residual hearing sufficient to enable successful processing of linguistic information than condition where a person cannot use aid. Hearing impairment may be classified according to etiology, pathology, or symptom severity.An estimated 1 in 750 infants in the low-risk newborn population is born with some degree of bilateral sensorineural hearing impairments

**Etiology:** Hearing loss may be due to a number of prenatal and post natal conditions this includes: family history of childhood hearing impairment, anatomic malformation of head or neck, Low birth weight,Severe prenatal asphyxia.Perinatal infection (cytomegalovirus), Rubella, herpes, syphilis, toxoplamosisos and bacteria meningitis, chronic ear infection, cerebral palsy Down syndrome, administration of toxic drugs.

me i.e. sensorineural hearing loss could be due to continuous humming noises or high noise levels associated with incubators, or intensive care units, especially when combined with the use of potentially ototoxic antibiotics. Environmental noise is a special concern, sounds loud enough to damage sensitive hair cells of the inner ear can produce irreversible hearing loss.

**Pathophysiology:** Disorders of hearing are divided according to the location of defects. Conductive or middle ear hearing loss is due to interference of transmission of sound to the middle ear. It’s commonly a result of recurrent serious otitis media.Sensorineural hearing loss also called perceptive or nerve deafness involves damage to the inner ear structure and the auditory nerve. Common causes include congenital defects of inner ear structures or consequences of acquired conditions, that is, kernicterus, infection, administration of ototoxic drugs, or exposure to excessive noise. This hearing loss results in distortion of sound and problem in discrimination that is; there are sound distortion.Mixed conductive sensorineutral results due to interference with the transmission of sound in the middle ear and along neural pathocry. It results from recurrent otitis media and its complications.Central auditory imperceptions – hearing loss that does not demonstrate defects in conductive or sensorineural structures normally divided into organic or txnal losses. In organic type of central auditory imperceptions, the defect involves the receptions of auditory stimuli along the central pollutions and expression of the message into meaningful communication. Example include: - Inability to express ideas in any form either written or verbally, agnosia inability to interpret sound correctly, dysacusis (Difficulty in processing details or discrimination among sounds). In functional type of hearing loss there no organic lesion to explain a central auditory loss. Example includes conversion hysteria (unconscious withdrawal from hearing to block remembrance of a traumatic event), infantile autism, and childhood schizophrenia. Hearing impairment is expressed in terms of a decibel (dB), a unit of loudness and is measured at varies frequencies i.e. 500, 1000 and 2000 cycles per second, the critical listening speech range. Hearing impairment can be classified according to hearing threshold level (measurement of an individuals hearing threshold by means of an audiometer) and the degree of symptom seventy as it affects speech.

**Clinical manifestation:**

**In infants the following clinical manifestations will feature**

Lack of startle or blink reflex to a loud sound; failure to be awakened by loud environmental noises; failure to localize a sense of sound by 6 moths of age; absence of babble or inflection in voice by 7 moths of age; general different into sound; lack of response to the spoken word, failure to follow verbal directions; Response to loud noises as opposed to the voice.

**In children the the following signs and symptoms will feature**

Use of gestures rather than verbalization to express desires, expect after 15 months of age.; failure to develop intelligible speech by age 24 months;vocal play, head banging or foot stamping vibratory sensation; asking to have statements repeated or answering then incorrectly;

responding more to facial expression and gestures then verbal explanation; inquiring sometimes confused facial expression; frequent stubborn because of lack of comprehension; irritable at not making themselves understood.

**Therapeutic Management:** Treatment of this depends on the cause and type of hearing impairment. Conductive hearing loss mainly respond to medical or surgical treatment the antibiotic therapy for acute otitis media or insertion of typmpanostroy tubes for chromic otitis media. When conductive hearing impairment is permanent hearing can be improved if the use of a hearing aid to amplify sound.Treatment for sensorineural hearing loss is less satisfactory; hearing aids are of less value in this type of defect.Use of cochlear implants (surgical implanted prosthetic device) provides hope for some affected children.Disorders of central auditor imperceptions depend on the cause: Textual type i.e. conversion hysteria may require psychologic interview but others i.e. autism may not respond to any therapy.

**Nursing considerations**

**Assessment**

* Discovery of hearing impairment within the 1st 6 – 12 months is essential.
* Hearing aids – Nurse should be familiar of this i.e. those worn in or behind the ear, models incorporated into an eyeglass frame or types worn by the body with a wire connection to ear.
* Lip reading – Child teams to supplements spoken words with sensitivity to visual cues, primarily body language and facial expression.
* Sign language – Uses hand signals that roughly corresponds to specific words and concepts in angling language.
* Speech therapy – Learned through a multisensory approach using visual, tactile, kinaesthetic and auditory stimulation.

Socialization – Name should discuss on the methods of fostering social contact with family members i.e. with peers and with parents themselves.Assist in measures to prevent hearing impairment. Appropriate measures are instituted to treat existing infections and prevent recurrences. Periodic auditory testing should be done regularly for children with histories of ear or respond infections or others known to increase the risk of hearing impairment.

**Evaluation**

Based on the following observational guidelines and expected outcomes.

* Observing techniques used to communicate with child i.e. inquire if child is enrolled in auditory training program, socialization opportunities for child (who are his friends, extra curricular activities).
* Interview family regarding their adjustment to the sensori impairment, observe family members relationships with child, interview child regarding feelings about sensori impairment and the effect on activities of daily living.

Nurse can observe neonates response to auditory stimuli as evidenced by startle reflex, head turning, eye blinking and ceasation of body movement. Infant may vary in the intensively of response depending on state of alertness.Consistent absence of a reaction should lead to a suspicion of hearing loss. A nurse should assess and suspect hearing impairment in any child who demonstrates the behaviours below, child with murk conductive hearing loss may speak fairly dearly but in a loud monotone voice, child with sensormeural detect has a different articulation i.e inability to hear higher frequencies may result in the word spoon being pronounced ‘poon’.

**Visual impairment:** It refers to visual loss that cannot be corrected with regular prescriptive lenses.Classifications is based on the type of activity in which the child can be expected to engage in. this may include; School vision (visual acuity between 20/200 and 20/200 also known as partially sighted; legal blindness (visual acuity of 20/200 or less and or a visual field of 20 degrees or less in better eye. its useful in only on legal definition not for medical diagnosis;travel vision. (Visual acuity of 20/400.it allows the child to travel in unfamiliar surroundings provided he is otherwise healthy;light perception, which are primarily important for the Childs sense of wellbeing and may be an aid in mobility.

**Etiology:** Based on the following divisions;

* Familial factors; including genetic diseases associated with visual defects, such as Tay - Sachs disease, albinism, galactosemia, or retinoblastoma.
* Prenatal/intrauterine factors; especially maternal infection, such as rubella, syphilis, herpes simplex, or toxoplasmosis.
* Perinatal factors; including prematurity, maternal infection (opthalmia, neonatorum), and oxygen toxicity (retrolental fibroplasias.)
* Postnatal factors; which are primarily trauma, infections (mumps, measles, rubella, poliomyelitis and chicken pox), and disorders such as juvenile rheumatoid arthritis, leukemia, and myasthenia gravis.

**Types of visual impairments**

**Refractive errors:** Which refers to those variations eye that prevent prefect focusing of light rays on the retina? These refractive errors may result in: myopia or nearsightedness and refers to the ability to see near objects but not those in a distance. It results from an eye ball that’s too long, resulting in the focal point falling in front of the retina.Correction**:** Use of biconcave lenses which cause the parallel rays to diverge thus permitting the lens of myopic eye to the two rays on the retina.

**Hyperopic (hypermetropia) or far sightedness.** This is a result of short in length; as a result rays of light are theoretically focused behind the retina. They see objects at a distance and because of their accommodative ability they can see objects at a close range. Correction: Use of convex lenses which bend the light rays so that the lens of the eye can focus them on the retina.

**Astigmatism:** refractive surfaces of the eye being rarely spheric.theres unequal curvatures in the cornea or lens such that rays are bent in different directions, producing a blurred image.Correction: Use of a specially ground lenses that compensate for the errors in refraction.

 **Amlyopia** which results when one eye does not receive sufficient visual stimulation during the critical period of development of the visual cortex.amlyopia can be classified according to the following; Strabismus amlyopia; from prolonged fixation by the dominant eye and suppression of the images in the deviating eye.Anisometropic or refractive amblyopic; from different refractive errors in the eye. Deprivation amlyopia; from congenital ocular defects, such as cataracts, that prevent vision on the affected eye. Occlusion amlyopia; from prolonged patching of an eye, such as therapeutic patching after an injury, in very young children.

**Therapeutic management:** Amlyopia treatment includes patching the good eye so that the child can be forced to use the weaker eye. If refractive errors are present then corrective lenses are worn.

**Strabismus**.refering to the malalignment of the eyes, and thus the visual axes not parallel causing the eye to see two separate images. The brain can suppress the images from the weaker or deviating eye; amlyopia can result in children less than 9 years of age.Strabismus can be classified as:

* Paralytic strabismus; which is a deviation of the eye caused by paralysis of an extra ocular muscle (six eye muscles innervated by the 3, 4, and 6th cranial nerves.)
* Non paralytic strabismus; where there is no defect in the action of the individual extra ocular muscles or in a specific nerve.
* Esotropia strabismus; an inward deviation of the eye, and be classified as infantile estropia or early onset estropia; which begins at an early age of 6-12 months.accomodative estropia which occurs between 6-7 years. And involves a large hyperopic refraction error that requires excessive accommodation to bring the image into clear focus.

**Therapeutic management:**  Depend on the type of strabismus but may involve surgery, of the affected muscles, lenses to correct refractive errors, occlusion therapy, and sometimes administration of anticholinesterases agents to reduce the accommodative effort.

 **Cataracts;** which is opacity of the crystalline lens. The lens is normally transparent to allow the light rays to enter the eye and refract them for a clear image on the retina. A cataract then interferes with both of these functions. Cataracts can be congenital ,such as those caused by maternal rubella during the first trimester, or acquired, most commonly as a result of penetrating injuries or as a result of a disease complication i.e. galactosemia. Cataracts are identified as a visible white clouding of the lens from absence of the red reflex on examination of the retina.

**Therapeutic management:**  For children include glasses or removable lenses to provide sharp vision at only one distance. As the child grows a bifocal system is required to correct for both far and near vision.Nursing interventions include general nursing goals focuses on prevention, detection, and rehabilitation. Prevention measures include:

* Prenatal screening for pregnant women at risk such as those with rubella or syphilis infection and family histories of genetic disorders associated with visual loss.
* Adequate prenatal and perinatal care to prevent prematurity and iatrogenic damage form excessive administration of oxygen.
* Periodic screening of children especially of newborns through preschoolers, for congenital blindness and visual impairment caused by refractive errors and strabismus.
* Adequate immunization for all children.

Most infants demonstrate specific orientation responses to visual impairment. Most infants would then exhibit the following the following response; failure to focus on or follow stimulus; stills with stimulus and brightens.;tills, focuses on stimulus when present, little spontaneous interest, no following; stills, focuses on stimuli, and follows for 30 degree arc, jerky movements; focuses and follows with eyes horizontally for at least 30 degree arc with smooth movement, loses stimulus but finds it again; Follows for 30- degree arch with eyes and head, eye movements are smooth; follows with eyes and head at least 60 degrees horizontally, maybe briefly vertically, partially continuous movement, loses stimulus occasionally, head turns to follow; follows with eyes and head 60 degrees horizontally and 30 degrees vertically;Focuses on stimulus and follows with smooth, continuous head movement horizontally, vertically, and in a circle; follows for 120-degree arch and during infancy, the child should be tested for strabismus.

In childhood the common problems are refractive errors. Testing for visual acuity is essential. Nurses should be aware of signs and symptom indicating other ocular problems. Nurses should also stress on continuity of periodic eye examinations. Glasses are necessary for visual impairment.Safety counseling regarding the common causes of ocular trauma.In rehabilitation nursing goals include; helping the child and family to adjust to the impairment; promoting parent-child attachment; fostering optimum development and independence; providing for play/socialization and being aware of educational facilities.

# **CHAPTER TWENTY: NEUROLOGICAL ALTERATIONS**

**Introduction:** Neurological alterations can be structural, infections or injury.General clinical manifestations: May be different levels of consciousness e.g. confusion, (e.g. disorientation), delirium with anxiety, fear and agitation. Further deterioration of consciousness may lead to stupor where the child can only react to deep stimulation .lastly comamay result where the child cannot respond even to deep painful stimulus .Assessment of level of consciousness by AVPU

A= alert and awake; V=Responsive to verbal stimuli; P =responsive to painful stimuli; U =unresponsive. Ensure that you state the exact stimuli and reaction used.

Other methods used for assessing level of consciousness: Glasgow coma scale –consider age the child e.g. 5 year old may not respond because have told by parent not to talk to strangers.Presence or absence of posturing:-decorticate (flexor posturing) associated with bilateral hemisphere injury while decerebrate (rigid extensor posturing) is associated with midbrain, pons injury. Flaccid areflexia (absence of response) indicates severe brain stem injury-common in terminal coma.Vital signs: Changes in the vital signs ca indicate pathophysiological changes within the brain especially the brain stem.CVS observations are important beause of the close relationship btn cerebral haemodynamic and cerebral blood flow.Reduced cerebral blood flow result in vasomotor response eg blood pressure increases.

**Diagnostic procedures:** Varies and depends on the child’s presentation. May include the following:

* Blood profiling eg urea and electrolytes,metabolic and immuno assays and genetic screening
* Lumbar puncture for CSf collection for bacterial/tumor screening,measure CSF pressure
* Neuroimaging eg X-ays,computerised axial tomography(CT),MRI
* Specialised physiological imaging techniques eg PET,SPECT,
* Ceerebralvascular studies eg angiography can detectaneurysms and arteriovenous malformations
* Electroencephalogrphy(EEG) to detect seizures
* Electromyography (EMG) conduction studies measures electrical activity and velocity in muscule fibres.diagnse neuromascular and peripheral nerve disorders
* Muscule biopsies measures muscule enzymes to detect if a problem is neurogenic or myogenicin origin

**CEREBRAL PALSY (CP):** Defined as non –progressive motor dysfunction caused by damage to the motor areas of the brain.

**Incidence Aetiology:** Incidence: 7:1000 live birth per year. Persons with CP may have accompanying disabilities in cognition and language delays. The most common cause is: Prematurity or/and Low birth weight. Neonates at special risk because of brain immaturity.

Other causes include:Congenital malfunctions, any injury or anoxia to brain.Such etiological factors occurring before, during or after birth can cause CP.Thus: Prenatal causes**:** Genetic/ chromosoma abnormalities,Brain malfunctions,Exposure to teratogens, Multiple fetuses, Intrauterine infection,Ineffective placenta causing insufficient nutrition & O2 delivery to the foetus.Birth related causes**:** Pre-eclampsia, Complicated labour (delivery), Birth injury caused by direct head trauma, Asphyxia 20 to cord collapse or strangulation.Perinatal related causes**:** Kernicterus, Central nervous system infection or sepsis.Child hood causes:Head trauma, Meningitis, toxic ingestion or inhalation

**Pathophysiology:** Congenital malformation or brain damage from any of the above factors.

**Clinical Manifestations:** CP is an abnormality of muscle tone & movement.clinical features depends on muscle responses & area of body affected. Clinical features according to muscle response:-Hypotonia: Manifested as floppiness, increase range of motion of joints, increase reflex responses.Hypertonic: Manifested as rigidity, spacisticity, scissoring or crossing of lower extremeties, reflex reactions (Babiski deep tendon reflexes are exaggerated.Athetosis: **-** Constant involuntary writhing motions; affect entire body, but more severe distally.Ataxia: - Irregularity in muscle action or coordination and wide- based gait. Clinical manifestations according to topographic response: Hemiplegic:Manifested as upper extremities move involved, sensory deficits, asymmetric posture/ positions, atypical response on affected side, alteration in muscle tone spasticity.Diplegia:Involve similar sides of the body; lower extremity dysfunctional than the upper; muscle tone altered – hypertonic/ spasticity; delay in development of gross motor milestones e.g. sitting, standing, and walking; achievement of fine motor skills usually at normal pace.Quadriplegia:Involvement of all 4 extremities with equal involvement although arms are usually flexed & legs extended; delay in attaining those developmental milestones dependent on motor ability; there are speech dysfunctions and swallowing may be impaired; emotional liability not uncommon.

**Diagnostic evaluation:** Based on clinical findings.

Any suspected case, keen observation is made on age of achieving specific motor skills.See the above clinical manifestation as important diagnostic features.

**Therapeutic management:** There is no cure for cerebral palsy. Interventions are aimed at: Enabling client achieve the best movement, locomotion, communication possible & be self-dependent as possible e.g. Occupational therapy to prevent complications of immobility ,Speech therapy, Wheel chairs/walkers ,Surgical intervention to reduce spasms e.g. rhizotomy with small section of spinal cord is cut. Medication for older child/adolescent e.g. muscle relaxants to decrease contractures. Anti anxiety – reduce excessive motions associated with athetosis.

Other important interventions include: Positioning vital e.g. pillows; protect any prominences –to prevent bedsores; moving client & feeding is a big challenge for the nurse – seek support from the family members; social support extremely vital for the entire family; family need to be taught how to take care of child at home as much as possible,

**Seizures:** Episodic, stereotypic behavioural syndrome that have an abrupt onset. Generally, not provoked by external stimuli.

**Aetiology:** Depends on the type of seizure. Incidence rate is 0.5-1.0%

**Partial:** Originate from a focal point**.** For comples partial, may be caused by intracranial leisure, tumours, and cysts. Birth and other traumatic injury, arteriovenous malformations, prolonged febrile seizures.Simple seizures – May be caused by tumours & other lesions, Focal damaged to brain, arteriovenous mal function, Brain abscess.Examples of simple seizures- Jacksonian, Rolandic/ sylvian seizures.

**Generalized:** Tonic/ Clonic seizures, birth injury/ cerebral trauma, metabolic disorder, fever, unknown .Absence seizures – possible genetic link. Myoclonic seizures– prenatal & perinatal encephalopathy, microcephaly

**Pathophysiology:** Spontaneous electrical discharge of hyper excited brain cell in epileptogenic focus.May be triggered by emotional stress, Anxiety, Fatigue, infection, metabolic disturbance. Location & number of epileptogenic foci determines the nature of seizures. Small area – localized, if spread – generalised. Status epilepticus:Prolonged seizures or series of convulsions where loss of consciousness occurs for at least 30 minutes.Epilepsy**:** Chronic seizures disorders that is often associated with CNS pathology.

**Clinical manifestations:** Depends on the type e.g.

Simple partial – local motor, sensory, psychic & somatic manifestations. E.g. hallucinations, anxiety, paresthesias. Complex partial:Aura, Anxiety, fear, Déjà Vu, unusual tastes, Visual/ auditory hallucinations, disturbed consciousness. Automatisms – repeated non- purposeful action e.g. lip smacking, chewing, sucking, uttering same word .Tonic/ clonic –grandmal seizures**.** Manifested in typical phases of epileptic attack: prodromal, Aura, Tonic, clonic, Postictal/ post convulsive state.Absence/ petit mal**:** Appear around 6th birthday & disappearance in adolescence transient loss of consciousness i.e. cessation of current activity. Stare at space. Loss of muscle tone – things drop from hand and head droop.Lip smacking occur.Febrile seizures:Type of clonic/ tonic .Associated with increase temperature. 390C at 6m- 5yrs .The family history vital .Frequently accompany infections e.g. URTI, pneumonia, otitis media etc.Infantile spasms:Salaam seizures being at 3month of age. x 2 in males .Infants head sudden drop forward while arms & legs flexed, eyes roll upward/ downward. Cry out turn pale or cyanotic/ flushed and loss of consciousness may result.

**Diagnostic evaluation:**  Family history is vital. Investigate about infection and some metabolic disturbance.Neurological evaluation e.g. Level of conciosness, Reflexes, Sensory and motor responses.CT/MRI – Structural abnormalities. Angiography – vascular abnormalities. Electro-ence phalogram (EEG) – brain electrical activity .Positron emission tomography (PET)-brain abnormality areas

**Therapeutic management:** Oxygen for tonic/clonic.Absence may be self limiting. Pharmacotherapy e.g. Benzodiazepines and barbiturates-Revise on pharmacology .Intractableseizures requireSurgery – epileptogenic focus if necessary e.g. temporal lobectomy or hemispherectomy.Nursing Management- Oxygen therapy & suction. Medications compliance is very important.Clasify seizures to accurately determine right medication.Safe environment – family education. Destigmatise about epilepsy.Counseling.Social services and support groups need be involved eg epilepsy association of Kenya. Medic alert bracelet –for legal and first aid purposes.

**MENINGITIS.**

Meningitis is the inflammation of the leptomeninges (brain covering) with variable involvement of the encephalon (brain matter). Acute meningitis may be either bacterial or viral in origin.

Acute viral meningitis is usually mild and self limiting illness while bacterial meningitis is a serious illness that is fatal if untreated. Meningitis caused by any bacteria (excluding tubercular meningitis) is called pyogenic meningitis.

Clinical Features.

High grade fever, nausea, vomiting, anorexia, irritability, excessive crying (high pitched), head banging in younger child, headache/photophobia in older children, seizures, altered sensorium such as stupor, coma, obtundation, meningeal signs: neck rigidity, kernig’s sign positive.

Focal CNS deficits such as hemiparesis, visual loss and features of raised ICP e.g. bulging fontanelle in infants, papilledema, bradycardia, hypertension may be present.

 **Etiological agents**

Common agents include: Gram negative bacteria (*E.coli, Pseudomonas, Proteus*) in newborn and younger infants ˂ 2 months of age. *Hemophilus influenzae*- between the ages of 2 months to 3 years. *Streptococcus pneumoniae* and *Nesseria meningitidis* in children ˃ 2 years of age.

**Investigations**

* Lumbar puncture for CSF – look for opening pressure, gross appearance, blood sugar, cytology, gram staining and culture.
* Other investigations: complete blood sugar, white cell counts, and blood culture.
* CT scan indicated when complications are suspected.

**Therapeutic Management.**

* Antibiotics – should be started immediately. Monotherapy with 3rd generation cephalosporin is the initial choice.
* Steroid therapy – dexamethasone used to decrease the cytokine mediated damage esp.auditory nerve, decreases raised intracranial pressure.
* Intravenous fluids – child should be kept nil orally for the first 24 hours, then assess the sensorium. Half saline in 5% dextrose as maintainance.
* If there is raised Intacranial pressure (ICP) – 20% mannitol should be given in a dose of 5 ml/kg over 10-15 minutes followed by 3 ml/kg 6 hourly till 48 hours.
* Supportive management – feeding once sensorium improves, control temperature, monitor vital signs.
* Complications- systemic: shock, myocarditis, status epilepticus, seizures, subdural empyema/effusion, brain abscess, deafness, hydrocephalus, arachnoiditis, mental retardation.

**Prognosis**: Mortality in about 10%. Neurologic sequelae – seen 20-30%, deafness occurs in 10% children mainly with H.influenzae infections, mental retardation, seizures and spasticity.

**Nursing Considerations**: Administer appropriate antibiotics immediately. Nurse in a quiet room, environmental stimuli should be kept at a minimum. Slightly elevate the head of the bed. Avoid unnecessary lifting of the head, this causes pain and increase discomfort.

Monitor and record vital signs, neurologic signs, level of consciousness, urine output, and other pertinent data. Watch for signs of complications especially signs of increased ICP, shock or respiratory distress. Family support – reassure the family, keep family informed of the child’s progress and of all procedures and treatment.

**ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)**

Neuro-developmental problem (neuropsychiatric disorder). It is characterized by levels of hyperactivity, poor attention, impulsivity. Symptoms must be developmental abnormal (out of expected). Symptoms must persist with time at all levels. Should not be explained by another medical condition or mental illness e.g. anxiety. Exclude psychosocial disturbance. Must cause substantial functional impairment in more than one sitting (environment). It interferes with work and interpersonal relationship.

**Specific Signs.**

**Inattention.** Cannot concentrate, child skips from one task to another.Forget instructions and are much disorganized, difficulty in completing tasks.Do not listen when talked to.Lose item important for school work – pens, books, bags.

**Hyperactivity.** Able to sit still, fidget or squirm.The child does not get tired.Talk excessively**.** They get impatient.

**Impulsivity.** Wants to dominate especially in groups, answers all questions.Do not think of the consequences of their actions/ behaviors e.g. injuries**.** Prone to accidents because of their behavior.Interrupt other people’s conversations**.** Outbursts of tempers**.** Labeled as rebellious child.

**Types of ADHD**

Classified as:

**Inattentive type** – commonest among the older; adolescents and above.

**Hyperactive-Impulsive type** – toddlers and young children.

**Combined Type** – the commonest type.

**NB:** some symptoms start as early e.g. crawling-children will just wonder away.

Reports from mother, was active in-utero, too colicky, little sleep.

In structured environments e.g. school, the symptoms become more obvious.

First noticed by early school teacher. Respond to all sorts of stimuli at the same time.

ADHD is a source of stress in families, social destruction and blame game.

ADHD exists in other conditions in 2/3 of cases.

Co-morbidities are;

* Learning disability – academic performance below average, problems with spelling.
* Oppositional defiant disorder and conduct disorder – child deliberately defying their parents, teachers. Aggressive, vandalism, vindictive. Labeled as indiscipline and get rejected in all institutions
* Anxiety and depression – feel low, nervous, and fearful; refuse to participate in activities with others.
* Tics – involuntary muscle movements. Habitual twitching of the face, vocal outbursts, derogatory language.
* Substance abuse – more in adolescent and adulthood, seeking for excitement. In adolescents it present with restlessness, inattention, poor impulse control, poor organization skills, weak problem solving strategies, low school performance, low self esteem, poor peer relationship, poor judgment, more prone to traffic accidents, engage in indiscriminate behavior and suicide attempts.

**Aetiology.** Not fully known/understood.Factors that play a role:Genetic predisposition – ADHD run in families.Alcohol use during pregnancy**,** Trauma – infection of the brain in early life may cause ADHD, seizures, and meningitis.Chemicals and anatomical imbalance in the brain e.g. noradrenalin and dopamine in some parts of the brain.Immaturity

**Management**

* Concerted efforts of all medical specialists, parents and teachers.
* Medication
* Behavioral
* Family counseling.
* Family – educate them on the problem. Should be positive in communication with the child. ADHD responds poorly with negative criticisms.
* Praise the child - they thrive on being praised.
* Have clear rules and structure with proper routine of activities.
* Help child prioritize their tasks e.g. home work, play, and bath.
* Rules at home should not be negotiable for the little ones.
* Minimize instructions and distractions.
* Some tasks may need to be reduced into smaller manageable ones.
* Bad behavior must be sorted out immediately.
* Do not enter into arguments with the child and give appropriate punishment where necessary.

**Medication.** Psychostimulants – methylphenidate (Ritalin) – short acting; reduces restlessness, improves peer relationship.Nonstimulants; Atomoxetin- good in ADHD, much safer than Ritalin in side effects though expensive.Others: imipramine, riperidone, fluoxetine.Drugs are for controlling the symptoms.

**Important to Note.** Herbal medications do not treat ADHD.Give a balanced diet and more of natural fresh food as possible.ADHD persists into adulthood.Poor parenting does not cause ADHD.Medications also do not cause ADHD.

**Poor prognosis.**

Adult directed oppositional behavior, Low intelligence. NB: ADHD predisposes one to future Bipolar 1 mood disorder.

**AUTISM (PERVASIVE DEVELOPMENTAL DISORDER[PDD])**

Characterized by severe pervasive impairment in several areas of development.

**Characteristics.** Problems of reciprocal interaction and skills.Desire for sameness**,** Presence of stereotype behavior, interest in activities, communication impairment**,** Associated with some degree of mental retardation**,** Recognized at 1 year of life.

**Cause:** Associated with chromosomal abnormalities, congenital defects, and structural abnormalities of CNS. Therefore a neurodevelopment problem.

**Classification:** Autistic disorder – commonest**,** Retts – disorder**,** Childhood disintegrative psychosis**,** Aspergers disorder**,** PDD not otherwise specified.

Prevalence is increasing 4.8/10,000 to 1:1000 in the general population.

Prevalence is high in clinical setting.

First seen by Leo Kana- described as wild idiot servants. Described 11 children who exhibited:

Congenital inability to relate to others but not to objects. Language development impairment, associated with echolalia and pronounce reversal and concreteness-black and white looking, lack imagination

**Clinical Presentation:** Onset before age of 3 years.Disturbance in social relatedness**,** Communication and play disturbance**,** Restricted interest and activities.

**Social Relatedness:**

* Impairment in non-verbal behavior in social interactions.
* Failure to develop peer relationships appropriate for age/developmental level.
* Lack of seeking to share enjoyment or interest.
* Lack of social or emotional reciprocity.
* Impairment in communication and play disturbance.
* Delay or total lack of spoken language without an attempt to compensate in other ways.
* Difficult to sustain or initiate a conversation
* Stereotyped or repetitive language. Perseveration – giving same response for different questions.
* Lack of make believe or social play – no symbolic position.

**Restricted interest and activities.** Adhere to non functional routine rituals e.g. squatting at a corner before going to sleep.Motor mannerism e.g. hand flapping with noise making.Persistent pre-occupation with parts of /or objects.

* Atypical autism if does not meet the onset criteria e.g. coming after 3 years.
* Autistic child carry hard objects not soft.
* Parental denial or lack of information.

**Common complains at 2 years.**

* Lack of language
* Inconsistence in responsiveness e.g. my child is deaf, sometimes hears sometimes not.
* Delay in processing information.

**Predictors of ultimate outcome;** Communicative speech by age of 5 years.Cognitive ability – high IQ > 70

**Other Observed Behavior.** Self stimulatory behavior – include self abuse like hitting oneself on head, biting, spinning, throw oneself on the ground, masturbate.

Disruptive and compulsive behavior – fighting and breaking things

Have a risk of getting seizures around adolescents. About 1-2% able to achieve independence, majority need supervision and adult care.

Adults with autism may be able to sustain employment. Male to female ratio is 4:1 and very severe in females.

**CHILD ABUSE.**

A public health problem. Has a cultural practice implications.

Child abuse – maltreatment of children and adolescents by parents/guardians or other caretakers.

American definition – physical injury of a child < 18 years by a person responsible for their welfare under circumstances that indicate the health of the child is harmed/threatened.

**Forms of child abuse.**

* Physical abuse/non accidental injury
* Emotional
* Neglect
* sexual

Child abuse looked into the context of children’s rights. US in 1995, 3 million victims/year. Mainly child neglect – 45%, physical – 26%, sexual – 11%, emotional – 3%. Median age of being abused 7 years, girls more, 77% abused by parents, 12% other family members.

Locally KNH 2009, 2 cases/day, 4% prevalence.

**Risks.** Male children more at risk because of many single families/single,Premature children**,** Step children**,** Mentally retarded**,** Physically challenged**,** Children with externalized disorders e.g. ADHD, Enuretic and encopretic**,** Refugees**,** Timid children.

**Other risks;** Less parental education**,** Under employment**,** Poverty**,** Poor housing**,** Single parenting**,** Family with substance use/abuse

About 90% of parents who abuse have criminal record e.t.c. but are stressed, angry, lonely.

Parents who were abused are likely to abuse their children (transgenerational transmission of abusive parenting).

**Diagnosis:**

Child indicates an adult has hurt them, unexplained injury e.g. parents says I have found the child just like that.

Inconsistence in history especially time, date and cause of injury.

History does not explain the severity of the injury.

When the child is hospitalized, there are no new bruises.

Delayed coming to hospital

Repetitive injury, injury with/at different stage of healing.

**Physical Findings.** Look at the skin – lesions all over, bruises on buttocks, back. Grip, teeth, pinch marks. Check of the bruise. Look for burns, cigarette burns. Glove and stocking type of burns. Circumferential friction marks.Skull injury – extradural and subdural hematomas. Extradural hematoma and retinal hemorrhage due to vigorous shaking. Skull fractures. Injury to long bones – spiral fractures, corner fractures.

**Evaluation on Physical abuse.** History from informant**,** Child must be interviewed**,** Examine the injuries, age, radiological examination e.g. chest, pelvis, skull.

Bleeding time, prothrombin time. Photogragh for forensic – back, front, face and the name for identity, date and time. Physical examination findings. Include social workers report and police report. Behavioral assessment observed e.g. dull, hyperactive, scared. Treatment/Management.

Multidisciplinary – children departments, courts, social workers, gynaecologist, surgeon, psychiatrics. Parents/caregiver may threaten; there should be a law to protect the reporter.

Depends on extent of injury, may be gynae, surgical or psychological.

**Emotional Abuse.**

Cannot pinpoint a real problem.Demeaning statements in caregiver-child relationship.

Emotional and neglect are the harm of other abuses.Categories of Emotional Abuses.

Emotional unavailability and unresponsiveness. Negative attribution and misattributions.

Inconsistent/developmental inappropriate interactions with the child. Failure to recognize the child individual and psychological boundaries. Failure to promote the child social adaptation.

**Outcome;**Poor cognitive development**,** Poor impulse control**,** Poor language development**,** Negative mental representation of self and others**,** Restricted positive view of themselves – withdrawn, Poor peer relationship**,** Engage in few social interactions**,** Helplessness – act useless**,** May not be able to discriminate emotions, Severe psychopathology – tics, steal, soiling, lack social skills, Emotional abuse has worst outcome if exist alone, but good if physical abuse co-exist.

**Long term Outcome of Abuse;** Low IQ**,** Poor reading ability**,** Running away from home**,** Delinquency**,** Substance abuse**,** Personality disorder**,** Severe psychosis/mental illness**,** Maltreated children are deprived of positive adult relationship, effective models of social skills, sense of personal control and predictability.

# **CHAPTER TWENTY ONE: MUSCULOSKELETAL ALTERATIONS**

**Soft tissue injuries:** Soft tissue injuries involve the skin and the underlying fat and connective tissue and muscles. A closed wound is an injury to the soft tissue but without a break in the skin.Closed wounds include: Contusions (bruises) - bleeding beneath the skin into the soft tissue. The bleeding can be a lot or a little. A lot of bleeding can cause pain and swelling, and can lead to problems with vital structures**.** Hematomas - well-defined pocket of blood and fluid beneath the skin. An open wound is an injury to soft tissue with a break in the skin. Usually, they are more serious than closed injuries because they can cause blood loss and infection. Open wounds include: Abrasions - superficial loss of skin from rubbing or scraping the skin over a rough or uneven surface. Lacerations - tears in the skin. The cut can have smooth or jagged edges. Punctures - skin is penetrated by a pointed object. Can be penetrating (entrance wound only) or perforating (entrance and exit wound). Usually, puncture wounds do not cause a lot of bleeding on the outside, but there may be a lot of bleeding on the insides and damage to organs. Avulsions - involve a tearing off or loss of a flap of skin. Amputations - traumatic cutting or tearing off of a finger, toe, arm, or leg.

**SPRAINS:** These occur from overstretching and tearing of ligaments. Sprains vary from sparse fibrous tears to complete disruption of a ligament complex. The results are pain, tenderness and soft tissue swelling. Ligament sprains are traditionally graded into three types, although distinguishing clinically between them may be difficult:First degree sprains involve minor tearing of ligament fibres and are entirely stable.Second degree sprains are more severe partial sprains. There may be some resultant slight ligamentous laxity, but with a definite end-point on stressing.Third degree sprains reflect completely torn ligaments causing significant laxity: patients sometimes report hearing a snap at the time of injury.Ligament sprains are very common, but there is a lack of reliable evidence about treatment. Prolonged immobilization seems to be detrimental to recovery, because of muscle wasting and loss of proprioception.

Painful minor sprains do respond well to traditional measures: Ice, compression with elastic support/strapping, elevation and progressive mobilization as soon as symptoms allow.

Simple analgesics such as paracetamol or NSAID (e.g. ibuprofen) may help. Complete ligament rupture can be relatively painless, but if associated with gross joint instability will require surgical repair. Associated haemarthroses require orthopaedic appraisal, aspiration and often initially, protection and immobilization in POP.

**STRAINS:** Indirect injury involving muscle-tendon units may be classified in a similar fashion to ligament sprains. Pain on palpation over the site of injury is also reproduced by passive stress or active contraction of the affected muscle unit.

**Diagnostic evaluation:**  palpable defect may be apparent in complete ruptures (which typically occur at the musculotendinous junction). However, associated swelling may prevent any defect from being easily palpable.

**Therapeutic management:**  Minor strains similarly to sprains; consider specialist review for complete ruptures, some of which may require surgical repair.

**Direct muscle injuries:** These result from direct impact to a limb, body surface or internal organ causing local pain, bruising and soft tissue swelling. Note that associated bone contusions can occur, such as in the perimeniscal areas of the knee (these are visible on MRI). Treatminor injuries with ice, analgesia and early mobilization within the limits of symptoms. For more significant injuries, consider and treat according to possible risks of compartment and crush syndromes (with rhabdomyolysis-?) and large haematomas

**Haematomas:** Blood can accumulate as a result of traumatic disruption of the vascular structures within bone, muscle or soft tissues. In the case of intracranial, intrathoracic, intra-abdominal and pelvic haematomas, this is potentially life-threatening. Deceptively large volumes of blood can be accommodated within the soft tissue planes of the chest wall or thigh.

Diagnosis: In the presence of massive visible bruising of the torso or a limb, check for shock and measure Hb and Hct. Perform a coagulation screen. Blood transfusion may be necessary. Treat minor haematomas with compression dressings, ice and consider ultrasound therapy. Large haematomas or supervening infection requires selective surgical drainage, haemostasis and antibiotics.

**Myositis ossificans:** After some muscle or joint injuries, calcification can occur within a haematoma leading to restriction of movement and loss of function. Frequent sites include calcification within a quadriceps haematoma (e.g. following a rugby injury) where inability to flex the knee >90° at 48h after injury indicates an increased risk of myositis ossificans. Other sites include the elbow and femur. Passive stretching movements of joints may be implicated in the development of myositis ossificans. This particularly applies at the shoulder, hip and knee where passive exercises are performed for spasticity following paraplegia or head injury.

**Therapeutic management:**  involves immobilising the limb or joint for a period of weeks, under specialist supervision. Early excision is contraindicated, as it is invariably followed by massive recurrence, but delayed excision (after 6-12 months) can improve function.

**Tendonitis/tenosynovitis:** This includes a bewildering range of conditions, some of which may have medicolegal implications (e.g. overuse or repetitive strain or injury).

Examples include: classic tenosynovitis:- swelling along a tendon sheath, with pain on passive stretching or upon attempted active movement against resistance. chronic paratendonitis (e.g. affecting Achilles tendon):- swelling around the tendon with localised pain and tenderness.tendon insertion inflammation causes epicondylitis in adults and traction apophysitis in children.

**Threpeutic management:** Appropriate initial treatment usually includes rest, immobilization and NSAID. Later, consider involving an appropriate specialist (e.g. physiotherapist or hand therapist).

**BURSITIS:** Inflammation of bursae most frequently affects the subacromial, olecranon and prepatellar bursae. There is localised swelling and tenderness: generalized joint effusions and/or tenderness along the whole joint line suggest an alternative diagnosis.

**Therapeutic management:** In many instances, bursitis is non-infective and responds to rest and NSAID. Significant warmth and erythema raise the possibility of an infective origin. In this case, consider aspiration for bacteriological culture and provide antibiotics (e.g. co-amoxiclav or penicillin + flucloxacillin).Other problems: Other causes of joint or limb pain with no specific history of trauma in the adult patient includes: stress fractures, cellulitis and other infections, osteoarthritis and other forms of acute arthritis, nerve compression (e.g. carpal tunnel syndrome). Apparently atraumatic limb pain in children may present with limping, likely underlying causes vary according to the age.

**Physiotherapy in Accident and Emergency (A&E) departments.**

 The term physiotherapy in an A&E department includes the advice given to each patient following minor injury. it encompasses the assessment and treatment of selected patients by skilled, experienced physiotherapists. It is valuable for a department to have close links with a physiotherapy unit, preferably with designated physiotherapy staff responsible for A&E referrals.

Minor soft tissue injuries are amongst the most commonly seen problems in A&E departments. Once bony injury has been excluded (clinically and/or radiologically) ensure that patients are discharged with clear, consistent advice on how to manage their own injuries in every case:

* be clear and specific about what the patient is to do
* set a realistic time limit after which the patient should seek further attention if their symptoms are not improving
* give additional written instructions for reinforcement (e.g. ankle sprains, minor knee injuries), as patients will forget much of the verbal advice given

**Formal physiotherapy:** Physiotherapists are trained in the rehabilitation and treatment of injury, based on a detailed knowledge of relevant limb and joint anatomy, biomechanics and physiology. In A&E, physiotherapy staffs are valuable in assessment and treatment of acute soft tissue injuries, patient education and advice and in the provision of appropriate mobility aids (particularly in the elderly) after injury. In order to make the best use of physiotherapy services, follow these guidelines:

* Refer early if required for acute injury. Aim for the patient to be seen for initial assessment the same day, so treatment needs can be properly assessed.
* Discuss the problem and treatment options with the physiotherapy staff prior to referral.
* Use the physiotherapy service for selected cases, not as a general rule.
* Never use the physiotherapy department to simply offload difficult or problematic patients.

Physiotherapists have a range of different treatments at their disposal, which typically focus upon regaining range of movement and mobility, improving strength and proprioception.

**Nursing Management:** Rest/ice/compression/elevation (RICE) forms the traditional basic framework for management of most acute soft tissue injuries.Rest: With most acute injuries, advise a period of 24-48h rest after an injury.Ice;This is often advocated both in the immediate first aid of soft tissue injuries, and in their subsequent treatment. Crushed ice cubes wrapped in a damp cloth (to avoid direct contact with the skin) placed against the injured joint may decrease swelling and pain. Do not apply for more than 10-15mins at a time. Repeat treatment every few hours initially. A cold pack or bag of frozen vegetables can also be used (do not refreeze if for consumption!).

**Compression:** Despite a distinct lack of evidence, injured joints (particularly the ankle) are frequently treated with some form of support. The easiest to use is an elasticated tubular bandage (e.g. Tubigrip), either single or doubled over. If provided, advise the patient not to wear it in bed and to discard as soon as convenient. If not provided, explain why, or the patient may feel inadequately treated. Avoid providing support bandages to patients with elbow and knee injuries because the bandage tends to be uncomfortable & dig in and in the case of the knee, may affect venous return and increase chance of DVT.

**Elevation:** Initially, advise elevation of injured limbs or extremities above horizontal to decrease swelling and discomfort. This is particularly crucial in hand or foot injuries.

**Exercise:** Start gentle, controlled exercises for any injured joint as soon as symptoms allow. Demonstrate what is expected and confirm that the patient understands what to do.

### Nursing intervention: nurse educates patient care of the injury and signs and symptoms that you should watch over at home. You should call the doctor if your child has a lot of pain that does not get better after you give him/her pain medication. You should be looking at the wound for signs and symptoms of infection (redness, swelling, pus from the wound or fever). Get medical help if your child has bleeding that will not stop after placing firm pressure with your fingers over the wound for 15 minutes.Medications/Pain: Nurse administers analgesics to reduce pain e.g. [acetaminophen](http://www.cincinnatichildrens.org/health/info/medication/a-e/acetaminophen.htm) as prescribed by the physician.Nurse also administers immunization e.g. tetanus toxoid.

### Wound and Skin Care: The child may shower or take a bath, but may need help for several days after going home. Advice patient and family about care when taking baths if your child has had surgery. If child has cuts or scrapes on the skin from other injuries, wash the areas with warm, soapy water and pat them dry. If child has stitches, follow the specific instructions on caring for them.Prevention Education: It is very important to teach the child about all types of safety. The child watches the parent, so you should also always use proper safety precautions. Child should learn to wear a helmet when riding a bike, rollerblading or skate boarding. Teach your child to always wear a seatbelt when riding in a car. Remember that children 12 years old and younger should always use correct safety restraints in the back seat when the car has a passenger side airbag.

### Follow-up Care: Stitches on the face are taken out in 3-5 days and stitches on the rest of the body are taken out in 7-10 days. Stitches may be taken out by your doctor or at Trauma Clinic. The nurse will make an appointment to have the stitches taken out before you leave the hospital or they will give you a number to call to make an appointment.

### Nutrition: Educate family to feed the child on nutritious foods and drinks as much fluid as he or she did before they were hurt. Activity: Activity limitations following a soft tissue injury depend on where the child was injured and how bad the injury is. The nurse will talk to you about what type of activity your child should stay away from after he/she leaves the hospital. The area that is injured will heal faster if kept at rest. The child can usually go back to day care or school right after your child is injured.nurse will help you decide when it is time to send your child back to school. If surgery was needed or your child has other injuries, he/she may be out of school longer. The trauma team will help you with your child returning to school. At school, child should not be taking gym class until the doctor says it's okay.

**Developmental dysplasia of the hip:** DDH (e.g. hip dislocation):1.3% of neonates have unstable hips or subluxation. A hip may be normal at birth, and become abnormal later. Incidence (UK): 2 per 1000 live births. Female/male is approximately 6:1; left hip/right hip. Incidence approximately 4:1 (bilateral in 1/3).

**At-risk babies:**Breech birth ,Caesar for breech ,Other malformations ,Positive family history ,Birth weight increase ,Oligohydramnios ,Post maturity,Older mother/ older primipara

**Diagnosis:** Examine hips of all babies in the 1st days of life and at 6 weeks. With well trained, well supported staff this prevents later dysplasia. Be alert to DDH throughout child surveillance.

**Click test of Ortolani:** With the baby supine and relaxed, flex the hips to 90° and knees fully. Place your middle finger over the greater trochanter, and thumb on inner thigh opposite the lesser trochanter.

**Diagnose** a dislocated hip if slow hip abduction produces a palpable (often audible) jerk or jolt (i.e. more than a click) as the femoral head slips back into the acetabulum.

**The Barlow manoeuvre:** With the pelvis stabilized by one hand, abduct each hip in turn by 45°. Forward pressure by the middle finger causes the femoral head to slip into the acetabulum if the hip is dislocated. If the femoral head slips over the posterior lip of acetabulum and straight back again when pressure is exerted by the thumb it is unstable (i.e. dislocatable not dislocated). Use both tests but avoid repetitions (may induce instability/dislocation).

In older children signs may be: delay in walking, abnormal waddling gait (affected leg is shorter), asymmetric thigh creases (extra crease on the affected side), and inability to fully abduct the affected hip. With bilateral involvement the perineum appears wide and lumbar lordosis is increased.

**Ultrasound:** Is the image of choice, as it is non-invasive and dynamic? Routine ultrasound screening for DDH remains controversial.

**Treatment:** If neonatal examination suggests instability, use double nappies; reassess at 3 weeks. If still a problem, splint the hips in moderate abduction for 3 months (e.g. the Pavlik harness). Excess abduction may case avascular necrosis of the head of femur. From 6-18 months an examination-underanaesthetic, arthrogram and closed reduction is performed followed by a period of immobilization in a hip spica. Open reduction is sometimes required if closed techniques fail. After 18 months (delayed presentation) open reduction is required with corrective femoral/pelvic osteotomies to maintain joint stability.Nursing management and intervention: The goal of treatment is to put the femoral head back into the socket of the hip so that the hip can develop normally.The nurse there fore has a role in educating patients on the treatment regimens and if possible describe the type of procedure, materials used need for surgery which the surgeon should have explained. The nurse explains the following treatment option; placement of a Pavlik harness. The Pavlik harness is used on babies up to 6 months of age to hold the hip in place, whileallowing the legs to move a little. The harness is put on by physician and is usually worn full time for at least six weeks, then part-time (12 hours per day) for six weeks**.**

The nurse organizes and informs parent and caretaker on return date.The baby is seen frequently during this time so that the harness may be checked for proper fit and to examine the hip. At the end of this treatment, x-rays (or an ultrasound) are used to check hip placement. The hip may be successfully treated with the Pavlik harness, but sometimes, it may continue to be partially or completely dislocated.

Traction and casting; if the hip continues to be partially or completely dislocated, traction, casting, or surgery may be required. Traction is the application of a force to stretch certain parts of the body in a specific direction. Traction consists of pulleys, strings, weights, and a metal frame attached over or on the bed. The purpose of traction is to stretch the soft tissues around the hip and to allow the femoral head to move back into the hip socket. Traction is most often used for approximately 10 to 14 days. Traction can either be set up at home or in the hospital, depending upon physician, hospital, and the availability of the resources.surgery and casting
If the other methods are not successful, or if DDH is diagnosed after the age of 2 years, surgery may be required to put the hip back into place manually, also known as a "closed reduction". If successful, a special cast (called a spica cast) is put on the baby to hold the hip in place. The spica cast is worn for approximately three to six months. The cast is changed from time to time to accommodate the baby's growth and to ensure the cast's rigidity, as it may soften with daily wear. The cast remains on the hip until the hip returns to normal placement. Following casting, a special brace and physical therapy exercises may be necessary to make the muscles around the hip and in the legs stronger.Nurse educates patients on the condition, what a short leg hip spica cast is, and its general care until it is removed.A short leg hip spica cast is applied from the chest to the thighs or knees. This type of cast is used to hold the hip in place after surgery to allow healing.Cast care instructions:

* Keep the cast clean and dry.
* Check for cracks or breaks in the cast.
* Rough edges can be padded to protect the skin from scratches.
* Do not scratch the skin under the cast by inserting objects inside the cast.
* Use a hairdryer placed on a cool setting to blow air under the cast and cool down the hot, itchy skin. Never blow warm or hot air into the cast.
* Do not put powders or lotion inside the cast.
* Cover the cast during feedings to prevent spills from entering the cast.
* Prevent small toys or objects from being put inside the cast.
* Elevate the cast above the level of the heart to decrease swelling.
* Do not use the abduction bar on the cast to lift or carry the baby.

###  Nurse educates patient on cast complications. Teach patient on signs that if observed he should call the physician: Contact your physician or healthcare provider if your baby develops one or more of the following symptoms: fever, increased pain, increased swelling above or below the cast, drainage or foul odor from the cast, cool or cold toes

**Scoliosis:** Increased lateral curvature of the spine. Above and below the scoliosis, secondary curves develop to maintain normal position of head and pelvis. In all cases, refer to orthopaedics for assessment. The chief cause is muscle spasm (e.g. with sciatica).Structural (true) scoliosis: Fixed deformity (non correctible). Scoliosis is associated with rotation of the vertebrae with or without ribs and wedging of the vertebrae. Causes: Idiopathic, neuromuscular (e.g. cerebral palsy, muscular dystrophy, neurofibromatosis), trauma, osteoporosis, TB of the spine (rare), spinal tumours (rare), congenital abnormalities of the spine (rare).Non-structural (mobile) scoliosis: Curvature is secondary to another condition outside the spine e.g. unequal leg length and disappears when that is corrected e.g. leg length disparity (disappears on sitting). No rotation of the vertebrae.

**Causes of true scoliosis**

* Idiopathic (this is seen both in infants and adolescents).
* Congenital: (failure of formation or segmentation).Vertebral malformations produce severe scoliosis which is rapidly progressive. Major causes: hemivertebra; Klippel-Feil syndrome; congenital vertebral bar due to failure of segmentation.
* Neuromuscular imbalance e.g. polio, cerebral palsy, muscular dystrophy, neurofibromatosis, syringomyelia.
* Trauma resulting in damage to the vertebral growth plate and uneven growth.
* Neoplasm: Primary : Osteoid osteoma and osteoblastoma cause a painful scoliosis and secondary: Lytic metastases
* Other (e.g. tumour, infection, trauma).
* Treatment of tumours (e.g. radiotherapy) may result in scoliosis.
* Metabolic Osteoporosis and crush fracture.
* Infection: TB of the spine (Potts' disease).

**Screening tests**

* <1y. Old: Place the child prone on his tummy and feel the shoulder and thoracic cage. There should be no rib hump or shoulder hump.
* >1y. Old: Ask the child to bend forward whilst standing straight with both feet together and holding both hands straight. Look for a shoulder, thoracic or lumbar hump, difference in shoulder height, obvious spinal curvature, and check the gap between arm and waistline.

**Clinical presentation:** Usually found incidentally or on screening. Look for: Difference in shoulder height; spinal curvature and difference in space between trunk and upper limbs: Structural scoliosis is often made more obvious by asking the child to bend forwards. Scoliosis which disappears on bending is postural and of no clinical significance.

**Management**

Refer children with structural scoliosis to orthopaedics.

If scoliosis is painful (especially at night) in a child or young person, consider spinal tumour and refer for urgent orthopaedic assessment.

**Complications:** Deformity; pain and limitation of activities; respiratory restriction.

**IDIOPATHIC SCOLIOSIS**

More than 10° of lateral curvature of the spine and thoracic curves tend to be more severe than lumbar.

 Incidence: 1-3% greater in girls than in boys.

Divided into 3 groups depending on basis of onset i.e.

* Infantile idiopathic scoliosis :( birth-3yrs) 90% are left-sided convex scoliosis. Associated with ipsilateral plagiocephaly (flattening of the skull). May resolve spontaneously (more likely if male‚ onset at <1y. of age and/or the rib-vertebral angle is >20°) or progress as the child grows.
* Progressive/juvenile scoliosis :-( 4-10yrs) is treated with braces and surgery. As a general rule, the younger the child and the higher the curve, the worse the prognosis.
* Late onset idiopathic/adolescent scoliosis: Affects children aged 10-15y. Female: male‚ [approximate] 9:1. The scoliosis is usually right-sided convex. The condition always gets worse without treatment as the child grows. Treatment is with observation (if the scoliosis is mild and the child has nearly completed growth), braces, and/or surgery.

**Therapeutic management:** Early treatment of scoliosis prevents progression. Early onset scoliosis (<8y.) is responsible for cosmetic problems, pain, and cardiopulmonary disturbance. Late onset scoliosis is less severe but also causes pain and significant deformity.Scoliosis which disappears on bending is postural and of no clinical significance.In all cases, if scoliosis is suspected, refer for an orthopaedic opinion.

**KYPHOSIS (round back)**

This is where the normal thoracic spine has a convex alignment in the sagital plane. The normal radiographic range of kyphosis is 20-40 degrees. People with increased kyphotic alignment have the clinical sign of round back. Round back may be flexible or structural

* Postural/flexible kyphosis (drooping shoulders or round back female) is common and voluntarily correctable.
* Structural kyphosis cannot be corrected voluntarily. It may be idiopathic or congenital in origin.

**Flexible kyphosis:** This is a common concern of parents of adolescents. The adolescents can correct the round back appearance voluntarily in both standing and prone positions. The overall angle of kyphosis may be increased on the standing lateral radiograph, but no vertebral abnormalities present.

**Therapeutic management:** - a thoracic hyperextension exercise program may assists in strengthening the extensor muscles of the spine, but the patient has the ultimate responsibility for their posture. Orthopaedic treatment is not indicated for patients with flexible kyphosis.

**Structural kyphosis**

**Idiopathic kyphosis/ Scheuermann disease**

This is a nonflexible kyphosis that develops during adolescence in previously normal children. Mild increases in structural kyphosis are equally normal in boys and girls; the condition may worsen slightly in boys than in girls. It is an autosomal dominant. The normal ossification of ring epiphyses of several thoracic vertebrae is affected. Deforming forces are greatest at their anterior border, so vertebrae are narrower here; causing kyphosis during the active phase, vertebrae may be tender.

**Radiographs**

Irregular vertebral endplates, Schmorl's nodes and decreased disc space with or without anterior wedging. Schmorl's nodes are herniations of the intervertebral disc through the vertebral end-plate.

**Treatment:**  If posture control (e.g. standing during lessons rather than sitting) and exercises (e.g. swimming) fails, physiotherapy with or without spinal braces can help. Surgery may be tried for severe kyphosis (>75°) with curve progression, refractory pain, or neurologic deficit.

**Congenital kyphosis/ kyphotic deformity:** This is the result of vertebral malformations that occur during the first trimester. The most common abnormalities are congenital failure of formation of all or part of the vertebral centrum and failure of anterior segmentation of the spine. Severe deformities are usually recognized at birth and rapidly progress thereafter. The less obvious deformities may not become obvious until later in childhood. Patients with congenital kyphosis should be referred for specialty evaluation as soon as deformity is recognized.

**Treatment:** Brace treatment is not effective. Surgical intervention is often necessary, and the results of surgery are best if performed before significant deformity has developed.

**Common causes of kyphosis**

* osteoporosis,
* Paget's disease,
* ankylosing spondylitis
* Adolescent kyphosis (Scheuermann's disease). May cause a restrictive ventilatory defect.
* Spina bifida
* Cancer; wedge fractures
* Tuberculosis; polio

**LORDOSIS:** In the antero posterior (frontal) plane, the vertebral bodies of normal spine are stack squarely on the other with little or no deviation from vertical alignment. The vertebral end plates are parallel and the intervertabral disks are symmetric in height. In the sagittal plane the spine has normal curvatures that provide balance and stability. The cervical and lumbar spine displays anterior convexity, termed lordosis, while sacrum and the thoracic spine display posterior convexity and are kyphotic. Nursing Care for Scoliosis, kyphosis and lordosis Patients.

**Surgical options:** Several types of spinal fusion can be performed, including posterior and/or anterior spinal fusion. The posterior spinal fusion (PSF) is performed on the back of the spine, with an incision down the center of the patient's back. The anterior spinal fusion (ASF) is performed on the front half of the spine, which is reached through an incision on the side of the chest. The ASF can also be performed by using a thoracoscope. A scope is used for visualization, with spinal fusion performed through small holes in the chest similar to knee arthroscopy.

**Nursing interventions.**

**Educating the family:** The nurse supplies the family with written materials, including a preoperative spinal fusion information packet; an activity list, which is a schedule of when the patient may or may not resume activities she was involved in prior to her surgery; research consents, if applicable; and name and phone number of a family whose child had a similar curve and same procedure.No more information is given at the first visit because the family is usually overwhelmed. It is suggested that they go home, further discuss the issues, consider a surgery date, and follow up with the nurse the next week.

**Presurgical tests:** Preparation for surgery begins with several tests. Consults are sent to the family for pulmonary function test (PFT), ECG, and basic labs (CBC, electrolytes, creatine kinase, sed rate, PT, PTT, platelets, and urinalysis). PFTs evaluate respiratory status, and if the results are abnormal, the patient will need surgical clearance from a pulmonologist. Rarely, children with spinal deformities show moderate constrictive disease on their PFTs secondary to asthma. If the results on the ECG are abnormal, an echocardiogram should be performed and cardiology clearance obtained.Occasionally, the neurological exam by the physician is abnormal and an MRI is done to ensure that the spine is free of tumors, intraspinal lesions, or syrinx (a cyst in the spinal cord). A syrinx sometimes needs to be surgically drained or decompressed before spinal fusion surgery. A consult with a neurosurgeon for surgical clearance must also be obtained if MRI findings are abnormal. Somatosensory evoked potentials (SSEP) is a noninvasive measurement of conduction in the central nervous system. Small electrodes are inserted onto the patient's scalp and extremities and connected to a monitor.SSEP monitoring is done during the surgical procedure to pick up any neurological problems that occur when spinal instrumentation is inserted and when the spinal curve is being straightened. A pre-op baseline SSEP is used as a comparison during surgery.

**Blood units needed:** Each patient undergoing this type of spinal surgery needs approximately two to four units of blood available, an amount specifically determined by the surgeon. If able, the patient can donate two units of autologous blood. Close family members can directly donate other units. If the family is not able to provide the required amount of blood, the nurse can obtain blood from a blood bank. The operating room uses a cell-saver machine, and most patients receive at least one unit of cell-saver. The patient needs to start taking iron supplements one week before donating blood, and then for 7-10 days following surgery. Because the surgical team prefers not to use frozen blood, patient donates her blood within five weeks before surgery so the blood would not expire.

**Informing the child's school:** Another pre surgical duty of the spine nurse is to contact patient’s school gym teacher to inform him that she wouldn't be able to participate in a full physical education program for six months after surgery. After that period, the patient will be able to participate in limited gym activities. The spine nurse also contacts the school nurse to initiate homebound instruction for 6 to 8 weeks post-op. When child returns to school, she should have access to the elevator and be allowed to leave class 5 to 10 minutes early to avoid crowded hallways. Because sick child will only be able to lift a limited amount of weight, she will need two sets of books--one for school and the other for home.

**Ongoing support:** Completing the necessary testing and blood donation can be overwhelming and confusing to the patient and family. Let the patient and her parents keep in close contact with the care coordinator for spine patients at the hospital. To help the patient and her family deal with anxiety about the upcoming surgery and recovery period, the spine nurse strongly suggests that they attend one of the meetings of a support group.

**Pre-op teaching:** Pre-op teaching by the spine nurse starts from the initial consult through the day of surgery. It begins with explaining the degree of the curve, the surgical procedure, the length of incision, and duration of hospital stay. Estimated blood loss, prevention of paralysis, and the risks and benefits of surgery are also emphasized. Post-op dressing changes, bracing needs, pain management, activity levels, and homebound instruction are included, and the nurse promises to return calls the same day or before noon the next day. After all the tests are completed, the patient is ready for surgery.

**Sedation and transport to operating room:** Early on the morning of surgery, the patient receives a sedative and a sip of water. She and her family are escorted to the OR/PACU (Post Anesthesia Care Unit), where they are greeted by the nurse and anesthesiologist. She will have a peripheral IV started in the pre-op holding area and two more IVs and an A-line inserted after she is asleep. A wake-up test, along with SSEP monitoring during surgery, will determine that no neurological damage has occurred. Toward the end of the surgery, after the hardware has been placed, the anesthesiologist will decrease the amount of anesthesia and ask the patient to move her feet. After successful completion of the wake-up test, the anesthesia will be resumed and the surgery will be completed. Patients have no recollection of this test, nor do they experience pain. The surgery usually takes 5 hours. A 12- to 16-inch incision is made down her back and the spine exposed by peeling backs the muscle. Next, small (2-cm) pieces of rib are resected to reduce the rib deformity. The hooks, screws and rods are placed and the spine is straightened. For the child, the surgeon may choose to use her ribs for bone graft. Some patients will have small pieces of their pelvis used as bone graft. The rib pieces are placed against the spine, under the rod, to facilitate the fusion. After surgery, the patient is taken to the PACU, where she will be monitored for 2 to 3 hours. Routine PACU monitoring includes vital signs, intake and output, neurovascular checks, dressing and skin checks, and labs, including ABGs, hemoglobin, and hematocrit. Patients receive oxygen via face tent at 40% concentration to keep oxygen saturation above 94%. Most patients have a hemovac in their back incision, a chest tube or rib protector, and a Foley catheter along with two peripheral IVs and an A-line.A chest x-ray is done to check for lung expansion and atelectasis (partial collapse of sections of the lung), and the position of the hardware in the back can also be seen. Pain is controlled by patient-controlled anesthesia (PCA) using morphine. Immediately after surgery, most children rate their pain as "5" on a severity scale of 1-5. By the first post-op day, the usual rating is 2 to 3. IV antibiotics are given until the patient's drains are removed. A posterior spinal fusion is a big operation. The nurses and doctors work very hard to make the patient as comfortable as possible. Six weeks after surgery, most kids say that they do not remember much of their first few days after surgery. The patient is moved to the Extended Post-Anesthesia Care Unit (EPACU) for two days. The two hemovac drains and one chest tube are removed once drainage decreases to a minimal amount. She is taken off the PCA pump and put on oral medication. Her diet is advanced to clear liquids, and she is allowed to sit in a chair. By Day 4 the child will be transferred out of EPACU to continue her recovery. Before she is discharged from the hospital, the patient will begin to build up her strength and endurance by walking and performing some nonstrenuous activities of daily living. Patient and her family are taught how to care for her wounds, and she is given a prescription for pain medication. The patient will return to the outpatient center for a wound check, and her dressing will be taken off and any remaining steri-strips on her back will be removed. Her pain level will also be assessed at this time. Patient will return to the outpatient center two and six months post-surgery for x-rays and follow-up. After the six-month check-up, patient will come to the outpatient center every six months three times and then yearly until she is discharged from the Hospital system at age 21. The care coordinator is always available by phone to answer any questions or handle any issues that may arise.

**Legg-calve-perthes disease:**  LCPD is idiopathic osteonecrosis or avascular necrosis of the capital femoral epiphysis, and the associated complications thereof, occurring in an immature growing child. This osteochondrosis is caused by an interruption of the capital femoral epiphysis blood supply.

**Etiology:** Is unknown, but an association among protein C and protein S defficieny, thrombophillia and hypofibrinolysis has been observed. It is primarily a disorder affecting males (4-5:1) and is bilateral in approximately 20% of children. Children with LCPD often have delayed bone age, disproportionate growth and mild short stature.

**Clinical manifestations:** Onset occurs between 2-12 years of age. Mean is 7 years.Most children present with mild or intermittent pain in the anterior thigh and a limb.

**Radiographic evaluation**

Anteroposterior & Laue stein lateral radiographs of pelvis should be obtained to establish the diagnosis.Radiographic characteristics divided into 5 distinct stages representing a continuum of disease process.

1. Cessation of capital femoral epiphysis growth; Subchondral fracture
2. Resorption
3. Reossification
4. Healed or residual stage.

**Prognosis:**

Usually the condition heals over 2-3yrs. Joint damage may lead to early arthritis. Young patients do best.Short-term prognosis relates to the femoral head deformity at the completion of healing stage. Adverse risk factors include:

* Older age at clinical onset
* Extensive capital femoral epiphysis involvement
* Loss of femoral head containment.
* Decreased range of hip motion
* Premature capital femoral epiphysis closure.

Long term prognosis relates to potential for osteoarthritis of the hip in adulthood. Older children with significant residual femoral head deformity are at risk for degenerative arthritis; incidence is essentially 100% in children who are 10 years of age or older at onset and who have residual head deformity.

**Management:** Treatment is with rest, X-ray surveillance, bracing, and/or surgery depending on severity.The more severe the case, the greater the likelihood that the child may experience limited hip motion, differences in leg lengths, and further hip problems in adulthood.

### Nursing care: Assessent and history taking

### Take past health history, intrauterine history its age, overall health and medical history. Child’s tolerance for specific medications, procedures or therapies.Assess the extent of the condition. The goal of treatment is to preserve the roundness of the femoral head and to prevent deformity while the condition runs its course. Treatment options are dependent upon the amount of hip pain, stiffness, and x-ray changes over time, as well as how much of the femoral head has collapsed.The ultimate goal in Legg-Calvé-Perthes disease is to diagnose the condition early in order to allow as much time as possible to let the femoral head remodel back into a round shape.Typically, the first step of treatment and management is to regain hip motion and eliminate pain that results from the tight muscles around the hip and the inflammation inside the joint.

**Therapeutic management includes:-**Rest:Nurse advices patient on importance of rest and orders bed rest.Activity restrictions**:** Activity increases the movement and therefore worsening necrosis.Bed rest and traction**:** This is important as it reduces movement of the limb allowing the bone recovers.Casting or bracing:Tto hold the femoral head in the hip socket, permit limited joint movement, and allow the femur to remold itself into a round shape again.Medications:Advice patient on importance of adheherence of prescribed medication as it reduces pain and reduces inflammation**.**Surgery:The nurse educates ensures that patient is aware of importance of surgery. Surgery is done to hold the femoral head in the hip socket. Physical therapy:The nurse collaborates with the physiotherapists to keep the hip muscles strong and to promote hip movement. Aim is to maintain hip motion and preventing continued hip deformity.Control of pain: Nurse administersprescribed analgesics e.g. paracetamol.

# **INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS (IMCI)**

Problem statement

Every year, almost 11 million children under the age of five in developing countries die from readily preventable and treatable illnesses such as;

* Diarrheal dehydration,
* Acute respiratory infections (ARI),
* measles, and
* malaria
* In half of the cases, illness is complicated by malnutrition.

While improved medical treatment combined with greater access to health care has helped children in many parts of the world, in others huge numbers of children continue to die needlessly. Many of these children were never seen at a health facility because; services don’t exist, their families lack access to these services, or families and other caregivers do not recognize the warning signs of life-threatening illness.

**Introduction**

Because most child deaths occur at home, before reaching health facilities, preventing fatalities by improving child health through the community is at the core of IMCI.

It offers simple and effective methods to prevent and manage the leading causes of serious illness and mortality in young children.

The clinical guidelines promote evidence-based assessment and treatment, using a syndromic approach that supports the rational, effective and affordable use of drugs.

The approach is designed for use in outpatient clinical settings with limited diagnostic tools, limited medications and limited opportunities to practice complicated clinical procedures.

There are feasible and effective ways that health workers in clinics can care for children with these illnesses and prevent most of these deaths.

WHO and UNICEF used updated technical findings to describe management of these illnesses as a set of integrated instead of separate guidelines for each illness.

Effective case management needs to consider all of a child’s symptoms.

Guidelines address most but not all of the major reasons a child is brought to a clinic.

**The case management process**

The integrated case management process ensures priority, need for urgent referral is met and treatment of child’s illnesses. Also mothers are counseled and follow up done. It is presented on a series of charts, which show the sequence of steps and provide information for performing them. It describes the following steps:

1. Assess the child or young infant.
2. Classify the illness.
3. Treat the child.
4. Counsel the mother.
5. Give follow-up care.

The case management process for sick children age 2months up to 5 years is presented on three charts titled:

Assess and classify the sick child.

Treat the child.

Counsel the mother.

Management of the young infant age up to 2 months is different. It has a chart titled assess, classify and treat the sick young infant.

Charts are designed to help health workers manage children correctly and efficiently**.**

THE COMPLETE IMCI CASE MANAGEMENT PROCESS INVOLVES THE FOLLOWING ELEMENTS:

1. Assessment; **Assess a child by checking first for danger signs (or possible bacterial infection in a young infant), asking questions about common conditions, examining the child, and checking nutrition and immunization status. Assessment includes checking the child for other health problems.**
2. Classification of illness: **Classify a child’s illnesses using a colour-coded triage system. Because many children have more than one condition, each illness is classified according to whether it requires:**

**— Urgent pre-referral treatment and referral (red), or**

**— Specific medical treatment and advice (yellow), or**

**— Simple advice on home management (green).**

1. Treatment of the illness; **Identify specific treatments for the child.**

**If a child requires urgent referral, give essential treatment before the patient is transferred.**

**If a child needs treatment at home, develop an integrated treatment plan for the child and**

**Give the first dose of drugs in the clinic. If a child should be immunized, give immunizations**

iv. Counsel the mother/guardian; **Provide practical treatment instructions, including; teaching the caretaker how to give oral drugs, how to feed and give fluids during illness, and how to treat local infections at home. Assess feeding, including assessment of breastfeeding practices, and counsel to solve any feeding problems found. Then counsel the mother about her own health.**

1. Give follow up care; **Ask the caretaker to return for follow-up on a specific date, and teach her how to recognize signs that indicate the child should return immediately to the health facility. When a child is brought back to the clinic as requested, give follow-up care and, if necessary, reassess the child for new problems.**

Purpose

Learn to manage sick children according to case management charts i.e.

* **Assessing signs and symptoms of illness and nutritional, suspected HIV infection, Immunization and vitamin A supplementation status.**
* **Classifying illness.**
* **Identifying treatments for the child’s classification, deciding on need for referral.**
* **Giving important pre-referral treatments (first dose of antibiotic, vitamin A, quinine injection, diazepam, treatment to prevent low blood sugar).**
* **Provide treatment e.g. ORS, vitamin A and immunizations.**
* **Teach mother to give treatment at home.**
* **Counsel mother on feeding and when to return.**
* **During follow up visit, re-asses the child’s problem and provide appropriate care.**

**ASSESS & CLASSIFY THE SICK CHILD AGE 2 MONTHS UP TO 5 YEARS**

**Introduction**

* **The chart describes how to assess and classify sick children to ensure signs of diseases are not overlooked.**
* **Ask child’s problem.**
* **Check the child for general danger sign.**
* **Ask about four main symptoms:** *cough or difficult breathing, diarrhea, fever and ear problem.*
* **When a main symptom is present ask additional questions to help classify the illness.**
* **Check the child for** *malnutrition and anaemia.*
* **Look for signs of suspected** *symptomatic HIV infection* **in a child with entry signs suggesting HIV infection.**
* **Check child’s** *immunization and vitamin A supplementation status***.**
* **Assess** *other problems* **the mother has mentioned.**

Asking child’s problem

**A mother brings the child to the clinic because the child is sick, for well-child visits, immunization sessions or for treatment of injuries. The steps on assess and classify chart describe what you should do when a mother brings her child to the clinic because he is sick;**

* **Greet the mother appropriately and ask her to sit with her child.**
* **Determine the** *child’s age* **and choose the** *right case management chart***.**
* **Look at the child’s record to find if** *weight and temperature* **have been recorded. If not taken weigh the child and measure temperature.**
* **Ask the mother what the** *child’s problem are and record***.**
* **Determine if this is an** *initial or follow-up* **visit for this problem**.

 CHECK FOR GENERAL DANGER SIGNS

**Check all sick children for general danger signs.**

**A general danger sign is present if:**

* **The child is not able to drink or breastfeed – child cannot suck or swallow.**
* **The child vomits everything.**
* **The child has had convulsions.**
* **The child is lethargic or unconscious.**
* **The child is convulsing now.**

**A child with general danger sign has a serious problem and may need** *urgent* **referral to hospital.**

**Complete the rest of the assessment immediately.**

EXERCISE

Salina is 15 months old. She weighs 8.5 Kg & her temperature is 38.5° C. The mother has brought her to the clinic because she refuses to breastfed. The nurse offers Salina some water but she is too weak to lift her head and she is not able to drink from the cup.

Salina has not vomited nor has she had a convulsion. She looked around the room as the nurse was talking to the mother.

Does Salina have a general danger sign? Explain

 ASSESS AND CLASSIFY COUGH OR DIFFICULT BREATHING

**Respiratory infections occur in any part of the respiratory tract e.g. nose, throat, larynx, trachea, air passages or lungs.**

**A child with cough or difficult breathing may have pneumonia or another severe respiratory infection.**

**The health care worker needs to identify children who are very sick with cough or difficult breathing requiring antibiotic therapy. This is done by assessing two clinical signs i.e.** fast breathing and chest indrawing**.**

**Due to pneumonia the child’s lungs become stiff and hypoxia results. The child responds by fast breathing.**

**When pneumonia becomes more severe, the lungs become even stiffer and chest indrawing may develop. It is a sign of severe pneumonia.**

**A child with cough or difficult breathing is assessed for;**

1. Duration of cough or difficult breathing, if more than 30 days **the child has chronic cough. It may be a sign of tuberculosis, asthma, whooping cough or another problem.**
2. Fast breathing**, count the breath the child takes in one minute to decide if the child has fast breathing. The cut-off for fast breathing depends on the child’s age. Normal rates are higher in children age 2 months up to 12 months than in children age 12 months up to 5 years.**

**A child age 2 months up to 12 months has fast breathing if 50 breaths per minute or more.**

**A child 12 months up to 5 years has fast breathing if 40 breaths per minute or more.**

Question

A child exactly 12 months with 40 breaths per minute, does the child have fast breathing?

1. Chest indrawing; **lift the child’s shirt and look for chest indrawing when the child breathes in. Child has chest indrawing if the lower chest wall goes in when the child breathes in. For chest indrawing to be present it must be clearly visible and present all the time.**
2. Stridor in a calm child; **look to see when the child breathes in and listen for stridor with your ear near the child’s mouth (a harsh noise made when the child breathes in).**
3. Wheeze; **look to see when the child is breathing out and listen for a soft musical noise (wheeze).**

Classification

**There are three possible classifications for a child with cough or difficult breathing;**

1. Severe pneumonia or very severe disease
* **Any general danger sign or**
* **Chest indrawing or**
* **Stridor in calm child.**

**A child with this classification is seriously ill and needs urgent referral to a hospital after giving first dose of injectable antibiotics.**

1. Pneumonia
* **Fast breathing**

**Treat with oral antibiotic.**

1. No pneumonia cough or cold
* **No signs of pneumonia or**
* **Very severe disease.**

**Child does not need an antibiotic, teach the mother how to relieve cough with home remedy e.g. warm tea with sugar.**

**When using classification table, start with the top row. If the child has signs from more than one row, always select the more serious classification.**

**Fast breathing and chest indrawing are entry signs for suspected symptomatic HIV infection.**

**For all sick children, ask about cough or difficult breathing, if present assess and classify and if absent ask about the next main symptom, diarrhea.**

EXERCISE

Aziz is 18 months old, he weighs 11.5Kg and has a temperature of 37.5°c. The mother has brought him to hospital because he has a cough and trouble breathing. This is the initial visit for Aziz.

The health worker assessed Aziz for general danger signs; he is able to drink, he does not vomit everything, no history of convulsion and he is not lethargic or unconscious.

The mother says Aziz has had a cough for 7 days. The health worker counted 41 breaths per minute, there was no chest indrawing no wheeze or stridor.

1. **Classify Aziz’s problems;**
2. **Explain how you have arrived at the classification;**

Wambui is 8 months old, she weighs 6Kg and has a temperature of 39°c. The mother has brought her to hospital because of cough and refusal to feed. She is not vomiting nor has she had a convulsion. She did not look at the health worker or her mother as they were talking.

The health worker counted 55 breaths per minute, she saw chest indrawing and heard a harsh noise as the child breathed in.

* **Classify Wambui’s problems;**
* **Explain how you have arrived at the classification;**

 ASSESS AND CLASSIFY DIARRRHOEA

**Diarrhoea is common in children between 6months and 2 years of age.**

**Common in infants below 6 months who are not exclusively breastfed.**

**Diarrhoea is three or more watery stools in a 24-hour period.**

Types of diarrhea

1. **Loose or watery diarrhea e.g. diarrhea due to cholera.**
2. **Acute diarrhea –It is diarrhea lasting less than 14 days. It causes dehydration and contributes to malnutrition.**
3. **Persistent diarrhea – It is diarrhea lasting 14 days or more. Up to 20% of diarrhea episodes become persistent.**
4. **Dysentery – diarrhea with blood in the stool, commonly caused by shigella bacteria.**

**Ask the mother if the child has diarrhea, if yes assess child for signs of dehydration, persistent diarrhea and dysentery. If no ask about the next main symptom fever.**

Assess diarrhea

**Assess the child for:**

* **How long the child has had diarrhea. Diarrhoea lasting 14 days or more is** persistent diarrhoea**. Ask if the child has had two or more episodes of diarrhea lasting 14 days or more, if yes check the child for suspected symptomatic HIV infection** (entry sign for suspected symptomatic HIV infection). **Current episode of diarrhoea lasting 14 days or more is included in the two or more episodes.**
* **Ask if there is blood in stool to determine if the child has dysentery.**
* **Signs of dehydration.**
1. **Look at the child’s general condition; is the child lethargic or unconscious? Is the child restless and irritable? A child who is lethargic or unconscious has a general danger sign.**
2. **Look for sunken eyes then ask the mother if she thinks her child’s eyes are unusual. A child with malnutrition and is visibly wasted has eyes that always look sunken even if the child is not dehydrated. Use the sign to classify the child’s dehydration.**
3. **Offer child fluid; is the child not able to drink or drinking poorly? Drinking eagerly, thirsty?**
4. **Pinch the skin of the abdomen; locate the area on the abdomen halfway between the umbilicus and the side of abdomen and pinch the skin using thumb and first finger. Does it go back very slowly (longer than 2 seconds)? Slowly? Immediately?**

**In a child with marasmus the skin may go back slowly even if the child is not dehydrated.**

**In an overweight child or a child with oedema, the skin may go back immediately even if the child is dehydrated.**

**Even though skin pinch is less reliable in these children, still use it to classify the child’s dehydration.**

Classify diarrhoea

**There are three classifications for diarrhoea;**

1. Severe dehydration

**Two of the following signs;**

* **Lethargic or unconscious.**
* **Sunken eyes.**
* **Not able to drink or drinking poorly.**
* **Skin pinch goes back very slowly.**

**A child with severe dehydration needs intravenous fluids quickly (plan C).**

1. Some dehydration

**Two of the following signs;**

* **Restless, irritable.**
* **Sunken eyes.**
* **Drinks eagerly, thirsty.**
* **Skin pinch goes back slowly.**

**The child is treated with ORS solution, in addition the child needs food and should continue breastfeeding (plan B).**

1. No dehydration

**Not enough signs to classify as some or severe dehydration.**

**The child needs home treatment. The three rules of home treatment are;**

1. **Give extra fluid.**
2. **Continue feeding.**
3. **When to return.**

**Plan A; treating diarrhoea at home.**

EXERCISE

Gretel 16 months old has had diarrhea for 2 days. She does not have blood in stool, has had 2 episodes of diarrhea lasting 14 days previously and is not irritable or restless. Her eyes are sunken, she is not able to drink and her skin pinch goes back very slowly.

1. **Classify Gretal’s problems;**
2. **Explain how you have arrived at the classification;**

Classify persistent diarrhoea

**There are two classifications for persistent diarrhoea;**

1. Severe persistent diarrhoea

**Dehydration present (child with diarrhoea for 14 days or more and also has some or severe dehydration).**

**The child needs referral to hospital, treat the child’s dehydration unless the child has another severe classification.**

1. Persistent diarrhoea

**No dehydration**

**The child requires special feeding, give multivitamin supplement.**

Classify dysentery

**There is one classification for dysentery i.e. dysentery (child with diarrhoea and blood in the stool).**

**Child is treated with an antibiotic.**

EXERCISE

Rana is 14 months old, she weighs 12Kg and her temperature is 37.5°c. Her mother has brought her to the hospital because she has diarrhea.

She does not have any general danger sign nor does she have cough or difficult breathing.

Rana has had diarrhea for 21 days, she last had diarrhea lasting 15 days four months ago. There is no blood in her stool, she is irritable, drinks eagerly and her skin pinch goes back immediately.

**Classify Rana’s problems;**

**Explain how you have arrived at the classification;**

ASSESS AND CLASSIFY FEVER

**A child with fever may have malaria, measles or another severe disease. The fever could also be due to simple cough or cold or other viral infection.**

Assess fever

**A child has the main symptom fever if;**

1. **The child has a history of fever or**
2. **The child feels hot (abdomen or underarm) or**
3. **The child has an axillary temperature of 37.50C or above.**

**Determine if child has fever, if fever is present assess child for fever if no fever ask about the next main symptom ear problem.**

**If the child has fever assess for;**

* **Duration of fever, if fever has been present every day for more than 7 days the child may be having** typhoid fever.
* **History of measles in the last 3 months; child could be having fever due to** measles **complications such as eye infection.**
* **Stiff neck; a child with fever and stiff neck may be having** meningitis.
* **Runny nose; runny nose in a child with fever mean that the child has a** common cold.
* **Signs suggesting measles; generalized rash (cephalocaudal, no vesicles or pustules, does not itch), cough, runny nose or red eyes.**
* **If the child has measles now or within the last 3 months, assess for signs of measles complications; mouth ulcers – are they deep & extensive, pus draining from the eye (sign of conjunctivitis) and clouding of the cornea.**

Classify fever

1. Very severe febrile disease
* **Any general danger sign or**
* **Stiff neck.**

**Child could be having meningitis, severe malaria or sepsis; he/she needs urgent referral, give pre-referral treatment.**

1. Malaria

**Fever**

Classify measles

 **A child with fever and signs & symptoms of measles now or within the last 3 months is classified both for fever and for measles. First you classify the child’s fever first next you classify measles. If the child does not have measles now or in the past 3 months, do not classify measles. Ask about the next main symptom; ear problem.**

**There are three possible classifications of measles;**

1. Severe complicated measles
* **Any general danger sign or**
* **Clouding of cornea or**
* **Deep or extensive mouth ulcers.**

**The child needs urgent treatment and referral to hospital.**

1. Measles with eye or mouth complications
* **Pus draining from the eye or**
* **Mouth ulcers**

 **The child does not need referral; treat with vitamin A, TEO or gentian violet.**

1. Measles
* **Measles now or within the last 3 months and with no complications listed in the pink or yellow rows.**

 **Treat the child by giving vitamin A to help prevent measles complications.**

**NB All children with measles should receive vitamin A.**

EXERCISE

Atika is 5 months old, she weighs 5Kg and her temperature is 36.5°c. She has been brought to hospital because she feels hot and has a cough.

She is not able to drink, there is no history of vomiting or convulsion and she is not lethargic or unconscious.

The health worker counted 43 breaths per minute, no chest indrawing and no stridor.

Atika does not have history of diarrhea.

She has had hotness of the body for 2 days, no stiff neck, she has a generalized rash, her eyes are red and she has mouth ulcers that are not deep or extensive.

1. **Classify Atika’s problems;**
2. **Explain how you have arrived at the classification;**

ASSESS AND CLASSIFY EAR PROBLEM

**A child with ear problem may have an ear infection.**

**When a child has ear infection, pus collects behind the ear and causes pain and often fever. If infection is not treated, the ear drum may burst and pus discharges. Fever and other symptoms may stop but the child suffers from poor hearing because the eardrum has a hole in it this could eventually lead to deafness.**

Assess ear problem

**Ask the mother if the child has an ear problem, if yes assess child for ear problem and if no check for malnutrition and anemia.**

A child with ear problem is assessed for;

* **Ear pain; ask the mother if the child has ear pain. If she is not sure ask if the child has been irritable and rubbing his ear.**
* **Ear discharge and**
* **If discharge is present; ask about its duration. An ear discharge that has been present for 2 weeks or more is treated as a chronic ear infection while one less than 2 weeks is treated as acute ear infection.**
* **Look for pus draining from the ear which is a sign of infection.**
* **Tender swelling behind the ear (sign of mastoiditis). Feel behind both ears, compare them and decide if there is tender swelling of the mastoid bone. Both tenderness and swelling must be present to classify mastoiditis.**

Classify ear problem

**There are four possible classifications for ear problem:**

1. Mastoiditis
* **Tender swelling behind the ear.**

 **Child needs urgent referral to hospital.**

1. Acute ear infection
* **Pus is seen draining from the ear and discharge is reported for less than 14 day or**
* **Ear pain.**

**Child is treated with appropriate antibiotic and analgesic for pain, if pus is draining from the ear dry the ear by wicking.**

1. Chronic ear infection
* **Pus is seen draining from the ear and discharge is reported for 14 days or more.**

 **Teach mother how to dry the ear by wicking.**

1. No ear infection

No ear pain and

No pus seen draining from the ear.

EXERCISE

Mbira is 3 years old. She weighs 13 Kg and her temperature is 37.5°c. Her mother has brought her to hospital because she has felt hot for the last 2 days. She cries at night and complains her ear hurts.

She does not have a general danger sign, no cough or difficult breathing, no diarrhea.

On assessment of the ear, there is discharge and ear pain and also a tender swelling behind one ear.

1. **Classify Mbira’s problems;**
2. **Explain how you have arrived at the classification;**

CHECK FOR MALNUTRITION AND ANAEMIA

**Check all sick children for signs suggesting malnutrition and anemia. Child with malnutrition has a higher risk of many types of diseases and death.**

**Some malnutrition cases can be treated at home while severe cases need referral to hospital for special feeding, blood transfusion or specific treatment of a disease contributing to malnutrition.**

**Children with malnutrition may have TB, ask for history of TB contact when assessing children for malnutrition and anemia.**

**Children with malnutrition may also have HIV infection, check any child who is very low weight for age for suspected symptomatic HIV infection.**

**Protein energy malnutrition results to;**

* **Severe wasting, a sign of marasmus.**
* **Oedema, a sign of kwashiorkor.**
* **Stunting**

**Child not eating foods that contain vitamin A can result in** vitamin A deficiency. **This makes the child at risk of measles, diarrhoea and blindness.**

**Not eating foods rich in iron can lead to** iron deficiency and anemia**. Anemia can also result from; infection, parasites, malaria, sickle cell disease and HIV infection.**

Assess for malnutrition

* **Ask if there history of TB contact.**
* **Look for visible severe wasting; very thin, no fat and looks like skin and bones. Remove Child’s clothes, look for severe wasting of the muscles of the shoulders, arms, buttocks and legs. Look to see if the outline of the ribs is easily seen. Look at the child’s hips, they may look small when compared to chest and abdomen. Look on the side to see if the fat of the buttocks is missing. When wasting is extreme, there are many folds of skin on the buttocks and thigh, child looks like is wearing baggy pants.**
* **Look for palmar pallor; look at the skin of the child’s palm. Hold the child’s open by grasping it gently from the side compare the colour of the child’s palm with your own palm. If the palm is pale, the child has some palmar pallor. If the skin of the palm is very pale or so pale that it looks white, the child has severe palmar pallor.**
* **Look and feel for oedema of both feet, use a thumb to press gently for a few seconds on the top side of each foot. The child has oedema if a dent remains in the child’s foot when the thumb is lifted.**
* **Determine weight for age, identify children whose weight for age is below the bottom curve of weight for age chart (child with very low weight). Identify if growth faltering is present.**

Classify nutritional status

**There are three classifications for a child’s nutritional status;**

1. Severe malnutrition or severe anemia
* **Visible severe wasting or**
* **Severe palmar pallor or**
* **Oedema of both feet.**

**Child needs urgent referral to hospital.**

1. Anemia or very low weight
* **Some palmar pallor or**
* **Very low weight for age.**

**Assess the child’s feeding and counsel the mother about feeding her child.**

**Check a child with very low weight for suspected symptomatic HIV infection.**

**Child with palmar pallor is treated with iron. Also give mebendazole if child with anemia is 2 years of age or older and has not had a dose of mebendazole in the last 6 months.**

1. No anemia and not very low weight
* **Not very low weight for age and other signs of malnutrition**
* **No pallor**

**If the child is less than 2 years assess the child’s feeding.**

CHECK FOR SUSUPECTED SYMPTOMATIC HIV INFECTION

**Children with symptomatic HIV infection usually present with same illnesses that others have, such as pneumonia, diarrhoea, malaria, ear infection and malnutrition. They may also present with tuberculosis, very low weight, failure to thrive. Enlarged lymph nodes or oral thrush.**

**IMCI helps in identifying children who are most likely to have HIV.**

Entry signs;

* **Chest indrawing.**
* **Fast breathing.**
* **Child has ever had two or more episodes of diarrhoea lasting 14 days or more.**
* **Very low weight.**
* **Growth faltering.**

**A child with any of the above signs should be assessed for suspected symptomatic HIV infection.**

Check for suspected symptomatic HIV infection.

* **Ask history of TB infections in any of the parents in the last 5 years.**
* **Find out if the child has fast breathing or chest indrawing.**
* **Ask if child has had two or more episodes of diarrhoea lasting 14 days or more.**
* **Look for growth faltering or weight below the “very low weight curve”.**
* **Feel for enlarged lymph nodes in two or more of the following sites; neck, axillae and groin.**
* **Look for oral thrush.**

Classify suspected symptomatic HIV infection

**There are two possible classifications;**

1. Suspected symptomatic HIV infection

**Presence of any three or more of the following;**

* **TB in any parent in the last 5 years.**
* **Fast breathing or chest indrawing.**
* **Child has had two or more episodes of diarrhoea lasting 14 days or more.**
* **Growth faltering or weight below the “very low weight” curve.**
* **Enlarged lymph nodes in two or more of the following sites; neck, axillae, groin.**
* **Oral thrush.**
1. NO suspected symptomatic HIV infection

**Less than three of the above features.**

CHECK THE CHILD’S IMMUNIZATION & VITAMIN A SUPPLEMENTATION STATUS

**Check the immunization status of all sick children. Identify if they have received all the immunizations recommended for their age and whether there are due immunizations.**

* **Give the recommended vaccine.**
* **Contraindications to immunization**
* **Pentavalent is not given to a child who has had convulsions or shock.**
* **BCG and yellow fever to a child known to have AIDS/symptomatic HIV infection.**
* **If the child is going to be referred do not immunize the child before referral.**
* **Children with diarrhoea who are due for OPV should receive a dose of OPV during the visit but do not count the dose. The child should return in 4 weeks for an extra dose of OPV.**

CHECK THE CHILD’S VIATMIN A SUPPLEMENTATTION STATUS

**Give vitamin A supplement to children with the following;**

* **Persistent diarrhoea.**
* **Malnutrition.**
* **Pneumonia.**
* **Measles.**

**If the child is out of schedule give the nearest dose and give next dose as per schedule as long as it is 1 month apart.**

ASSESS OTHER PROBLEMS

**Asses the child for other problems that the mother talked about and were not assessed in IMCI**.

# **IDENTIFY TREATMENT**

**Determine if urgent referral is needed, if yes identify urgent pre-referral treatment needed, give pre-referral treatment and refer the child.**

**If the child does not require urgent referral identify treatment.**

**Some children will have more than one classification; identify treatment for the listed classification. Some may be the same e.g. pneumonia and ear infection require an antibiotic. You must notice which treatment are the same and can be used for both problems and which treatment are different.**

Classifications that require urgent referral to hospital

* **Severe pneumonia or very severe disease.**
* **Severe dehydration.**
* **Severe persistent diarrhoea.**
* **Very severe febrile disease.**
* **Severe complicated measles.**
* **Mastoiditis.**
* **Severe malnutrition or severe anemia**.

**NB; For severe persistent diarrhoea refer the child to hospital. This means referral is needed but not urgently. Give all treatments before referral.**

**If the child’s only severe classification is severe dehydration use plan C to decide whether to refer the child.**

**If the child has another severe classification in addition to severe dehydration refer urgently to hospital with mother giving frequent sips of ORS on the way. Advise mother to continue breastfeeding.**

Refer to treatment model to see the flow chart.

**A child with any general danger sign needs urgent attention, complete the assessment and any pre-referral treatment immediately so referral is not delayed.**

**Refer the child for any other severe problem ( fracture, gun shot wound, extensive burns) that cannot be treated at the clinic.**

**While identifying treatment for a child that does not require referral include follow up.**

**List non-urgent referrals for further assessment e.g. child with chronic cough, fever lasting more than 7 days.**

**NB; Advise mother when to return immediately. Teach the mother the signs that mean she should return immediately.**

**Anaemia or very low weight; A child with palmar pallor should begin iron treatment fro anemia and should also be given an oral antimalarial even if the child does not have a fever. I the child is 2 years of age or older and has not had a dose of mebendazole in the last past 6 months he/she should be given.**

When to return immediately;

**Advice the mother to return immediately if the child has any of these signs;**

1. **Any sick child**
* **Not able to drink or breast feed.**
* **Becomes sicker.**
* **Develops a fever.**
1. **If child has no pneumonia, cough or cold return if;**
* **Fast breathing.**
* **Difficult breathing.**
* **Wheeze.**
1. **If child has diarrhoea, also return if;**
* **Blood in stool.**
* **Drinking poorly.**
* **Vomiting everything.**

Urgent treatments

* **Diazepam IV 0.3mg/kg for a child convulsing.**
* **Appropriate antibiotic; chloramphenicol 25mg/kg IV.**
* **Quinine for severe malaria; 15mg/kg iv (loading dose).**
* **Vitamin A in child with severe malnutrition or measles.**
* **Treatment to prevent low blood sugar.**
* **Oral antimalarial; coartem**
* **Paracetamol for high fever (38.5oc or above).**
* **TEO (tetracycline eye ointment) if cornea clouding or pus draining from the eye.**
* **Provide ORS solution for mother to give frequent sips on the way to hospital.**

Refer the child

Steps to refer a child to the hospital;

1. **Explain to the mother the need for referral and get her agreement to take the child.**
2. **Calm the mother’s fears and help her resolve any problems.**
3. **Write a referral note for the mother to take with her to the hospital. It should include; name and age of the child, date and time of referral, description of the child’s problems, the reason for referral, treatment given, any other important information, your name and name of clinic.**
4. **Give the mother any supplies and instructions needed to care for her child on the way to the hospital.**
* **Additional doses of antibiotic.**
* **Keeping the child warm.**
* **Continue breastfeeding.**
* **Give ORS for a child with some or severe dehydration.**

# TREAT THE CHILD

**Select the appropriate oral drug and determine the dose and schedule.**

**Children with the following classifications need an antibiotic;**

* **Severe pneumonia or very severe disease.**
* **Pneumonia.**
* **Severe dehydration with cholera in the area.**
* **Dysentery.**
* **Symptomatic HIV infection – long term prophylaxis with cotrimoxazole.**
* **Very severe febrile disease.**
* **Severe complicated measles.**
* **Mastoiditis.**
* **Acute ear infection.**

 Severe pneumonia or very severe disease

1. **Give first dose of appropriate antibiotic; ampicillin 50mg/kg or gentamycin 7.5mg/kg.**
2. **Treat to prevent low blood sugar.**
* **If child is able to breastfeed ask the mother to breast feed the** child**.**
* **If the child is not able to breast feed but is able to feed; give expressed breast milk or breast milk substitute.**
* **If neither of these is available give 30-50ml sugar water. To make sugar water dissolve 4 level teaspoons of sugar (20grams) in a 200ml cup of clean water.**
* **If the child is not able to swallow give 50mls of milk or sugar water by nasogastric tube.**
* **For suspected low blood sugar give 10% glucose 10ml/kg by nasogastric tube or give the same amount slowly intravenously.**
1. **Keep the child warm.**
2. **Treat wheeze if present; Give salbutamol metered dose inhaler using a spacer. Give 2 puffs. Repeat up to three times every 15 minutes.**
3. **Refer** urgently **to hospital**.

Convulsion

1. **Turn the child to his/her side and clear the airway. Avoid putting things in the mouth.**
2. **Give 0.5mg diazepam injection solution per rectum using a small syringe or using a catheter if convulsion lasts more than 5 minutes.**
3. **Check for low blood sugar, then treat to prevent.**
4. **Give oxygen.**
5. **Refer.**
6. **If convulsions have not stopped after 10 minutes repeat diazepam dose.**

Pneumonia

1. **Give cotrimoxazole BD for 5 days or amoxycillin TDS for 5 days.**
2. **Give vitamin A.**
3. **Treat wheeze if present.**
4. **Soothe throat and relieve the cough with a safe home remedy.**
5. **Advise the mother when to return immediately.**
6. **Follow up in 2 days.**

No pneumonia cough or cold

1. **If coughing more than 14 days refer for assessment.**
2. **Treat wheeze.**
3. **Soothe the throat and relieve the cough with a safe remedy.**
4. **Advice the mother when to return immediately.**
5. **Follow up in 5 days if not improving.**

Severe dehydration

1. **If the child has another severe classification refer urgently to hospital with mother giving frequent sips of ORS on the way.**
2. **Advise mother to continue breastfeeding.**

**OR**

1. **Give fluid using plan C (use the chart booklet page 13.**
2. **Give vitamin A.**
3. **Give zinc.**
4. **If the child is 2 years or older and there is cholera in the area give antibiotic for cholera.**

Some dehydration

1. **If the child has a severe classification refer urgently to hospital with mother giving frequent sips of ORS on the way.**
2. **Advice mother to continue breastfeeding.**

OR

**If the child has no severe classification;**

1. **Give fluid plan B.**
* **Give ORS solution 75 X child weight for the first 4 hours.**
* **Give more if the child wants.**
* **For infants < 6 months who are not breast feed also give 100-200 mls clean water during this period.**
* **Give frequent small sips from a cup. If the child vomits, wait 10 minutes then continue breastfeeding whenever the child wants.**
* **After 4 hours reassess the child and classify for dehydration.**
* **Continue treatment.**
* **Begin feeding the child in the clinic.**
* **If the mother must leave before completing treatment; show her how to prepare ORS solution at home, how much to give for finish 4 hours, instruct her how to prepare salt and sugar solution for use at home and explain the four rules of home treatment.**
1. **Give vitamin A.**
2. **Give zinc.**
3. **Advice mother when to return immediately.**
4. **Follow up in 2 days if not improving.**

No dehydration

**If the child has a severe classification refer urgently to hospital with mother giving frequent sips of ORS on the way.**

**Advice mother to continue breastfeeding.**

**OR**

1. **Give fluid and food to treat diarrhoea at home (plan A).**
* **4 rules of home treatment; Give extra fluid, Give zinc supplements, Continue feeding and Counsel mother when to return.**
* **Give extra fluid;**
* **Tell mother to breast feed frequently and for longer at each feed.**
* **If the child is EBF give ORS or clean water in addition to breast milk.**
* **If the child is not EBF give one or more of the following food based fluids (soup, rice water and yoghurt) or ORS.**
* **Teach the mother how to mix and give ORS. Give the mother 2 packets of ORS to use at home.**
* **Show the mother how much fluid to give in addition to the usual fluid intake.**
* **Up to 2 years; 50 to 100ml after each loose stool.**
* **2 years or more; 100 to 200mls after each loose stool.**
* **Tell the mother to give frequent small sips from a cup, if child vomits, wait 10 minutes then continue but more slowly.**
1. **Give vitamin A.**
2. **Give zinc.**
3. **Advice mother when to return immediately.**
4. **Follow up in 2 days if not improving.**

Severe persistent diarrhoea

1. **Treat dehydration before referral unless the child has another severe classification.**
2. **Give vitamin A.**
3. **Give zinc.**
4. **Give multivitamin/mineral supplements.**
5. **Refer to hospital.**

Persistent diarrhoea

1. **Advise the mother on feeding the child.**
2. **Give vitamin A.**
3. **Give zinc.**
4. **Give multivitamin/mineral supplements.**
5. **Follow up in 5 days.**

 Dysentery

1. **Treat with antibiotic, if child has not improved on ciprofloxacin by second day change to metronidazole.**
2. **Give vitamin A.**
3. **Give zinc.**
4. **Follow in 2 days.**

Very severe febrile disease

1. **Give quinine 15mg/kg IV/IM for severe malaria (first dose), maintenance 10mg/kg BD to complete 10 days.**
2. **Give first dose of appropriate antibiotic.**
3. **Treat to prevent low blood sugar.**
4. **If fever is present give one dose paracetamol in the clinic.**
5. **Refer urgently to hospital.**

Malaria

1. **Treat with oral antimalarial co-artemether.**
2. **Stat, repeat after 8 hours next dose after 24 hours then 36, 48 and 60th hour. For a child 5 months to 3 years (5-<15kg) give 1 tablet if more than 3 years (15 - <20kg) give two tablets.**

Read on treatment for other classifications.

# **MANAGEMENT OF THE SICK YOUNG INFANT AGE 1 WEEK UPTO 2 MONTHS**

 Introduction

**Young infants have special characteristics that must be considered when classifying their illness. They can become sick and die very quickly from serious bacterial infections.**

**Mild chest indrawing is normal in young infants because their chest wall is soft.**

**This chart is not used for a sick newborn, i.e. a young infant less than 1 week of age.**

Assess and classify the sick young infant

**Ask the mother what the sick young infant’s problems are.**

**Determine if this is an initial or follow up visit for these problems.**

*Check the young infant for possible bacterial infection*

**Check all sick infant for possible bacterial infection.**

**Ask if the infant had convulsions.**

**Ask and look if the infant not able to feed or breastfeed.**

**Look for breathing, is the baby gasping or not breathing at all even when stimulated**

**Count the breaths in one minute/ repeat the count if elevated (cut off 60 breaths per minute).**

**Look for severe chest indrawing.**

**Look for nasal flaring (widening of the nostril when the young infant breathes in).**

**Look and listen for grunting or wheezing.**

The above signs must be assessed when the child is calm.

* **Look for central cyanosis.**
* **Look and feel for bulging fontanelle.**
* **Look for pus draining from the ear.**
* **Look fro pus draining from the eyes.**
* **Is there associated swelling or redness of the eyelids?**
* **Look at the umbilicus. Is it red or draining pus?**
* **Does the redness extend to the skin?**
* **Measure temperature (or feel for fever or low body temperature less than 35.5oc).**
* **Look for skin pustules. Are there many or severe pustules?**
* **See if the young infant is lethargic or unconscious.**
* **Look at the young infant’s movements, are they less than normal?**

Classify all sick young infants for bacterial infection

**There are four possible classifications.**

1. Very severe disease

**A child with any of the following signs;**

* **Gasping or**
* **Not breathing at all even when stimulated or**
* **Respiratory rate less than 20 breathes per minute**
* **Convulsions or convulsing now or**
* **Not able to feed or breastfeed.**
* **Fast breathing.**
* **Severe chest indrawing.**
* **Grunting or wheezing or**
* **Nasal flaring**
* **Central cyanosis**
* **Bulging fontanelle**
* **Pus draining from the ear**
* **Fever/ low body temperature or**
* **Drowsy (lethargic) or unconscious or**
* **No movements even when stimulated**.

**Treatment**

* **Immediately resuscitate if;**
* **child is not breathing at all even when stimulated or**
* **Is gasping or**
* **Has a respiratory rate les than 20 breaths per minute.**
* **If convulsing now, give anticonvulsants.**
* **Give first dose of intramuscular antibiotics.**
* **Treat to prevent low blood sugar.**
* **Advise mother how to keep the infant warm on the way to the hospital.**
* **Refer urgently to hospital.**
1. Local bacterial infection
* **Red umbilicus or draining pus or**
* **Skin pustules.**

 **Treatment**

* **Give an appropriate oral antibiotic.**
* **Teach the mother to treat local infections at home.**
* **Advise mother to give home care fro the young infant.**
* **Follow up in 2 days.**
1. No very severe disease or local bacterial infection

**None of the signs of very severe diseases or local bacterial infection.**

 **Treatment**

**Advice the mother to give home care fro the young infant.**

1. Low body temperature

**Temperature 35.5 -36.4**

**Treatment**

* **Rewarm the young infant and reassess after 1 hour.**
* **Treat to prevent low blood sugar.**
* **Advise mother to give home care for the young infant.**
* **Advice mother when to return immediately.**

**Check for jaundice**

**Yellow discoloration of skin is visible in a neonate when serum bilirubin is >5mg/dl.**

**Physiologic jaundice 48-72 hours disappear in 14 da ys, does not extend to palm and soles and does not need any treatment.**

Assess for jaundice

**Ask if the infant has yellow discolouration of the skin.**

**Look at the infants palms and soles for yellow discolouration.**

Classification

1. Severe jaundice
* **Yellow palms and soles at any age.**
* **Any jaundice if age less than 24 hours OR more than 14 days of age.**

 **Treatment**

* **Treat to prevent low blood sugar.**
* **Advise mother how to keep the infant warm on the way to the hospital.**
1. Jaundice

**No yellow palms and soles AND**

**Jaundice appearing between 24 hours and 14 days.**

**Treatment**

* **Advise caregiver to expose the baby to the direct sunlight fro at least half an hour per day.**
* **Advise the mother when to return immediately.**
* **Advise the mother to give home care fro the young infant.**
* **Follow up in 2 days.**
1. No jaundice

**No signs to classify as severe jaundice or jaundice**

 **Treatment**

**Advise mother to give home care for the young infant.**

Check for eye infections

**Ask the mother if there is eye discharge.**

**Enquire on duration of eye discharge.**

**Look at the young infant’s eyes, are they draining pus?**

**Are they swollen?**

Classify eye infections

1. Severe eye infection

**Eyes swollen and draining pus.**

 **Treatment**

**Give first dose of intramuscular antibiotics.**

**Apply first dose of local antibiotic.**

**Treat to prevent low blood sugar.**

**Refer urgently to hospital.**

**Advise mother how to keep the infant warm on the way to the hospital.**

1. Eye infection

**Eyes draining pus**

 **Treatment**

**Teach the mother to treat eye infection at home.**

**Advise mother to give home care fro the young infant.**

**Follow up in 2 days.**

1. No eye infection

**No swollen eyes or**

**Eyes not draining pus.**

**Treatment**

**Advise mother to give home care for the young infant**

Assess and classify for diarrhea

* **Ask the mother if the young infant has diarrhoea.**
* **Ask about duration of diarrhea.**
* **Ask if there is blood in stool.**
* **Assess infant for lethargy or unconsciousness.**
* **Assess fro irritability or restlessness.**
* **Look at the eyes, are they sunken?**
* **Assess for skin turgor**

Classify diarrhoea

1. Severe dehydration

 **Two or more of the following signs;**

**Lethargic or unconscious.**

**Sunken eyes.**

**Skin pinch goes back very slowly.**

**Treatment**

**Refer urgently to hospital with mother giving frequent sips of ORS on the way.**

**Advise mother to continue breastfeeding.**

**Advise mother to keep the young infant warm on the way to hospital OR**

**If the infant does not have another very severe disease give fluid according to plan C.**

1. Some dehydration

**Two of the following signs;**

**Restless, irritable.**

**Sunken eyes.**

**Skin pinch goes back slowly.**

 **Treatment**

**If the infant has very severe disease refer urgently to hospital with mother giving frequent sips of ORS on the way.**

**Advise mother to continue breastfeeding.**

**Advise mother to keep the young infant warm on the way to hospital OR**

**Give fluid according to plan B.**

**Give zinc.**

1. No dehydration

**Not enough signs to classify as some or severe dehydration**

 **Treatment**

**Give fluids according to plan A.**

**Give zinc.**

**Advice mother when to return immediately.**

**Follow up in 5 days if not improving.**

1. Severe prolonged diarrhoea

**Diarrhea lasting 7 days or more**

 **Treatment**

**If the young infant is dehydrated, treat dehydration before referral unless the infant has also very severe disease.**

**Refer to hospital.**

1. Possible serious abdominal problem

**Blood in stool**

 **Treatment**

**Give first dose of intramuscular antibiotics.**

**Treat to fro and prevent low blood sugar.**

**Refer urgently to hospital.**

**Advise mother how to keep the infant warm on the way to hospital.**

Check for feeding problem, low weight or low birth weight

* **Ask if the infant is breast fed?**
* **How many times in 24 hours? day/night**
* **Weaning? Frequency of feeds? Preparation of feeds?**
* **What the infant is fed on?**
* **Determine weight for age.**
* **Determine mother’s HIV status (reactive, non reactive or unknown)**
1. Feeding problem or low weight

**A child with any of the following signs is classified as having feeding problem or low weight;**

* **Not well attached to the breast or not suckling effectively**
* **Not suckling effectively**
* **Less than 8 breastfeeds in 24 hours**
* **Receives other foods or drinks**
* **Low weight for age**
* **Oral thrush**
1. No feeding problem

**A child who is not low weight for age and no other signs of inadequate feeding.**

Check the young infant immunization and vitamin A supplementation

**BCG, OPV, Pentavalent; assess for immunization, give missed immunization unless there is need for referral**

**☺☺**

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BABY AT RISK

# INTRODUCTION

## 1.1 ADMISSION CRETERIA INTO THE NEWBORN UNIT

The new born unit does not only admit babies at risk but also offers accommodation to normal neonates due to unstable condition or death of the mother.

Reasons for admitting a baby into the nursery include the following:

* Pre-maturity
* Asphyxia neonatorum
* Hemorrhagic disease of the new born
* Ophalmia neonatorum
* Birth injuries
* Congenital abnormalities e.g hydrocephalus
* Respiratory distress syndrome
* Infants of diabetic mothers(risk of hypoglycaemia)
* Maternal death
* Unstable maternal condition

## 1.2 INFECTION CONTROL IN THE NEW BORN UNIT

Due to low immunity of the babies in the NBU, infection control is critical to protect the babies from infection during their stay in the unit. This is necessitates high infection control measures within the unit.

The following are some ways of ensuring infection control in the nursery.

* Keep the unit clean, free from dust. The windows should remain closed at all times to prevent flowing in of dusty air.
* Daily dump dusting and cleaning of the incubator and cots
* Isolation of infected babies for barrier nursing.
* Restriction of visitors to ensure adequate control of human traffic into the nursery. Visitors should see the babies through the window glass.
* Washing hand before and after handling the baby for any procedure.
* Strictly observing aseptic technique while performing procedures.
* Feeding utensils should be rinsed, decontaminated, cleaned thoroughly in soapy water and kept in presept till the next feed.
* Staff working in isolation room should not move into other nurseries
* Cleaning of incubators upon discharge or death of a baby, before the next baby is put.
* Mothers changing clothes whenever they come to feed the babies.
* Health educating the mothers on the importance of personal hygiene and care of the baby.

## 1.3 FIRST EXAMINATION OF THE BABY

This is a routine procedure done after third stage of labour in labour ward but is also done in the nursery as part of admission procedure. The aims are;

* To rule out congenital abnormalities
* To rule out birth injuries
* To assess maturity of the baby

**Head**

* measure the head circumference (average is 35 cm
* Check for the moulding of the foetal skull
* Width of the fontannelles and sutures, bilging of fontanel and wide sutures may indicate hydrocephalus
* Depression on the skull may imply a fracture
* Injuries e.g caput succadenium and cephalohaematoma

**Eyes**

* absence of eyebrows
* Conjuctival haemorrage / bleeding
* Any discharge and squint

**Nose**

* Check for any deformities e.g. Well formed septum
* Bleeding from the nose
* Check for nasal flaring which is a sign of respiratory distress
* Check for blocked nostrils

**Mouth**

* Bleeding from the mouth
* Check for tongue tie
* Abnormalities e.g cleft palate or cleft lip
* Frothing of the mouth

**Ears**

* Bleeding from the ears
* Leakage of CSF through the ears
* Shape of the lobes to rule out malformations
* Extra lobe of the ear

**Neck**

* Check out for abnormalities e.g. congenital goiter
* Check for meningocele

**Chest**

* Shape of the chest for symmetry
* Chest movement during respiration
* Take apex beat
* Check breast for swelling and discharge

**Abdomen**

* Check for skin colour and presence of rashes
* Check whether the cord is well ligated
* Bleeding from the umbilical cord
* Abdominal abnormalities e.g. hernia

**Genitalia**

* For males check for the testis to rule out undescended testis
* Female check for vaginal discharge, labia should be well formed size of a clitoris

**Hip joint**

* Rule out congenital hip dislocation

**Limbs**

* Check if arms and hands are moving freely
* Rule out dislocation, fractures and Erb’s paralysis
* Check for equality of the arms and to rule out abnormalities
* Fingers for webbed and extra digits
* Legs for equality, abnormalities and movement
* Rule out tallipes and club foot

**Back**

* Abnormalities of the back e.g. spina bifida, myelomeningocele
* Check for skin colour and septic spots

**Anus**

* While taking rectal temperature, check for imperforate anus
* Bruises on the skin or rashes

**Check for the following reflexes:**

* Sucking reflexes – full term infant sucks the small finger
* Moro reflex – tested by gently lifting the baby up by its fingers from a flat surface and suddenly releasing it. It will respond by spreading its hands then move them together as though hugging.
* Rooting reflex – the baby turns in search of the nipple
* Grasping reflex – it will grasp your finger if you put it in its palm.
* Stepping reflex – when held on a flat surface in standing position, it makes stepping movement.

# 2.0 NORMAL NEONATE

This refers to a baby born at term or as near term as possible after 37 weeks of gestation and has no complications.

Upon birth the infant has to undergo physiological changes in order to adapt to life outside the uterus to have independent existence.

## 2.1 PHYSIOLOGICAL CHANGES AT BIRTH

1. **Respiration** occurs due to:

* Low oxygen and high carbon- dioxide stimulates respiratory center and respiration begins
* Compression of the chest wall during second stage creates a vaccum and aid respiration
* External stimuli e.g handling the baby, cold extra uterine environment makes the baby gasp and respiration starts
* Baby is encourage to cry initially by flicking the sole of the foot for it allows complete aeration of the lungs
* Presence of surfactant factor aids expansion of the lungs (lecithin:sphingomyelin =2:1 and is an indicator of lung maturity detectable on amniocentesis)

The normal respiration rate at birth is 40-50/ min

Irregular breathing may be due to the following factors:

* Prematurity (inadequate surfactant factor)
* Depression of the respiratory centre by drugs e.g pethedine or strong uterine contractions
* Excessive carbondioxide (hyperpnoea)
* Lack of oxygen (hypoxia)

**2. Circulatory system**

* Extrauterine circulation is established and the baby is able to divert deoxygenated blood to the lung for deoxygenation. This accounts for the pink colour of an infant.
* In utero the Hb is high 18-20g/dl and high RBC to transport sufficient oxygen to the foetus. After birth the Hb drops to 14g/dl and some of the RBC are broken down by the liver cells to bilirubin and may lead to physiological jaundice.
* Normal heart rate in utero is 120 -160 beats per minute but upon birth it drops to 100 -120 beats /min

**3. Temperature regulation**

* Temperature in utero is 38\*C but the baby’s rectal temperature is 37\*C. The temperature drops due to evaporation, conduction, convection and radiation.
* Temperature is not adequately regulated due to low metabolic rate and insufficient heat regulating center in the hypothalamus. They are at risk of overheating as well as chilling.
* They have thin subcutaneous layer which provides poor insulation and heat is lost. They have brown adipose tissue to mobilize heat resources.

**4. Digestive system**

* Sucking and swallowing reflexes are present and they feed on colostrums and pass meconium (initially green then turns yellow)
* They open bowels 3-4 times a day.

**5. Liver**

* Stars functioning in utero although negligible. Its function remains depressed for a few days yet it has to handle excess Hb thus there is accumulation of bilirubin leading to physiological jaundice.

**6. Urinary system**

* A kidney start functioning in utero and the foetus passes urine but has no ability to concentrate urine thus excretes chlorides and phosphates.
* The baby should pass urine within the first 48 hours of birth.

**7. Weight**

* Average birth weight is 2.5 -3.5 kgs but is affected by factors such as period of gestation, placental function, nutritional status of the mother, size of the parents, type of pregnancy i.e. single or multiple and sex of the baby.
* In the first three days the baby looses 1/10 of its weight (physiological weight loss) due to limited intake, loss of meconium and loss of tissue fluid. The weight is gained within 7-10 days then it gains 250-500g weekly.

## 2.2 CHARACTERISTIC OF NORMAL NEONATE

Weight is 2.5 -3.5 kgs.

Length from vertex to heel is 45-52 cm

Head circumference is 35 cm and increases by 1-2 cm during the first month

Fontannelles and sutures are patent. Anterior fontanel closes at 18 -24 months while the posterior closes at 6-8 weeks.

Skin is covered by vernix caseosa, a secretion of the sebaceous gland that helps in heat retention and acts as a lubricant during delivery.

Umbilical cord shrivels by necrosis and falls off in 7 days. The remaining part forms abdominal ligaments. Hernia may develop but usually disappears spontaneously.

Reflexes are fully developed.

Senses are developing.

# 3.0 PRE TERM BABY

 This refers to a baby born before 37 complete weeks of pregnancy. Some of them may have growth retardation and therefore be small while others may be excessively large for gestational age (macrosomia)

Low birth weight baby is one with less than 2500g

## 3.1 predisposing factors

1. Maternal factors – maternal age eg. Primigravida below 17 years or above 35 years
2. Maternal disease in pregnancy such as anaemia, hypertension, pre-eclampsia.
3. Foetal factors –congenital abnormalities; multiple pregnancy and polyhydromnous due to over distension of the uterus; rhesus incompatibility interfering with foetal viability
4. Placental factors –APH due to placenta praevia and placenta abruption
5. Social factors –strenuous exercises, excessive drinking of alcohol and smoking, previous history of miscarriage, physiological stress.

## 3.2 clinical features

* Small stature with low birth weighs less than 2500g
* Thin and sparsely distributed hair on the head.
* Skin is reddish with plenty of lanugo
* Widely open sutures
* Eyes closed most of the time
* Pinnae of the ears are soft and fold easily on pressure and slow to uncoil
* Narrow sinuses and the nose a bit flat
* Swallowing and sucking reflexes absent or very weak
* Weak cry and there are no tears
* Chest is small, soft with underdeveloped breast tissue
* Poor muscle tone and the baby lies inactive most of the time
* In females, labia majora are widely separated and labia minora is protruding in between
* In males, scrotal muscles are smooth and testis are undescended
* Palmer and planter creases are absent
* Grasp reflex are absent

## 3.3 physiology of the pre term baby

1. Immunity is low due to:

* Low gamma globulins responsible for immunity.
* Delicate skin that is vulnerable to injuries and infection
* Lack of passive immunity which usually develops around 38 weeks gestation

2. Blood system

* Has poor peripheral circulation with high tendency to hemorrhage because of weak vascular walls.
* Prone to hemorrhage due to lack of clotting factors(vitamin A is administered to promote clotting)
* Unable to store iron hence at risk of iron deficiency anemia.
* They have very few blood cells and may develop non pitting anemia

3. Weight

* Initially they lose up to 10% of their birth weight and start gaining and reach birth weight 2-3 weeks post delivery.

4. Temperature regulation is poor due to:

* Immature heat regulatory centre
* Limited food intake and low metabolic rate
* Inability to shiver and generate heat
* Excessive heat loss due to little or no subcutaneous fat. The brown fat is usually in baby’s body by 36 weeks gestation.

5. Respiratory system

* Under developed respiratory centre leading to difficulty in initiation of respiration.
	+ Frequent apnoeic attacks with irregular respiration.
* Abdominal movements more than chest movements.

6. Renal system

* Immature kidneys are unable to concentrate urine hence they excrete chlorides and phosphates.

7. Digestive system

* Absence of swallowing and sucking reflexes lead to poor feeding
* Regurgitation after feeds due to underdeveloped cardiac sphincter

8. Nervous system

* All regulatory centres are under developed.

## 3.3 NURSING MANAGEMENT

* Delivery of a preterm baby should be conducted in a warm room and subsequently nursed in a preterm incubator.
* Temperatures of the incubator should be maintained within normal range of about36 – 37 \*c
* Perform first examination of the baby to assess maturity.
* Fix NG tube and the baby with breast milk and substitute only where breast milk is not available.
* Feed the baby using the oral feeding regime:
* Baby is given 60- 65 mls per kg of body weight in 24 hrs in 8 divided doses e.g. 2.5 kg baby will have *2.5 x60/8 =18.99 mls* per feeding thus should be fed 3 hourly.
* If the baby tolerates, the feed can be increased
* If the baby can’t tolerate the oral feeds, give IV fluids e.g. 10% dextrose
* Introduce cup and spoon feeding gradually as the baby gains weight
* Aspirate the gastric content to rule out indigestion.
* Close observation to include:

-vital signs TPR

- Respiratory rhythm to note apnoeic attack

- Umbilical stump for signs of infection

-vomitting or retaining food

- general activity and emotional status

* Provide care of IV line i.e. securing, cleaning and dressing.
* Give nutritional supplements e.g. iron , folic acids, vitamin from the second week.
* Administer broad spectrum antibiotic prophylactically for prevention of infection
* Take weight on alternate days to monitor the progress.
* Discharge the baby at 2000 – 2500g
* Give BCG vaccine on discharge or advice the mother to go for it.
* Advice mother on family planning so that she gets another baby by choice and not by chance.

## 3.5 COMPLICATIONS

1. Hypothermia neonaterum
2. Haemorrhagic disease of the newborn
3. Respiratory distress syndrome
4. Retrolental fibroplasias
5. Failure to thrive
6. Jaundice
7. Infections
8. Anaemia
9. Rickets

# 4.0 SMALL FOR GESTATIONAL AGE

This term refers to a baby whose birth weight is below 10th percentile of his gestational age commonly referred to as low birth weight but this includes preterm babies.

They are susceptible to various problems including:

* Congenital abnormalities
* Foetal hypoxia that may lead to intrapartal death
* Birth asphyxia due to inadequate perfusion, meconium aspiration leading to airway obstruction.
* Hypothermia due to little subcutaneous tissues
* Apnoeic attacks hypoglycemia

## 4.1 SIGNS AND SYMPTOMS

* Mostly they are born after 37 weeks.
* Pale, dry loose skin with wrinkles and have little or no lanugo
* Subcutaneous fat is minimal
* Shows features of retarded growth
* The abdomen appears sunken
* Sutures and fontanel appear normal
* Eyes are alert and has mature facial expression
* Skull bones are hard and allow little mobility
* Have strong cry
* Umbilical cord is thin
* Swallowing and sucking reflexes are present so they feed well
* Normal muscle tone are active

## 4.2 NURSING MANAGEMENT

* The baby is predisposed to the risks similar to those of preterm baby thus the management principles are the same.
* Management should start in labour by closely monitoring foetal condition for signs of foetal distress.
* In case of foetal distress in the first stage, administer oxygen to the mother and start IV drip of 10% dextrose as you prepare the mother for emergency caesarian section. If in second stage, the delivery is hastened by giving generous episiotomy.
* Since the baby is prone to hypoglycaemia, it should be stared on breastfeeding as soon as possible.
* Gastric lavage should be done with warm dextrose before breastfeeding.
* Substitutes are given if there is no breast milk. The feed is calculated at 90 mls/kg of body weight in 24 hrs in 8 divided doses i.e. 3 hourly feeding.
* Closely observe vital signs TPR and signs of infection.
* The baby should be nursed in a warm environment to prevent hypothermia although it has temperature regulating mechanism.
* Closely monitor blood sugar to rule out hypoglycaemia.
* Weigh the baby on alternate days to monitor the progress. Usually weight loss is minimal and it gains weight more rapidly and steadily than preterm.
* Teach the mother how to take care of the delicate skin that may be dry, cracked or peeling.

## 4.3 COMPLICATIONS

* Hypoglycaemia
* Respiratory distress syndrome
* Aspiration pneumonia
* Brain damage

# ASPHYXIA NEONATORUM

This is a term which refers to a condition in which the baby fails to breath at birth.

##  5.1 TYPES OF ASPHYXIA

 The degree of asphyxia is determined by Apgar score in which the following features are observed and score 0-2

* Appearance (colour of the body)
* Pulse (heart rate)
* Grimace (response to stimuli)
* Activity (muscle tone)
* Respiration /respiratory effort

A score between 8- 10 does not show asphyxia. There are three types of asphyxia namely:

1. Mild asphyxia – Apgar score is 6-7. It requires clearing of the airway and application of external stimuli to in initiate breathing

2. Moderate asphyxia – Apgar score is 4-5. It requires resuscitation, administration of oxygen and drugs to initiate breathing.

3. Severe asphyxia – Apgar score is 0-3. It requires intensive resuscitative measures and intubation to survive.

## 5.2 PREDISPOSING FACTORS

* Any condition causing foetal distress e.g. cord prolapse, prolonged labour,APH, intrauterine hypoxia due to placental insufficiency, post maturity, placenta abruption.
* Anaemia, Pre- eclampsia
* Pre- maturity due to under development of the respiratory centre.
* Blockage of the airway by mucus or liquor amnii at birth.
* Birth injuries e.g. intracranial injury
* Severe maternal disease in pregnancy e.g. sickle cell anaemia, cardiac disease
* Depression of respiratory center due to drugs e.g. GA and narcotics

## 5.3 SIGNS AND SYMPTOMS

**MILD AND MODERATE ASPHYXIA**

1. Apex beat (pulse rate) 100/min or less

2. Skin colour is pink with blue extremities

3. Response to stimuli may be present

4. Cry may be weak or strong

5. Makes effort to breath and may gasp with irregular respiration

**SEVERE ASPHYXIA**

1. No attempt to breath and may gasp periodically
2. it does not cry
3. Entire body skin is blue i.e. cyanosed-central.
4. No response to stimuli
5. Pulse rate very low or absent
6. Poor muscle tone

## 5.4 NURSING MANAGEMENT

* Clear the airway as soon as possible.
* Nurse the baby in an incubator for at least 48 hrs to keep it warm at body temperature.
* Resuscitation may be needed to promote ventilation and ensure effective circulation to prevent acidosis, hypoglycaemia and intracranial hemorrhage
* Do suctioning whenever necessary
* Closely observe the baby for skin colour, TPR.
* Administer oxygen by mask, ambu bag or nasal catheter whenever there is an apnoeic attack
* Give IV fluids for rehydration.
* Aspirate mucus to unblock the airway or may intubate the baby.
* Give fluids with electrolytes to maintain fluid – electrolyte balance.
* If the mother was given narcotics during labour, administer its antidote *naloxone* thro the umbilical vein.
* Administer the following drugs:
* *Sodium bi- carbonate 1-2 mls* to combat acidosis.
* *Vitamin K 0.5 -1 mg i.m* to prevent haemorrhagic disorders.
* *Aminophylline to improve* respiration.
* *Calcium gluconate to* strengthen heart muscles.
* Maintain accurate input output chart to prevent over hydration and under hydration
* When the baby is stable pass NG tube and start feeding.
* Observe aseptic technique to prevent cross infection.
* Administer broad spectrum antibiotic prophylactically.

## 5.4 PREVENTION OF ASPHYXIA

* Proper screening of mothers to detect those mothers at risk and advice on hospital delivery for proper management.
* Pelvic assessment should be done at 36 weeks gestation to rule out pelvic inadequacy e.g. CPD.
* Proper management of maternal diseases in pregnancy.
* Drugs that depress respiratory center e.g. sedatives, GA and narcotics should be avoided in late first stage.
* Early detection and management of foetal distress.
* Clearing baby’s airway as soon as the head is born.
* Avoiding instrumental deliveries but rather prepare for caeserian section.

## 5.5 COMPLICATIONS

1. Brain damage
2. Cardiac arrest
3. Respiratory distress syndrome
4. Respiratory acidosis.

# RESPIRATORY DISTRESS SYNDROME

This is a condition that occurs due to lack of or inadequate surfactant in the lung tissue. Mature lungs have adequate surfactant factor that lower the surface tension in the alveoli, stabilizes the alveoli and prevents them from adhering together and collapse. This leads to breathing with ease. Surfactant is produced slowly from 20 weeks gestation and reaches a surge at 30- 34 weeks gestation and another surge at onset of labour.

The premature infant lack this function thus the alveola walls pressure rises as he breaths out and alveoli collapse leading to severe difficulty in breathing.

Other names are:

* Hyaline membrane disease
* Pulmonary syndrome of the newborn
* Developmental respiratory distress

It is a disease of prematurity and self limiting with recovery phase or death.

## 6.1PREDISPOSING FACTORS

* RDS may be a complication of asphyxia and develops within 48 hrs of birth
* Prematurity due to inadequate surfactant factor
* Perinatal hypoxia e.g due to APH which reduces surfactant synthesis
* Perinatal hypoxia
* Profound hypothermia –leads to injury of cells that produces surfactant
* Congenital heart disease

## 6.2CLINICAL FEATURES

* difficulty in breathing- dyspnoea
* flaring of the alae nasi
* tachypnoea with respiration of above 60/min
* hypothermia
* generalized cyanosis
* costal and sterna retraction
* grunting expiration ( prevent atelectasis)
* reduced or increased heart rate
* chest X-ray shows collapsed alveoli
* the baby has poor muscle tone and is motionless
* poor digestion due to diminished bowel movement
* resolves or death occurs within 3-5 days

## 6.3 NURSING MANAGEMENT

Management is symptomatic until the disease resolves.

If RDS is anticipated, inform the paediatrician to resuscitate the baby.

Nurse the baby in an incubator to prevent hypothermia by controlling the body temperature.

 Administer oxygen or do artificial ventilation to prevent hypoxia.

Closely monitor the blood PH to prevent acidosis and support pulmonary circulation because high carbon dioxide level leads to constriction of pulmonary arterioles leading to poor pulmonary blood flow.

In case there is acidosis, sodium bicarbonate is added to 10 % dextrose drip.

 Keep the baby nil per oral till the distress resolves.

Administer IV fluids eg.10% dextrose and add calcium gluconate to strengthen heart muscles; sodium bicarbonate to ensure fluid electrolyte balance.

Check heamocrit (PCV) and if less than 40% transfuse with blood.

Maintain the normal BP with volume expanders eg. n/saline.

Position the baby to provide greatest air entry(prone position with extended head)

Suction and do postural drainage to remove secretion and keep the airway patent.

 Close observation to monitor the progress whether improving or deteriorating i.e. the heart rate, respiration, chest in- drawing, grunting respiration, and cyanosis.

When the condition resolves, introduce oral feeds. In case the baby develops abdominal distention due to ingestion, stop the oral feeds and start IV fluids.

NB: principles followed during care of babies with respiratory problems are observation, oxygenation, positioning, nutrition and hydration.

## 6.4 PREVENTION

* Early detection and management of high risk pregnancies to prevent premature delivery
* Conditions such as diabetic mellitus should be properly managed so that delivery can be prolonged to 36 -38 weeks. The mother is given *Dexamethasone 4mg tds 48 hrs* before c/s to stimulate lung maturity.
* Prevent prenatal hypoxia by ensuring there is no intracranial injury at birth.
* Effective resuscitation at birth of high-risk babies.
* Assessment of gestational age and lungs maturity through amniocentesis so that elective c/s or delivery can be delayed if lungs are not mature enough

## 6.5 COMPLICATIONS

* Retrolental fibriplasia
* Hypothermia
* Hypoglycaemia
* Patent ductus arteriuosus
* Abdominal distension
* Hypocalcaemia
* Intracranial
* Infection

# 7.0 HYPOGLYCAEMIA

This is a metabolic disorder in which the blood glucose level falls below 2.6 mmol/L. At term, the baby’s glucose level is almost equal to that of the mother but gradually drops within 3-4 hrs after birth. This is why the baby has to be fed within four hours of life. The baby’s maintain their energy requirements as long as they are kept warm.

This condition is common in infants of diabetic mothers. Due to excess glucose, the large babies (macrosomia). At birth the glucose level falls rapidly while insulin levels remain relatively high so the baby is at risk of hypoglycemia . this is why such babies are admitted to the NBU.

Prolonged hypoglycaemia can lead to mental retardation, permanent neurological damage anddeath due to respiratory and metabolic acidosis.

## 7.1 PREDISPOSING FACTORS

* Low birth weight
* Prematurity
* Birth injuries
* Maternal diabetes mellitus
* Asphyxia
* Septicaemia
* Respiratory distress syndrome

## 7.2 CLINICAL FEATURES

* Low blood glucose less than 2.6 mmol/L
* Poor feeding
* High pitched cry
* Lethargy
* Irritability
* Hypotonic muscle activity
* Hypothermia
* Apnoea

## 7.3 NURSING MAMAGEMENT

* Give 10% dextrose infusion until normal glucose levels are achieved.
* Encourage the mother to breastfeed the baby
* Feed through NG tube or cup and spoon expressed breast milk.
* If the hypoglycemia is severe, put up 10% dextrose infusion and give 65-85 mls/kg of body weight in 24hrs.
* Give bolus dose of 25% dextrose 2wmls/kg body weight iv slowly for 30 min.
* Closely monitor the glucose levels 1 hourly until the general condition is stable or normal levels have been achieved.
* Once the normal levels have been achieved, wean off the dextrose and observe closely for changes in the condition.

## 7.4 PREVENTION

* Taking blood glucose levels at birth and introducing glucose feeds e.g. dextrose or breastfeeding within 1hr of life.
* Prevent hypothermia.
* Monitoring glucose level 2hrly for the first 6-8 hours.
* Infants of diabetic mothers should be admitted into NBU and blood glucose level regularly checked.

## 7.5 COMPLICATION

* Hypothermia
* Convulsions
* Brain damage
* Neonatal death as an outcome.

# 8.0 NEONATAL HYPOTHERMIA

 This is a condition in which the neonates body temperature falls below 36\*C .the baby losses heat through radiation,conduction, convection and evaporation.

## 8.1 PREDISPOSING FACTORS

* Prematurity
* Asphyxia neonatorum
* Maternal diabetes mellitus
* Respiratory distress syndrome
* Cold environment

## 8.2 CLINICAL FEATURES

* Rectal temperatures is below 36\*C
* Baby feels cold on touch
* Paleness of extremeties and face
* Very weak cry
* Low respiration rate
* Baby not eager to feed (poor feeding)

## 8.3NURSING MANAGEMENT

* Nurse the baby in a warm environment in a resuscitaire or wrap it in warm clothings
* Feed the baby with expressed breast milk via NG tube
* Give the baby extra glucose e.g. dextrose
* Closely observe the baby for signs of hypoglycaemia and if present, give 10% dextrose
* Check for and treat convulsions with anticonvulsants

## 8.4 PREVENTION

* Delivery should be conducted in a room temperature
* Put the baby on resuscitaire or in incubator to compensate heat loss to the environment.
* Baby should not be bathed within 1hr of life but top-tailing can be done after one hour.
* Encourage skin to skin contact (kangaroo method) when carrying the baby.

## 8.5COMPLICATIONS

* Convulsions
* Hypoglycaemia
* Brain damage

# 9.0 OPTHALMIA NEONATORUM

This is a condition that occurs in neonates within 21 days of life and is characterized by purulent discharge from the eyes. It is common in infants of mothers who had vaginal discharge e.g. gonnorrhoea during pregnancy. Syphilis does not predispose an infant to opthalmia neonatorum but it causes congenital syphilis that is characterized by gross congenital malformation.

## 9.1CAUSATIVE ORGANISMS

* *neisseria gonorrhoeae*
* *chalmydia trachomatis*
* *staphylococcus aureus*
* *Escherichia coli*
* *Haemophilus influenza*
* *Streptococcus pneumonia*
* *Pseudomonas .spp*
* *Klebsiella*

## 9.2 CLINICAL FEATURES

* Eyes have sticky watery discharge
* Eyes are slightly red
* Oedematus eyelids
* Yellow purulent discharge if the infection is by *N.gonorrhoeae*
* Inflamed conjunctiva

## 9.3 NURSING MANAGEMENT

* All perinatal mothers presenting with vaginal discharge suggestive of gonnorrhoae should be treated before delivery.
* Correctly swab the baby’s eye at birth.
* Instill 1% tetracycline ointment (TEO) to all babies prophylactically.
* All infected babies should be isolated
* Take eye swab for culture and sensitivity
* Administer drugs such as;
* Gentamycin eye drops
* TEO but not systemic tetracycline
* Penicillin eye drops
* Kanamycin eye drops
* Swab the eyes with warm saline 3 times a day from inside outwards
* Administer some broad –spectrum systemic antibiotic but not tetracycline because it deposits in bone leading to depressed bone growth.

## 9.4 COMPLICATIONS

Partial or permanent blindness

# 10.0 NEONATAL JAUNDICE

This is condition in neonates characterized by yellow discoloration of the skin, sclera and mucous membrane. It develops when there is an excessive bilirubin level in the blood stream. When there is increased rate of haemolysis of RBC or decreased conjugation, there are high amounts of free bilirubin in circulation leading to jaundice.

## 10.1BILIRUBIN METABOLISM

When RBC’s are broken down by haemolysis, they produce heme and globulin. The heme part produces bilirubin and iron. Unconjugated (indirect) bilirubin is fat soluble hence has to be converted to water soluble form (conjugated/ direct bilirubin) by process of conjugation for it to be excreted. Conjugation of bilirubin occurs in the liver and thus it has to be transported to the liver by binding to transport protein, albumin. On arrival to the liver, bilirubin detaches itself from the albumin.

Conjugation is done by glucoronly transfares in which bilirubin is added to glucoronic acid to become bilirubin Diglucoronide that is water soluble. Excretion of the bilirubin is done through the biliary system into the intestine. While in the intestine, it is converted to stercobilinogen by the gut normal flora and excreted in stool. Some of it is absorbed from the gut and becomes urobilinogen which is excreted in urine.

If conjugation process is interfered with, there will be accumulation of unconjugated bilirubin leading to hyper bilirubinaemia and jaundice. This bilirubin may cross the BBB and cause brain damage, a condition known as *kernicterus* that is characterized by seizure, hyper-tonicity, lethargy, and stiff neck with hyper extended head.

## 10.2TYPES OF JAUNDICE

### 10.2.1 PHYSIOLOGICAL JAUNDICE

This type of jaundice affects both preterm and term babies in the first few days of life. It is apparent with the signs on the third day when the unconjugated bilirubin levels in serum is 25-125 mmol/L. In term babies , it never appears before 24 hrs of life but it can be in pre terms and the serum levels never exceeds 200mmol/L. it is also self limiting in term babies.

## Causes

* Excessive haemolysis of RBCs greater than conjugation rate.
* Glucoronyl transferase enzyme deficiency
* Increased enterohepatic reabsorption
* Decreased albumin binding capacity thus less bilirubin is transported to the liver for conjugation.

## Nursing management

* Admit the baby into NBU and assess the general condition.
* Start early and frequent breastfeeding for it provides glucose to the liver cells and also encourages bowel colonization with normal flora which is important in formation of stercobilinogen for excretion in stool. It also leads to increased gut motility leading to faster excretion of bilirubin. Feeding also enhances enzyme production and conjugation.
* Closely monitor serum bilirubin levels at 12 -24 hrs interval.
* If bilirubin levels takes time to clear, put the baby on phototherapy.

## 10.2.2 PATHOLOGICAL JAUNDICE

This type of jaundice appears within 24 hrs of life and is not self- limiting thus may persist for long. There is rapid rise in serum bilirubin. It includes both obstructive and haemolytic jaundice.

## Causes

They include pathological disorders that increase bilirubin production, reduces transportation to and fro the liver or reduced rate of conjugation.

1. Increased haemolysis –Rhesus and ABO incompatibility, G6PD enzyme deficiency, bacterial septicaemia.
2. Non- haemolytic causes of increased unconjugated bilirubin –CNS hemorrhage, cephalo haematoma, polycythaemia, exaggerated enterohepatic circulation of bilirubin due to fuctional ileus.
3. Decreased rate of conjugation –Criggler Nagar syndrome, Gilbert’s syndrome
4. Hepatotoxic drugs
5. Billiary obstruction that prevents transport of conjugated bilirubin to GIT for excretion
6. Reduced bilirubin binding sites to the albumin.
7. Malnutrition
8. Increased reconversion of conjugated to unconjugated bilirubin if it stays in the GIT for long.

## Nursing management

* Assess the baby to determine the degree of jaundice.
* Do investigation on serum bilirubin levels and Hb.
* Start the baby on phototherapy.
* Order for blood exchange transfusion if necessary.

## 10.3Complication of neonatal jaundice

* Retinal damage due to lights used in treatment
* Anemia
* Hyperthermia associated with phototherapy.
* Hypocalcaemia
* Kernicterus

NB:read more on obstructive and haemolytic jaundice

## 10.4 TREATMENT MODALITIES OF NEONATAL JAUNDICE

 There are three main modalities namely;

* Phototherapy
* Blood exchange transfusion
* Protoporphyrins

## 10.4.1 phototherapy

Phototherapy prevents bilirubin levels from going high enough to cross BBB and cause kernicterus

### Mechanism of action

Blue florescent light at a given wave length is absorbed by the unconjugated bilirubin in the skin and superficial capillary and is converted into conjugated bilirubin which is water soluble and can be excreted in stool and urine.

### Indications

* Pre term with jaundice appearing after 48 hrs and bilirubin levels are 260 -265 mmol/L
* Pre term with weight less than 1500g and bilirubin levels are 85 -114 mmol/L
* Pre term with weight more than 1500g and bilirubin levels are 114-165 mmol/L

### Care of the baby on phototherapy

* Expose the whole body of the baby to increase surface area exposed to light
* Keep turning the baby 2hrly to expose all parts to the fluorescent light.
* Ensure the airway of the baby is patent by extending the head.
* Cover the eyes of the baby to prevent damage by direct ray of lights.
* When breastfeeding the eyes are unpadded to encourage eye contact with the mother.
* Provide intermittent phototherapy i.e. 6 hrs on and 6 hrs off but may be continous.
* Give phototherapy for 2-3days and assess the serum bilirubin levels twice or three times a day NB. Greatest reduction in bilirubin levels will be in the first 24 hrs of phototherapy.
* Observe the eyes for weeping or discharge.
* If phototherapy is continous, give extra fluids to prevent dehydration and maintain accurate input output charts.
* Change linen frequently because opening of bowels is increased(loose stool)
* Observe the feeding and sleeping behavior of the baby.
* Observation e.g. temperature to rule out hyperthermia and skin colour to monitor the progress.
* Top tail the baby to maintain hygiene.

## Side effects

* Loose stool due to rapid instinal transit
* Dehydration
* Hyperthermia
* Visual deprivation
* Poor feeding
* Fragility
* Lethargy
* Irritability
* Hypocalcaemia

## 10.4.2 BLOOD EXCHANGE TRANSFUSION

This is a treatment in which the baby’s blood is gradually removed and replaced by donor’s blood. It is used as a definitive treatment when bilirubin concentrations are approaching toxic levels. The baby has haemolytic disease or low Hb. The transfusion has the following benefits

-it helps in increasing the baby’s Hb

-excessive bilirubin and unwanted antibodies are washed from the babys circulation.

The donor’s blood used for the transfusion should be rhesus negative so that it does not alter the babys blood group and to ensure that no antigen ios introduced into the baby’s circulation that may lead to antibodies production. It should also be fresh and ABO compactible.

## Indications

* Infants with haemolytic disease.
* Preterms with bilirubin levels of 300 -400 mol/l
* Babies whose birth weight was less than 1500g and have bilirubin levels of 255mol/l
* Term babies with bilirubin levels above 100 mol/l at birth or later 400 -500 mol/l

## Care of the baby post transfusion

* Put the baby back to phototherapy to continue with it.
* Closely observe the baby for bleeding from the umbilical cord.
* If the baby was on infusion, continue for some time.
* Reassure the mother and involve her in the care of the baby.

## Complications

* Circulatory collapse
* Incompatibility reactions
* Acquired infections e.g. HIV, hepatitis B.

## 10.4.3 PROTOPORPHYRINS

These are heme oxygenase inhibitors which are administered to inhibit the breakdown of heme thus reduce bilirubin production.

They are usually used in combination with phototherapy and/or blood exchange transfusion.

## 10.4.4 Nursing diagnosis of children undergoing phototherapy

* Deficient fluid volume
* Imbalanced nutrition less than body requirements
* Impaired skin integrity
* Risk for injury
* Ineffective thermoregulation

# 11.0 HAEMORRHAGIC DISEASE OF THE NEWBORN

This bleeding occurs during the first fews days of life due to vitasmin K deficiency. Vitamin K is synthesized by the bowel normal flora and its role is to convert clotting factors such as prothombin, thrombokinase, thromboplastin. To prevent HDN the neonates are given *vitamin K 0.5-1 mg i.m.*

## 11.1 predisposing factors

* Hereditary factors- clotting factor defect e.g. haemophilia
* Prematurity
* Birth trauma
* Treatment with antibiotics
* Respiratory distress syndrome
* Disseminated intravascular coagulopathy (DIC)
* Birth asphyxia
* Mothers who are on drug such as warfarin, heparin and Phenobarbital

## 11.2 Clinical features

* Continuous oozing of blood from the umbilical cord
* There is a spontaneous bleeding from various parts of the body
* Bleeding in the mucous membrane of GIT and may present with maleana stool or haematemesis
* Continuous bleeding from any punctured blood vessel or injection site thus when looking for venous access avoid puncturing femoral or jugular veins which are the largest veins in the body
* Haematuria or omphalorrhagia

## 11.3 Nursing management

* Upon admission into NBU, administer vitamin K 0.5-1 mg i.m
* Preserve all linen soiled by blood for estimination of blood loss
* Administer vitamin K 1-2 mg to arrest bleeding immediately
* Observe vital signs TPR ¼ hrly
* If bleeding is severe, transfuse fresh blood or frozen plasma at 20mls/kg of body weight
* Obnserve for signs of shock and if present transfuse with packed cells and fresh whole blood at 75 -100mls/kg of body weight if the baby is term
* General management is like any other baby in the unit

## 11.4 Complications

* Anaemia
* Hypovolaemic shock
* Brain damage

# 12.0 BIRTH INJURIES

Birth injuries refer to trauma that a foetus sustains during birth. The structures commonly involved are muscles, nerves, bones, visceral organs and skin.

## 12.1types of birth injuries

1. Internal organ injuries – spleen, liver, adrenal glands
2. Nerve injury –mostly brachial plexus leading to Erb’s palsy
3. Soft tissue injury –intracranial haemorrage, skull fractures
4. Extracranial injuries –cephalohaematoma,caput succadenium.

## 12.2 predisposing factors

* Prematurity
* Large for dates
* Cephalo pelvic disproportion
* Malpresentation
* Congenital malformation e.g. hydrocephalus

**CAPUT SUCCADENIUM AND CEPHALOHAEMATOMA**

*Caput succadenium –* is an oedematous swelling due to accumulation of serum fluid under the foetal scalp. It results from pressure between the foetal skull and pelvic bones during delivery that leads to reduced venous blood and lymphatic drainage and part of the serum escapes into the tissues. The swelling is self – limiting and disappears within 36hours of life.

*Cephalohaematoma –*is accumulation of blood between the periosternum and the skull bone. It is caused by friction between the foetal skull bones and the pelvic bones e.g. in CPD

***Caput succadenium Cephalohaematoma***

Present at birth Appears after 12 hrs of life

Disappears within 36 hrs May persist for weeks

Diffuse and pits with pressure Circumscribed; doesn’t pit on pressure

May cross a suture line Never crosses a suture line

Double suture line is unilateral Double cephalohaematoma is bilateral

Tends to grow less with time Tends to grow larger with time

INTRACRANIAL INJURIES AND HAEMORRHAGE

This refer to the damage of structures within the cerebral hemispheres of the brain. Various structures may be injured leading to different types of haemorrhage:

* Cerebral tissue – injury to cerebrum leading to cerebral haemorrhage
* Cerebral hemisphere and basal ganglia –supra tentorial haemorrhage
* Veins of gallen and tentorium – subarachnoid haemorrhage
* Falx cerebri (fold of dura mater and tentorium cerebelli) –subdural haemorrhage

PREDISPOSING FACTORS

* Prematurity
* Excessive moulding
* Instrumental delivery
* Hypoxia that leads to engorgement of blood vessels
* Precipitate labour
* Prolonged labour
* Large babies

CLINICAL FEATURES

* Dyspnoea
* Asphyxia
* Rolling of the eyes
* Pallor of the skin and mucous membranes
* Bulging of the anterior fontanelle due to increased intracranial pressure
* Shock due to circulatory collapse
* Twitching of the facial muscles if facial nerve is affected
* Cyanosis
* Grunting respirations
* High pitched cry
* Rigidity of limbs

## 12.3 GENERAL MANAGEMENT OF BIRTH INJURIES

* Intraparetally, predisposing factors should be diagnosed and managed early e.g. preterm labour, malpresentation, prolonged labour.
* Observe the baby closely for skin colour, twitching, rolling of the eyes, convulsions
* Keep the baby warm
* Administer Vitamin K 0.5 -1 mg i.m for they are predisposed to haemorrhage
* Maintain 2 hrly turning of the baby
* Provide intermittent oxygen therapy PRN
* Give IV fluids e.g. 10% dextrose for the first 24 hrs then introduce oral feeds if the condituion improves
* Give symptomatic management
* Have resuscitative equipment ready in case of an emergency
* Administer anticonvulsants e.g. Phenobarbital prophylactically

## 12.4 COMPLICATIONS

* Musculoskeletal deformities
* Brain damage
* Respiratory distress
* Hyperbilirubineamia
* Hypoglycaemia

# 13.0 HYDROCEPHALUS

This is a condition where ther is accumulation of CSF within the ventricles of the brain with the resultant increased ICP and enlargement of cerebral ventricles. It can be detected prenatally by ultrasound and in labour they may present by breech presentation, fontanel and sutures are very wide on VE.