PRIMARY HEALTH CARE

A MANUAL FOR MEDICAL STUDENTS AND OTHER HEALTH WORKERS

DEPARTMENTS OF PAEDIATRICS AND CHILD HEALTH, UNIVERSITIES OF DAR-ES-SALAAM, MAKERERE, NAIROBI, AND ZAMBIA



EDITED BY: PROF. KOPANO MUKELABAI

FIRST EDITION

CONTENTS

Page		CHAPTERS AND AUTHORS
I.		Preface
III.		Acknowledgement
V.		Message from Dr. Halfdan Mahler, Former Director General of WHO
1.	1.	PRIMARY HEALTH CARE Profs. Donald and Elizabeth Hillman
9.	2.	EARLY CHILDHOOD DEVELOPMENT Dr. Emmanuel Munubhi
25.	3.	CONCEPT OF GROWTH MONITORING AND PROMOTION Dr. Jessica Jitta
42.	4.	CHILDHOOD IMMUNIZATION Dr. Oliver Lulembo
60.	5.	NUTRITION Dr. Andrew Mbewe
80.	6.	ACUTE DIARRHOEA IN CHILDREN MANAGEMENT AND PREVENTION Prof. Kopano Mukelabai
95.	7.	ACUTE RESPIRATORY INFECTIONS Prof. Francis Onyango and Dr. Ezekiel Wafula
105.	8.	MALARIA IN CHILDREN Prof. Roger Mbise and Dr. Isaacs
121.	9.	ESSENTIAL DRUGS AND RATIONAL USE OF ANTIBIOTICS Dr. Jessica Jitta
134.	10.	POISONING, ACCIDENTS AND CHILD ABUSE Dr. Ruth Nduati
152.	11.	AIDS IN CHILDREN Dr. Mutinta Nyumbu
170.	12.	HEALTH EDUCATION Dr. Dan Njai
188.	13.	MANAGEMENT AND HEALTH ECONOMICS Dr. Esther Mwaikambo

PREFACE

This manual is designed to meet the learning needs of medical students and other health workers, to achieve competence in the understanding and management of priority problems in Primary Health Care in Zambia, Uganda, Tanzania, and Kenya. It is applicable to other countries with similar problems.

Each chapter of the manual, has objectives related to an important Primary Health Care topic, and defines the knowledge, skills and attitude required to meet these objectives.

The manual is intended to supplement paediatric texts and reference material, and is a targeted aid to Primary Health Care problem solving both in tertiary and Primary Health centres, which should both be the major sites for relevant health learning.

Some of the chapters contain case illustrations designed to facilitate learning by presenting real-life problems relevant to the topic.

The manual contains self evaluation questions and a list of objectives. Other learning materials supplied by other institutions and organizations like W.H.O., UNICEF, etc. may be very useful. For the manual to be of continuing value, the students and the teachers must add relevant details of priority health problems in their region with particular focus and emphasis on the overall child health programmes. This should include collaborative emphasis on links between the training programmes and the country's health care system, both governmental and non-governmental.

In order to adapt to the rapidly changing field of primary health care teaching, revisions and additions to the problems presented here, must be developed by teachers and students to reflect changing priorities and approaches.

THE PHC/EA PROJECT

The Primary Health Care East Africa Project is a collaborative programme between departments of paediatrics and Child Health of the Universities of Zambia, Uganda, Tanzania and Kenya that is funded by the Canadian International Development Agency (CIDA).

The major strategy of the Project was to develop a group of skilled faculty teachers who will provide leadership in PHC teaching in their own Universities, and by meeting together they will improve their teaching skills in this important area and collaborate in the development of appropriate health learning materials focussed on the priority health problems of this region. This manual is the result of collaboration between the four universities.

The project has achieved the support of the Deans of Medical Schools, as an effective step in strengthening the PHC content of the whole curriculum, recognizing that for PHC to become an integral part of Health Sciences teaching, it must be accepted as the responsibility of all faculty members and all departments.

Department of Paediatrics and Child Health

University of Dar-es-Salaam P.O. Box 65001 Dar-es-Salaam **TANZANIA**	Makerere University P.O. Box 7072 Kampala **UGANDA**	University of Nairobi P.O. Box 19676 Nairobi **KENYA**	University of Zambia P.O. Box 50110 Lusaka **ZAMBIA**

ACKNOWLEDGEMENT

The editor wishes to thank the Canadian Government for providing the crucial financial support through CIDA (Canadian International Development Agency) to the Primary Health Care East Africa Project. Special thanks to Memorial University of Newfoundland, which was the Canadian collaborating medical school, and its two dedicated faculty members Prof. Donald Hillman and Prof. Elizabeth Hillman.

I wish to acknowledge with thanks the strong support of the Universities of Zambia, Dar-es-Salaam, Nairobi and Makerere, which through their Principals and Deans, gave the widest latitude to their Chairmen of Departments of Paediatrics and Child Health and their staff and students, to successfully implement the Primary Health Care East Africa (PHC/EA) project.

Particular thanks go to the Chairmen of Departments of Paediatrics and Child Health and the Hilllmans, who together mooted the whole idea of PHC/EA. Their congeniality, and extreme dedication ensured the smooth implementation of the project's stated objectives.

To Prof. Gabriel Anabwani, the first programme manager of PHC/EA project, who worked so hard to overcome most of the teething problems encountered, I say special thanks, and thanks go to all our departmental Secretaries who bore the brunt of retyping the illegible manuscripts. Particular thanks go to Mrs. Jane Thairu, University of Nairobi for typing the draft manuscript on her ACER 910, and to Mrs. Beatrice Mwanamuchende and Ms. Shirley Kapapa of University of Zambia who typed the revised final manuscripts.

Finally my gratitude go to all our students and fellows whose constant quest for more knowledge was the prime mover for the production of this manual.

The following are thanked for contributing directly or indirectly to the manual:-
Prof. Donal Hillman, Memorial University, New foundland;
Prof. Elizabeth Hillman, Memorial University, New foundland;
Prof. Stuart Macleod, Dean, MacMaster University, Hamilton, Canada;
Prof. Vic Neufeld, McMaster University, Canada;

Prof. N. Bwibo, former Principal, University of Nairobi, College of Health Sciences;

Prof. H. Pamba. former Dean, Faculty of Medicine, University of Nairobi;

Prof. W. Makene - former Dean, Muhimbili Medical Center, Dar-es-Salaam ;

Prof. G. Mwaluko, former Dean and Director General, Muhimbili Medical Centre, Dar-es-Salaam;

Prof. J. W. Mugerwa, Dean Faculty of Medicine, Makerere University;

Prof. R. Owor - Former Dean, Faculty of Medicine, Makerere University;

Prof. Julius Meme, former Chairman, Dept. of Paediatrics and Child health, University of Nairobi;

Prof, F. Onyango, Chairman, Dept. of Paediatrics and Child Health, University of Nairobi;

Prof. R. Mbise, former Chairman, Dept. of Paediatrics and Child Health, University of Dar-es-Salaam;

Dr. E. Mwaikambo, Chairman, Dept. of Paediatrics and Child Health, Muhimbili Medical Center, Dar-es-Salaam;

Prof. C. Ndugwa, Chairman, Dept. of Paediatrics and Child Health, Makerere University, Kampala;

Prof. K. Mukelabai, Dean and former Chairman of Department of Paediatrics and Child Health, University of Zambia, Lusaka;

Dr. Alfred Mutema, Nairobi

Mr. L. Dierick, Nairobi

Prof. Peter Kinyanjui, Common Wealth of Learning, University of Vancouver Canada;

UNICEF

All Primary Health Care East Africa Fellows

All Faculty members of departments of Paediatrics and Child Health at Universities of Zambia, Dar-es-Salaam, Makerere and Nairobi.

Finally I wish to thank all my colleagues for their maximum cooperation and patience in implementing the PHC/EA project to the end. This manual lends credit to your dedicated and excellent efforts.

Prof. Kopano Mukelabai

Programme Manager

PRIMARY HEALTH CARE, EAST AFRICAN PROJECT.

30th May 1992

A MESSAGE FROM THE FORMER DIRECTOR GENERAL OF THE WORLD HEALTH ORGANIZATION.

World Health will improve only if the people themselves become involved in planning, implementing and having a say about their own health and health care. But involvement will not just happen.

How serious are we about involving individuals, families and communities? Are we prepared - mentally and professionally - to listen to their concerns, to learn from them what they feel is important, to share with them appropriate information, encourage and support them? Are we ready to assist them in choosing from alternative solutions, in setting their own targets and evaluating their efforts?

In many cases, so far, the answer is No. We can go on and on developing plans: nothing will happen unless all health workers, all health managers, and key professionals in other sectors come to realize what is at stake.

First, health workers must understand that the concept of primary health care involves new roles for them, and a new outlook. Not only should we be concerned with disease prevention and control, we must also be concerned with health promotion and care. And not least with development in general - and with people. Our health technologies must be based on what the people themselves want and need. In other words, the worker should learn first and foremost to act as a 'facilitator' of action by individuals, families and communities. We must stop trying to fit communities into systems and programmes that we devise, without a real and deep feeling for the social aspects of health problems, or the economic constraints - not to speak of the cultural dissonance that is often the backlash of such programmes.

Second, health workers must accept their new roles. They must accept new ideas, must be taken to try them out, to adapt them, to broaden their scope and innovate in the partnership approach. Their main concept must be to find ways of helping individuals and communities become self-reliant. It must be made clear that advocating self-reliance in Health matters in no way means

abdicating our responsibilities and passing them on to someone else. Both lay persons and professionals are essential. They cannot replace each other, but they must work together.

This brings me to my third point: health workers must have the necessary skills to perform these new roles effectively and to make efficient use of existing knowledge. This calls for a training force fully familiar with accumulated experience and keen to provide the kind and quality of professional preparation needed. It also calls for full backing from health managers for such training.

All health care workers must meet these requirements. This manual helps define the role of health workers in Primary Health Care. Your skills and commitment to this role will be of critical importance to the achievement of Health for All by the year 2000.

Halfdan Mahler
Former Director General,
W.H.O.

CHAPTER 1

PRIMARY HEALTH CARE.

INTRODUCTION.

> "A health system based on PHC cannot be realized, cannot be developed, cannot function and simply cannot exist, without a network of physicians and hospitals with responsibilities for supporting primary health care, promoting community health development action, basic and continuing education of all categories of health personnel, and research"
>
> Halfdan Mahler
> Former Director General, W.H.O

Primary Health Care has come a long way since Alma Ata in 1978 when it was accepted as the means to achieve "Health for All" by the year 2000. Many thought that if more inexpensive and simple health services were provided to the people, they would be healthy. Years were wasted in defining primary health care. Many equated it to primary medical care. Other experts suggested doctors had no place in primary health care in developing countries, while some argued that only doctors with special training in public health and community medicine could help to achieve "Health for ALL".

It is now recognized that the goals of Health for All can be reached if all physicians and indeed all health workers have the necessary PHC skills, knowledge and attitudes and recognize their own particular role in helping communities solve their health problems.

OBJECTIVES

At the end of this chapter you should be able to:

1. Define the concept of Primary Health Care expressed in the Declaration of Alma Ata.
2. List the 8 essential elements of Primary Health Care and the 2 additional elements added by the Government of Kenya.
3. List 8 characteristics of Primary Health Care.
4. Differentiate "community involvement" from "participation and compliance of a community" in development projects.

(A). DEFINITION OF PRIMARY HEALTH CARE

The Declaration of Alma Ata States:

"Primary Health Care is essential health care based on practical, scientifically sound and socially acceptable methods and technology, more universally accessible to individuals and families in the community, through their full participation and at a cost that the community and country can afford to maintain at every stage of their development, in the spirit of self-reliance and self-determination. It forms an integral part both of the country's health system, of which it is a central function and main focus, and of the overall social and economic development of the community".

LEARNING EXPERIENCES.

1. Read the Declaration of Alma Ata, WHO, 1978, Report of the International Conference on Primary Health Care
2. Visit your local UNICEF and WHO offices, to become familiar with existing PHC programmes and available reference materials.
3. Visit your country's Health Learning Materials Programme Centre to become familiar with these resources.

(B) ESSENTIAL ELEMENTS

The essential elements of PHC include at least the following 8 components:

1. Maternal and Child Health Care, which include family planning and all the services provided in antenatal and under-five clinics;
2. Education concerning the prevailing health problems and the methods of preventing and controlling them given in the language the people understand;
3. Drugs that are included in Essential Drug programmes to treat the majority of illness of people;
4. Immunization against the major infectious diseases;
5. Common disease management including treatment and prevention of injuries;
6. Indigenous disease treatment and control;
7. Nutrition support with promotion of breast feeding and good food supply;
8. Environmental sanitation and an adequate supply of safe water.

The first letter of each of these elements together form the word M E D I C I N E, a mnemonic that may be helpful to remember the basic elements of PHC.

As primary health care has evolved other elements have been added. In Kenya MENTAL HEALTH and DENTAL HEALTH are included in the national PHC programmes.

(C). THE CHARACTERISTICS OF PHC

The PHC philosophy has a political dimension with the following underlying principles:

1. Equitable Distribution - health services must be equally accessible to all people including rural and isolated population and periurban dwellers.
2. Community Involvement - active participation by the community in their own health decisions is essential. This type of involvement goes beyond collaboration and the possible acceptance of programmes imposed from without and implies a true partnership in which the community is involved in all phases from planning to evaluation.

3. Focus on Prevention - preventive and promotive services become a central focus of health care and the physician's leadership in this area is essential. It is said that Chinese doctors of old, were paid only when their clients were well, and payment stopped when a patient became sick.

4. Appropriate Technology - the methods and materials used in the health system should be available, affordable and sustainable. The concept of appropriate technology is to enable people to do things for themselves with their own resources. Appropriate technology is most needed in nutrition and food production, maternal and infant care, immunization, water and sanitation and information - education - communication. Many procedures in health and development which were formerly considered to be too complex except for use by trained health workers are now to be found at family and village level.

Growth monitoring, routine antenatal care, normal childbirth, preparation of local weaning foods, protection and provision of water supplies and safe disposal of excreta can all take place efficiently at family and village level, using:-

appropriate technology and appropriate training, that are socially acceptable and relevant.

For technologies to be appropriate, they must be affordable, sustainable and available to the community. The physician must be fully aware of the PHC approach to the health problems in their countries. For example in the case of Malaria the following may be of value:-

(a) Using screens and nets;
(b) Filling ponds and standing water;
(c) Using insecticide sprays and dips for nets, curtains etc;
(d) Placing special fish, eating mosquito larvae in ponds;
(e) Cutting grass and brushes near houses;
(f) Making anti-malaria drugs readily available.

The multisectoral approach - Health is an integral part of development, requiring the co-operation of many sectors of society including nutrition, education, water development,

agriculture, social services and women's affairs,local government, housing and information. Interministerial councils and collaboration with non-governmental organizations (NGO's) play an important role in the intersectoral approach to health. Effective intersectoral collaboration is frequently mobilized during major disasters and emergencies. The physicians should be able to promote such collaborations to meet priority health problems. These may include the quiet emergencies of chronic malnutrition, inadequate educational opportunities particularly for girls and lack of effective sanitation and safe water. In all intersectoral activities, the importance of communication by both traditional and non-traditional means must be stressed.

Decentralization:- Essential to an effective primary health care approach is decentralization to strengthen the District Focus approach. This strategy provides the best opportunity for identifying the underserved and for integrating all the interventions needed to improve the health of the entire population.

Accessibility:- In order to establish effective health promotion and disease prevention, health services must be readily accessible to the people.

Leading:- The importance of leadership in the development of new values and systems in society is recognized as an essential principle of PHC. The physician has the opportunity and the moral obligation to assume leadership in health but to do so the concept of PHC must be brought into the mainstream of medical education. In this way the physician of the future will be fully informed about health for all, able to communicate it to others and identify not only the central issues, but also his own personal role in resolving vital health problems. It is in this way that the physician will be able to initiate change, involve and mobilize others into the creation of networks and support systems necessary for effective community leadership in health.

Women in Development:-

is an important principle of PHC which has become a focus for world-wide development projects. The beneficial effect of increased female

education on the nutrition of the infant and the whole family and on the acceptance of government policies of immunization, and child spacing and family planning has been clearly established.

Child Survival and Development Revolution:-

(CSDR) consists of a group of simple cost-effective health strategies to combat some of the major diseases of childhood in the developing world. UNICEF has been instrumental in facilitating the widespread use of these strategies which can be remembered by the mnemonic GOBIFFF.

* G is growth monitoring
* O is oral rehydration
* B is breast feeding
* I is immunization
* F is food supply
* F is female education
* F is family spacing

Several of these strategies are considered in detail elsewhere in this manual and have proven to be highly effective in reducing mortality and morbidity of children under 5 years of age. As a physician you should be very familiar with this approach and be prepared to teach these interventions to other health workers and to design and undertake useful operational research. You should be able to critically assess the proposed interventions, to measure their impact on disease and identify constraints limiting the achievement of objectives. Very worthwhile studies of the impact of community applications of child survival strategies have been carried out by medical students during their long vacations. These have proven to be useful and profitable hands-on learning experience in PHC.

A new strategy of PHC is that of integrating child development initiative into existing child survival strategies. The physician is in a position to integrate the concept of the psycho-social and biological development of children. In order to do this the medical student must learn to

understand the interrelatedness of biological, nutritional, physical and socio-emotional risk factors on the development of the child.

The physician thus can contribute to the community, by supporting early childhood development programmes such as day care centres and pre-schools, in order to validate the parents' knowledge and self confidence, to meet the needs of developing children, which depends on positive interaction between children and the adults who feature in their lives.

The Primary Health Care Project concept emerged from a series of ideas appraised in 1978 in the Declaration of Alma Ata. In the 14 years that have elapsed, the PHC concept has evolved and gone well beyond these original ideas to become a powerful integral part of our countries' health and development system.

Physicians have a vital leadership role to play in Primary Health Care. To do so they must be fully informed of the characteristics and elements of PHC, the existing programmes and define their own personal role in a changing health system.

Medical Education worldwide is adapting to this changing system and becoming more relevant to the needs of society. Medical students must learn PHC strategies, develop skills in communication and health education and in the management of primary health care services.

Medical training must focus more on health promotion and disease prevention and still develop competence in the management of disease. Medical students must be prepared to meet the prerequisites of effective team work and acquire much of their training in the communities they will serve.

James Grant the Executive Director of UNICEF said in the address to the World Conference on Medical Education in Edinburgh in August 1988.

" The medical school of today without a commitment to its community, comparable in importance to the focus of the University Teaching Hospital, is abrogating its responsibilities not only to society, but also to the doctors and other health professional which it trains".

CHAPTER 2

EARLY CHILDHOOD DEVELOPMENT

Early childhood, the first 5 to 6 years, is critical for the foundation of intellectual, personality and social behaviour which are developed in successive periods of life. It is also in early childhood that children develop proportionately more than in any comparable period in the rest of their lives, therefore a sound knowledge of growth and development in early childhood, is essential for all health workers, to ensure early detection of correctable developmental problems and hence guarantee optimal growth and development.

OBJECTIVES.

At the end of this chapter, the student should be able to:-

1. Define development;
2. State the principles of development;
3. Explain the biological basis of development;
4. State the facts which influence development;
5. Assess the development of a child;

LEARNING ACTIVITIES.

1. Visit a newborn unit. Observe a term infant's posture in supine, prone and ventral suspension positions and record your observations;
2. Visit a child welfare clinic. Observe the control of eye muscles, of facial muscles for smiling and of neck muscles for head lifting and turning, in infants, aged one, two and six months respectively;
3. Assess the development of one and three year old children by history and observation.

DEFINITION OF CHILD DEVELOPMENT.

It is the progressive acquisition by a child, of increasingly complex skills necessary for successful living. The four major skills are motor, intellectual, emotional and social. The development in all these areas occurs simultaneously and influences each other.

PRINCIPLES OF CHILD DEVELOPMENT.

It is governed by principles which provide a useful point of departure in understanding and dealing with an individual child or group of children (2).

1. Development occurs continuously throughout life;
2. Development occurs in an orderly sequence of stages which is the same in all children. Each stage is an out growth of the preceding one and provides a foundation for the subsequent ones. An example of the orderly sequence is acquisition of head control, sitting with support, sitting without support, standing alone, walking and finally running;
3. The rate of progress through the sequence, and quality of achievement vary from one individual to the other. So some normal children develop more slowly while others do so more rapidly, but each develops at a constant individual rate which reflects his unique interaction with the environment and explains the wide age ranges within which normal children achieve various skills. For example walking may be achieved at anytime from 9 to 18 months. In evaluating an individual child's development, it is necessary to consider both his individual rate of development and how his development compares with the normal for that population. Hence parents should avoid comparing one child with another.
4. Development proceeds concurrently in two directions, cephalocaudal (head to toes) and proximodistal (trunk to fingers and toes). The sequence or progression up to running, mentioned earlier, is an example of the cephalocaudal direction of development. Control of the arm by the shoulder muscles before control of wrists and hands illustrates

proximodistal progression. Cephalocaudally and proximodistally, different muscle groups come under control in different quarters of the first years, postural control preceding the acquisition of motor skills in each part. Eye tracking of objects is achieved first and later control of facial muscles for smiling and of the neck muscle for head lifting as well as head turning are achieved. In the third quarter control of facial muscles for sitting and of the forearm and hand muscles are achieved. Finally, in the last quarter, the leg muscles come under control, first for standing erect holding onto furniture and somewhat later for crawling;

5. Development proceeds from the general responses to more specific ones. For instance, on seeing a toy, an infant initially displays whole body movement which is subsequently replaced by grasping the toy with one hand. Further, a 6 month old infant shows pleasure by kicking his legs, waving arms and breathing rapidly while an older infant uses mere facial expression to show his pleasure.

BIOLOGICAL BASIS OF DEVELOPMENT.

Normal development is biologically a result of the continual interaction between heredity and environmental factors (3,4). Heredity sets the limits of the maturation of the nervous system which is most rapid in the intrauterine life and in the first four years of life. This rapid maturation is reflected in the size of the brain which is one third of the adult size at birth, one half at six months, two thirds at one year, three quarters at eighteen months and four fifths at four years. At birth the visual and hearing cortical areas are developed. Cortical development is about half complete at six months and three quarters complete by two years. The motor areas controlling the upper trunk, arms, wrists and hands develop in the first six months while those controlling the legs are not well developed into the second year. An essential element of maturation is myelinization. At birth the myelinization of the cranial nerves and subcortical centres is complete. The myelinization of the corticospinal tract begins soon after birth,

proceeds gradually in a craniocaudal and proximodistal progression, and is nearly complete by two years. The myelin sheath provide protection of the nerve fibre, the insulation which allows the impulse to travel rapidly without diffusion.

FACTORS INFLUENCING DEVELOPMENT.

The environmental factors which influence development may be favourable or unfavourable (4). The favourable environmental factors include:-

1. Adequate stimulation (verbal, toy manipulation);
2. Opportunities for practicing physical, language and social skills;
3. Adequate nutrition;
4. Protection from accidents;
5. Proper methods of teaching and reading;
6. Feeling of security engendered by prompt and consistent satisfaction of the child's needs;
7. Supportive society;
8. Supportive culture;
9. Stimulating school experience.

All those caring for children should serve as advocates of community based initiative that enhance optimal early childhood development. Such initiatives include parents education, child day care centres and child-to child programmes.

Unfavourable factors, over-stimulation or under-stimulation may all delay development. Under-stimulation is likely to occur in orphanages.

Development stimulation intervention before two years of age, may significantly raise the intelligence quotient of the high risk children (5). Parents should be encouraged to provide stimulating care for their children from birth onwards.

MOTOR DEVELOPMENT:

This is gradual acquisition of the ability to use voluntary muscles purposefully in bringing about control of body posture, gross motor behaviour, fine movements as well as care of one's biologic and physiologic needs (2,3,4,6). After the achievement of control of posture, motor development occurs through a steady improving of sensory, neural and muscular activities.

GROSS MOTOR DEVELOPMENT

At birth: The newborn displays certain reflexes such as:- Moro reflex, routing reflex, sucking reflex, swallowing reflex,, tonic neck reflex, stepping reflex and grasp reflex.

A newborn: Maintains a predominantly flexion posture with clenched fists due to dominance of flexor muscles over the extensor muscles so that his hands, arms and legs can be extended for measuring only with considerable difficulty. In prone position, the newborn turns his head to one side to avoid suffocation, he has his elbows flexed and he has his knees flexed and drawn under the abdomen so that the pelvis is raised. In ventral suspension, he flops his head downwards and he has some extension of the hips for lack of head control. The newborn's movements are coarse and jerky.

At six weeks: The infant still maintains a predominantly flexed posture, displays movement which are still gross and purposeless but he now opens the fists most of the time. In prone position, he raises the head intermittently, still raises the hip and keeps the legs extended backwards. In ventral suspension, he raises the head to the same level as the trunk, flexes the elbow, extends the hip slightly and flexes the legs. In supine position he may be in a tonic neck posture with arm and leg on the same side towards which the face is turned are extended while the opposite limbs are flexed.

At three months: Most infants display good head control. In a prone position, he raises the head and chest for prolonged periods as weight is born on forearms and he extends the hips fully. In ventral suspension, he raises the head to look forward for prolonged periods and has limbs only slightly flexed. In supine position, the infant displays a markedly diminished flexion of the limbs and his movements are smooth and more controlled. In a sitting position he holds the head erect.

At four months: The infant in a prone position holds the head in a vertical position and turns it from side to side while he raises the chest off the couch.

At six months: He sits up with the trunk curved when supported. He rolls from supine to prone position and vice versa. When held standing, he can bear almost all his weight and he bounces with pleasure.

At eight months: He sits momentarily without support.

At nine months: He sits steadily without support, he leans forward while sitting and he recovers balance. He readily changes from sitting to prone position. He stands holding on to the furniture. He can pull himself to standing position, but is unable to let himself down smoothly, he lets himself down briskly with a bang on the floor. Also at nine months he crawls on his abdomen pulling himself with the hands.

At ten months: While in a sitting position, he can reach for an object without stopping, he crawls on hands and knees with abdomen off the couch. He walks holding on to furniture and with two hands held.

At one year: The infant walks with one hand holding.

At 13 months: The child walks without support with a broad base and steps of unequal direction and length usually with arms abducted and elbows flexed.

At 15 months: He can sit himself in a chair, he creeps upstairs, he gets into standing position without help, he kneels without support and he walks along with frequent falls.

At 18 months: He sits on a small chair, he is able to bend in order to pick an object from the floor, he walks up and down the stairs holding on to the rail, he walks up the stairs with one hand held, he pushes and pulls wheeled toys, he walks carrying a toy, he throws a ball in a standing position, he runs stiffly and he begins jumping on both feet.

At 2 years: He runs well without falling. He walks up and down the stairs two feet per step. He picks up objects from the floor without falling. He kicks a ball without overbalancing. He squats to play with an object and then rises again. He climbs on to furniture.

At two and half years: He jumps well on both feet and he can walk on tiptoes.

At three years: He jumps up the stairs with alternation of feet, he goes down the stairs still placing both feet on each step. He rides a tricycle.

At four years: He goes down the stairs with alternation of feet, he hopes and skips on one foot, he skips with alternating feet, he slides, he dances rhythmically to music and he swings.

At 6 years: He displays advanced throwing and he stands on each foot alternately with eyes closed.

Fine motor development: Is the acquisition of increasingly complex ability to use one's fingers. It requires integration of vision and finger movements.

At birth: The infant fixates on objects put in his line of vision, follows them visually from side to mid line. He keeps his hands predominantly closed and he manifests a grasp reflex.

At one month: The infant is able to follow moving objects through an arc of 180° he now keeps his hands open most of the time and he still has a grasp reflex which is diminished.

At three months: He looks at his hands and object. The grasp reflex disappears. He momentarily holds objects placed in his hands. With disappearance of tonic neck reflex, he brings his hands to the midline and the mouth for oral exploration which stops between 13 and 15 months. He pulls at his dress. He attempts to grasp objects but he misses them.

At six months: He holds a bottle. When supine he holds his feet and puts them in the mouth. He picks small cubes using thumb-palm grasp. He reaches for offered objects. He grasps an object and drops it when another is offered. He enjoys dropping objects. He may bang objects on the table or nearby objects. He transfers objects from one hand to the other.

At seven months: He promptly sees the pellet, he pursues it with raking movements of the finger but he is unable to pick it up.

At eight months: He uses unidexterous approach. He retains one cube when a second one is offered. He crudely grasps small objects between thumb and fore finger.

At ten months: He picks an 8 mm pellet with assisted pincer grip. He points at objects with forefinger. When he falls forward or sideways he extends arms reflexly in a protective response. he uncovers a hidden toy. He attempts to retrieve a dropped object.

At one year: He neatly and precisely picks pellets with unassisted pincer movement of thumb and index finger. He may pick up blocks into each hand simultaneously, inspect them, bring them together for comparison and knocks them together. He releases a pellet into the hand of one requesting it. He holds a cup to drink, tries to feed, he tries to brush the hair and he cooperates in dressing.

Between 12 and 15 months:

He casts objects onto the floor and ceases doing so by 15 - 18 months.

At 15 months: He builds a tower of two or three cubes on demonstration. He can drink from a cup. He is able to put a pellet into a small bottle.

At 18 months: He builds a tower of 3 - 4 cubes. He feeds self without tipping the spoon or spilling. He scribbles, dumps a pellet from a bottle and imitates vertical lines.

At two years: He builds a tower of 6 - 7 cubes, he turns door knobs and unscrews lids, he holds a book and turns pages one at a time, he puts on shoes, socks and pants but may put them on the wrong foot, he can empty wastebaskets.

At two and half years: He builds a tower of 8 cubes. He makes horizontal and vertical strokes. He wears clothes with front back.

At three years: He builds a tower of 9 - 10 cubes. He imitates construction of a bridge of 3 cubes. He holds a pencil in a conventional way. He copies a circle and imitates a cross. He begins to throw a ball and catches it with arms straight when it is well directed. Dresses and undresses fully if helped with buttoning and choice of correct shoe. He begins to manage buttoning and unbuttoning. He gets cups and saucers from the cupboard and sets the table.

At four years: He imitates a gate of 5 cubes, he eats with spoon and knife. He cuts with scissors. He builds a 3 cube pyramid. He copies a cross and a square. He draws a man with 2 - 4 parts besides the head (2 limbs and 2 eyes). Only occasionally does he make mistakes in dressing. He still cannot manage back buttons. He washes in the bath. He names the longer of the two lines.

At five years: He copies a triangle. He draws a recognizable person with details and a house with door and windows. He ties shoe laces. He

names the heavier of two weights. He dresses self fully. He brushes his teeth. He washes without wetting his clothes.

At six years: He copies the diamond. He makes steps with cubes. Intellectual development embraces perception cognition and language development. Perception encompasses use of sense to gain immediate awareness of what is happening outside ourselves. Cognitive development consists of growing ability to apprehend the relationships and to respond in terms of those relationships. Language involves development of ability to communicate, speech being the most obvious means of communication. Perception, cognition and language are intimately interwoven. Intellectual development enables a child to understand the environment. It has been shown that developmental stimulation intervention before two years of age may significantly raise the intelligence quotient of the high risk children.

At two years: A child:- names 2 - 5 pictures, points to 5 pictures, gives and takes objects on cue and matches 2 colours.

At three years: A child counts 3 objects correctly, names 8 pictures, can state his age, knows his sex, matches 2 or 3 colours, can classify by colour and size and repeats 3 digits.

At four years: The child counts up to four by rote, gives two sticks from a pile of four, understands time elements such as today and tomorrow, knows days of the week, makes a string of wooden beads, knows what to do if sleepy, hungry or cold.

At five years: The child counts up to ten and recites higher numbers by rote, knows his right and left hand and can classify objects.

SPEECH DEVELOPMENT

This is acquisition of usage of words of the language to which the infant is exposed. It depends on hearing ability, normal nervous system, normal intelligence and verbal stimulation. To provide verbal stimulation, the parents should speak clearly, narrate stories to children, sing to children, avoid laughing at the child's mistakes and avoid baby talk. Talking to children and getting them to talk back is an important means of promoting their intellectual and social development.

At birth:	The infant cries and he notices a sound. To loud noises he responds with a blink, moro reflexes or a cry;
At two months:	He notices both the sound and the speaker and may smile;
At three months:	He enunciates vowel sounds (ah, eh, and ugh, he laughs);
At six months:	He utters distinct syllables (kah, mah, tah, etc);
At nine months:	He babbles using a string of sounds (dah-dah-dah-mah-mah-mah-) apparently for playing with sounds. He understands no no as well as bye bye and he imitates many sounds or words. The deaf children do to progress beyond the babbling stage;
At twelve months:	He knows one word besides mama or dada, he turns on hearing his own name and he shakes his head for no;
At fifteen months:	He uses six nouns. He follows a simple command and he may name a familiar object;
At eighteen months:	He uses ten words;
At two years:	He makes a two to three word sentence, he asks names of things, he names two to five objects;
At two and half years:	He knows full names he uses pronouns I, me, you and mine, he enjoys listening to stories. Names five common objects;

At three years: He asks what, where and who questions, he knows his age and sex, he repeats three digits, he repeats sentences of six words. He names eight pictures and he names one colour;

At four years: He makes a four to five word sentence. He counts four objects, he knows his first name, he follows two commands, he recounts his recent experiences, he enjoys stories, and he names two to three colours;

At five years: He counts fluently and grammatically, asks for meaning of abstract words, he can print his first name if he is offered a chance to learn he names four colours, he begins to distinguish left from right and he makes six to seven word sentences;

At six years: He defines many words, he reads and he writes if he has been offered an opportunity to learn;

At seven years: He attains adult proficiency. Speech is acquired earlier in first borns and in girls and later in twins.

EMOTIONAL DEVELOPMENT:

This is acquisition of the skill to adjust to life situations which cannot be resolved immediately. Normal emotional development is dependent upon a feeling of security which drives from prompt and consistent satisfaction of the infant's needs by the mother. Parents therefore can foster emotional development by meeting the baby's needs promptly and consistently. Emotional development progresses from simple sense feeling (sensations) to complex emotion. The progression of emotional development is from general arousal to specific emotions (11).

Zero to one month: Newborn displays two feelings, pleasure and distress. As a reflex response to distress, (hunger, thirst, heat, cold, pain), the newborn cries and displays muscular tension until relieved;

At two months:	He shows delight with smiling and increased vocalization in response to a human face;
At three to four months:	He may stop crying on seeing the mother approaching or on noting evidence that his wants are about to be satisfied;
At five months:	He manifests anger;
At seven months:	He manifests elation, fear on being separated and fear of strangers;
At ten to eleven months:	He shows signs of affection and love for certain adults and shows distress on being separated from them;
At three years:	He may strongly express wishes and feeling towards others (love, anger, sympathy, sadness, surprise), accepts substitute toys which indicates improved frustration tolerance;
At one and a half years:	He manifests jealousy;
At two to three years:	He shows humour. He may show anxiety over the possibility of punishment or disapproval on failing to achieve the standards set by the family or self;
At four years:	He manifests shame, guilt, grief and anxiety. The appearance of shame and guilt indicate the development of conscience.

SOCIAL DEVELOPMENT:

Social development is learning to behave in ways approved by one's social group so that one can participate satisfactorily in that group. The learning occurs through observing the parents. In social and spiritual development it is the behaviour and not words of the parents that influence the child. The behaviour learnt in the social development include smiling, identification of persons as well as objects, feeding habits, sleeping habits, control of bladder as well as bowel functions, working and playing with others and adapting to the regulations imposed by the society.

At zero to two months:	Newborn elicits protective behaviour from the parents, by crying and he shows a preference for human faces;
At two months:	The infant smiles in response to gentle touch, vigorous physical stimulation, voice of human faces, apparently to entice caretaker to stay nearby;
At three months:	The infant shows pleasure in anticipation of being pulled to a sitting position by tossing his neck muscles or raising the head or doing both of these activities. He also cries less;
At four months:	He laughs in response to vigorous physical stimulation. he extends his arms and tries to raise himself when arms are extended towards him;
At five months:	He smiles at images of self in the mirror. He may cry on hearing a scolding voice and angry facial expression;
At seven months:	He prefers mother and may display fear of strangers;
At seven to nine months:	He pats at image of self in the mirror;
At nine months:	He waves bye-bye, he enjoys playing peek a-boo and pats a doll and responds to name;
At eleven months:	He repeats a performance laughed at and he shows interest when shown pictures in a book;
At one year:	He may kiss on request;
At thirteen months:	He kisses a mirror image;
At fifteen months:	He feeds self without help and uses a cup, he casts objects in play, he pats pictures, he indicates desire by pointing and he seeks help when in trouble or is wet;
At eighteen months:	He copies mother in dusting, washing and cleaning;
At ten to twenty months:	Bladder control begins;
At two years:	He plays in parallel for lacking sense of cooperation, he listens to stories with pleasure;

At two and a half years: He helps put things away. He is bowel trained and vocalizes toilet needs;

At three years: He plays cooperatively and is able to share his toys with others;

At four years: He begins fantasy based on role playing and goes to toilet alone;

At five years: He is almost, if not completely, independent in dressing, undressing, eating and washing.

DEVELOPMENT ASSESSMENT (DIAGNOSIS)

This is a determination of the development status of a particular child. It is done through developmental history, developmental examination and complete physical examination which establishes what a child can do and how he does it. History reveals risk factors (low birth weight, prematurity, birth injury etc), development landmarks and family patterns. The key thing in developmental examination are: eliciting significant skills by a test appropriate for the age and culture of the child; careful observation of the child's behaviour; accurate recording and comparison with the normal for age adjusted appropriately in case of prematurely born infants. Developmental examination is done while the child is not tired, while his interest lasts and while his cooperation has not been interfered with by a cry which may occur during the physical examination. Care is taken to establish good rapport and to perform the examination when the infant or child is quiet and awake. You may have to ask the mother to administer certain items.

It is useful to use an assessment form or scale such as Denver Development Screening Test (14). If there is any developmental delay, further investigation for determining its cause are indicated. The child is then managed appropriately by other specialists e.g. speech therapist, physiotherapists, occupational therapists, orthopedists, social workers etc.

REFERENCES

1. Vaughan, III V.C.; The field of paediatrics in "Nelson Textbook of Paediatrics, 12th Ed;
2. IIIingworth R.S.; Normal development in "The development of infant and the young child" IIIingworth, R.S. Eds. 6th Ed. Churchill Livingstone, Edinburgh, London and New York, 1975 p. 13 - 666;
3. Holt, R.S; Basis of development. In "Developmental paediatrics. Holt R.S.Ed. Butterworths, London - Boston 1977 p. 9 - 49;
4. Horowitz, F.D: Child development for the pediatrician. Paediat. Clin. N. Amer. 29; 359 - 375, 1982;
5. Gesell, A. and Amatruda, B.A.; The development of behaviour in "Developmental diagnosis 2nd Edition. Harper and Row, New York, 1947 p. 3 - 14;
6. Kenney T.J. and Clemmens. R.I.; A summary of child development. In behavioural paediatrics and development 2nd Ed. Williams & Wilkins, Baltimore/London 1980 p. 9 - 14;
7. Flavell, J.H.; Cognitive development. Prentice-Hall Nos. Jersey, 1977, p. 61 - 79;
8. Bee, H.; Language Development. In "The developing Child. Bods, H., Harper and Row, New York 1975 p. 141 - 161;
9. Frankerberg W.R.; and Dodds J.B.; The Denver Developmental Screening Test. J. Paediat. 71: 181 - 191., 1967.

CHAPTER 3

CONCEPT OF GROWTH MONITORING AND PROMOTION

INTRODUCTION

Growth is the gradual increase in size of the body and its organs. A child who grows well is probably healthy and adequately nourished. The growth of a child visibly displayed on an appropriate chart is the most important and sensitive tool of measuring his health and nutritional status. Growth monitoring and promotion is therefore an operational child survival strategy in Primary Health Care (PHC) since it ensures good health and nutrition of the child. Health workers charged with the responsibility of promoting good health and nutrition, must acquire the most relevant knowledge, skills and attitudes to perform and manage growth monitoring and promotion in communities they serve.

OBJECTIVES

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

1. Explain the concept and strategy of growth monitoring and promotion as a means of measuring and promoting health and nutrition of a child.
2. Differentiate growth monitoring from nutritional assessment and treatment.
3. Outline the four main objectives of growth monitoring through weight/age charts.
4. Perform growth monitoring and promotion at a health facility and in the community.
5. List the seven tasks of identifying growth monitoring needed in the community.
6. State the six steps of creating awareness of growth monitoring in the community.
7. Describe five tasks of mobilizing resources to support growth monitoring programmes.
8. List eight tasks of planning a growth monitoring program.

9. Identify the essential tasks of organizing and evaluating programmes.
10. Establish appropriate education programmes for community and health workers.
11. Apply relevant operational research to facilitate growth monitoring and promotion in the community.

LEARNING ACTIVITIES

1. Read booklet "A guide for Health Workers in Uganda" Republic of Uganda, Ministry of Health, Kampala, 1984.
2. Participate in growth monitoring and promotion session at a health facility such as a Health Centre. During the participation you answer the following questions.
   (a) In which part of the health unit is the session taking place?
   (b) Who is actively involved in the process? State their roles.
   (c) Which are the two essential tools used.
   (d) State the four steps of performing growth monitoring.
   (e) Who takes the final decision in this process?
   (f) Who implements the decision taken?
3. Present and report your findings to the rest of the class and give feedback to the health team at the unit you attend.

   The concept of growth monitoring as a measure of the health of the child is based on the assumption that:

   "If a child is growing, he is well, and if he is not growing then something is wrong usually some illness or lack of adequate nourishment" (1)

   Measuring a child's growth is one way of measuring his total health including his nutritional adequacy.

Possible measurements that have been used as indicators of growth include:-

(a) Weight/age
(b) Height/age

(c) Combination - weight/Height

The weight - for - age (weight/age) is the most commonly used growth indicator used in monitoring and supervising the growth of young children. This is because it is the most sensitive method of identifying children with health and nutritional problems.

Two other indicators have been endorsed by WHO as useful growth monitoring indicators [2]

(i) Mid upper arm circumference, used in communities with limited resources, using minimally - educated health workers. It is a simple measurement but is not sensitive to minor changes in nutrition or health status.

(ii) Weight for height has been recommended because it distinguishes acute from chronic nutritional status in children.

While not strictly part of normal growth monitoring and promotion strategy head circumference measurement is of great value following low birth weight infants.

Definition of Growth Monitoring and Promotion

Growth monitoring is the regular and sequential weighing of the child, recording the results on the growth chart and allowing growth or lack of it to be made visible. Growth promotion is giving mothers specific, relevant and practical guidance in ways she, her family and her community can act to assure health and continued growth in her child [3]. Please note the following:-

(a) Growth Monitoring is a process of measuring and visualizing a growth while promotion is the mother or community taking appropriate action to support and protect normal growth;

(b) Growth monitoring and promotion is an operational strategy, aimed at behavioural change and adoption of improved self-help action of the mother or community, to promote optimal health;

(c) The strategy recognizes growth to be the result of the total environment of the growing child;

(d) Shifts responsibility of health promotion from health workers to the mother and community.

Definition of Nutritional Assessment and Treatment

Nutritional assessment is the process of taking weight for age of the child, plotting the information on an international standard growth graph, to identify nutritional disorders. Nutritional treatment is usually curative when food supplements or other nutritional interventions for those below a given level of nutrition status is administered (3). How does growth monitoring and promotion differ from nutritional assessment and treatment when both strategies use weight-for age plotted on a graph record" See Table 1.

Objectives of Growth Monitoring/Promotion Using Weight-for age Charts

1. To promote normal child growth by increasing the understanding of health workers, mothers and their families, the importance of maintaining an adequate growth.
2. Enable workers to assess what normal growth is and detect any deviation from normal. Thus enabling them to make the right decision regarding the most appropriate care.
3. Provide reliable data for evaluating specific intervention by individual families or health workers.
4. Used to monitor the level of growth in a community or a region (where there is 80% effective coverage).
5. It will help the community to improve health and nutrition. It will create demand for a whole variety of services required for promotion of growth.
6. It can be a foundation for effective Primary Health Care in the community.

PERFORMANCE OF GROWTH MONITORING

Having grasped the concept of growth monitoring and promotion, the student should learn to perform accurately the task of growth monitoring and promotion. Medical officers require this skill in order to fulfill their role as health workers and supervisor of other health workers in the community. The following sub-tasks are important in performing growth monitoring and promotion.

(a) Measure accurately and safely the weight of infants and children.

(b) Plot the weight information on the growth chart

(c) Interpret growth curve

(d) Counsel mother using the growth information (4).

Accurate and Safe Weight of Infants and Children

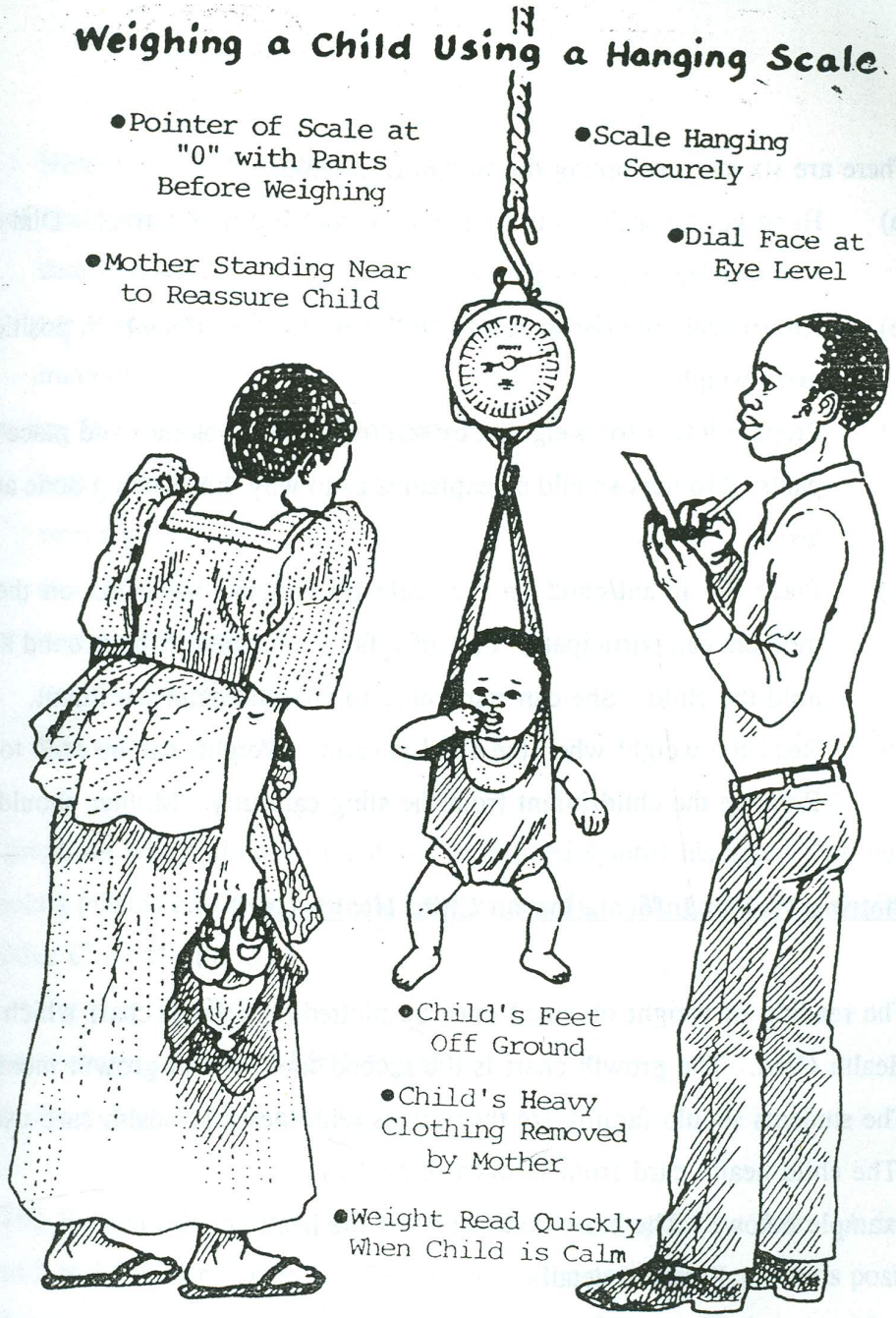
The weighing scale is the first tool used in measuring weight. It is recommended that the student finds out the most commonly used type in his country, as types vary from one country to another. Students should be able to describe the major parts of the scale. An example of Salter Scale used widely in Uganda will be used to illustrate measuring weight for infants and children.

Major Parts of Salter Scale: (see figure 1)

1. Upper hook (suspends scale with chain/rope from above)
2. Knob (adjusts pointer to zero)
3. Dial (reading of weight taken in kg)
4. Pointer (points to weight reading)
5. Lower hook (holds pair of pants which suspends child)

Each scale is usually supplied with four sets of strong plastic pants but other cotton pants or a basket will do.

Fig. 1.


Weighing a Child Using a Hanging Scale
•Pointer of Scale at "0" with Pants Before Weighing
•Mother Standing Near to Reassure Child
•Scale Hanging Securely
•Dial Face at Eye Level
•Child's Feet Off Ground
•Child's Heavy Clothing Removed by Mother
•Weight Read Quickly When Child is Calm

There are six steps of taking the weight of a child:

(a) Hang up the scale securely from the roof beam or a tree. Dial should be at eye level to minimize errors in reading.

(b) Adjust scale pointer to zero with the empty pair of pants in position to account for their extra weight.

(c) Prepare infant for weighing by removing heavy clothes and place the infant in weighing pants. Mothers should be explained as to why this is being done and should perform this task,

(d) Place the infant/child on the scale by hanging the pants on the lower hook. Again mothers can participate. Feet of infants must be off the ground and mothers should not hold the child. She can stand near to talk and calm the infant.

(e) Read the weight when the child is calm. Weights can be read to the nearest 0.5. kg. Remove the child/infant from the sling carefully. Mother should assist here.

Plotting Weight Information on Child Health Card

The reading of weight obtained must be plotted on growth chart which is found on the Child Health Card. The growth chart is the second tool used in growth monitoring and promotion. The students should familiarize themselves with the child health card used in his own country. The child health card from Uganda is used as an example below. The basic component of the health card are:-

1. - Personal details:
   - (a) Child's name, registration number and sex
   - (b) Parent's names and address
   - (c) Birth date
2. - Potential risk factors or reasons for special care:-
   - (a) birth weight
   - (b) Problem calling for special care such as low-birth weight, twins, large family, spacing of less than 2 years etc.

(c) History of sibling death

3. - Use of health services:
   (a) date first seen
   (b) immunization record and national schedule for immunization
4. - Other key factors which may affect growth:
   (a) breast feeding
   (b) weaning diet
   (c) child spacing
5. - Other possible components:
   (a) treatment of diarrhoea
   (b) treatment of illness

6. - The graph on which child's weight can be plotted against his age. Two curves are boldly printed and represent reference standards. The graph is on the inside of folded Child Health Card.

Please note the following (see fig. 2)

Vertical lines represent weight of the child in kilograms.

Horizontal line represent age of child in months.

Two bold lines A and B represent cut off points in the reference population date. A is the fiftieth percentile and B is the third percentile. The number of the percentile represents position out of 100. The fiftieth percentile which is the mid point weight of the population, exactly half of the children will be above and a half below this value.

For example, if in a group of 100 children, one child falls at the tenth percentile line, nine children would be below and ninety above this child. Line B is more important of the two because it represents the average weight of children in the village of a developing country. There is only a 3% chance of weight for age of child being normal, if it falls below B.

Fig. 2.

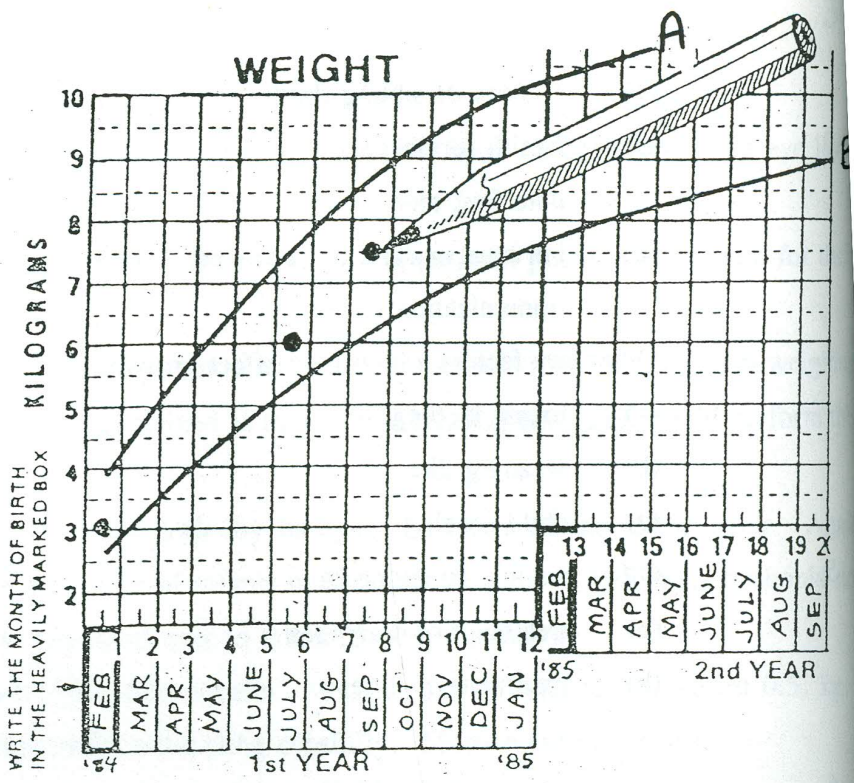
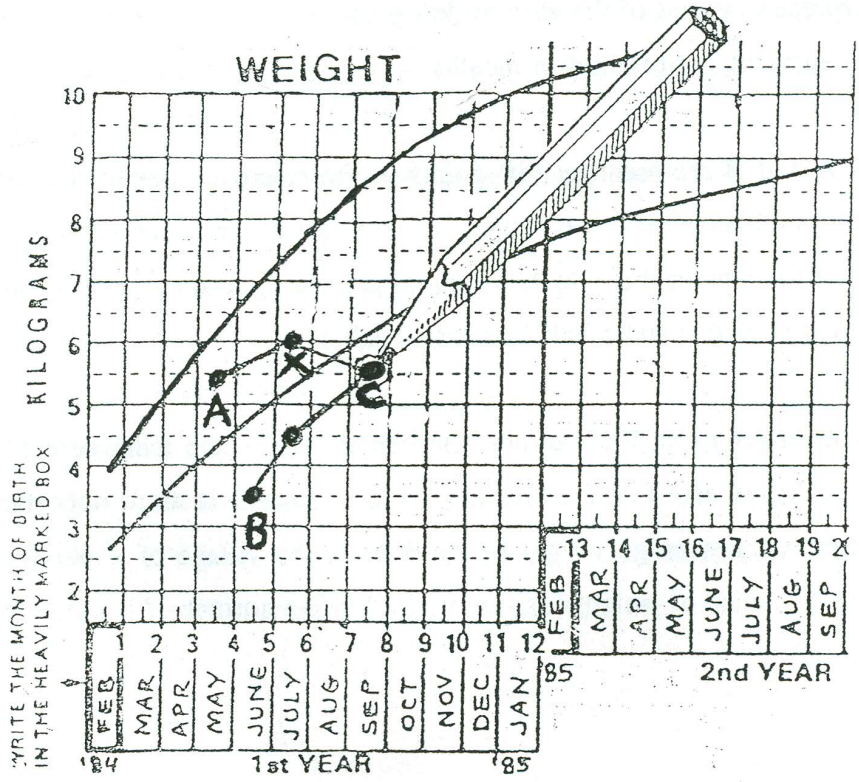
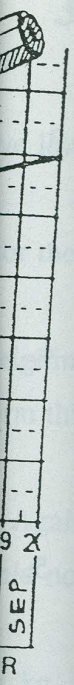

WEIGHT
KILOGRAMS
WRITE THE MONTH OF BIRTH IN THE HEAVILY MARKED BOX
'84
'85
1st YEAR
2nd YEAR
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
JAN
A

Fig. 3.


WEIGHT
KILOGRAMS
WRITE THE MONTH OF BIRTH IN THE HEAVILY MARKED BOX
'84
'85
1st YEAR
2nd YEAR
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP
OCT
NOV
DEC
JAN
A
B
C
X



The area between A and B represents the majority of the normal children and is referred to as the "Road to health".

How to Plot the weight on Growth Chart

To illustrate this we shall use the example of an infant called Mukasa, born in February 1984, whose birth weight was 3 kgs, who attended a growth monitoring session for the first time in July 1984, when his weight was 6.0 kgs.

Write the name and birth weight in the right hand corner of the card. Print the year 1984 at the beginning below the first box of the first year, and then subsequent years. Print February in the first box of the first year, then fill the subsequent months for each year. Place a dot as illustrated in figure 2, for the birth weight (middle of February) and the second dot in the middle of July, September boxes etc, at the respective weights. Join the dots with a straight line.

How to find out the age of infant/child (month and year)

1. Date of birth can be filled out on the chart soon after birth. Mothers can number exact date of birth soon after delivery.
2. Use any written record held by the mother such as a note of birth in a book, baptism certificates or health unit discharge form. Check if mother has any such records.
3. In the absence of any record and mother cannot remember the age of the child, age can still be estimated as below:-

   Year: Compare with other children born in the neighbourhood. Use major events in the local area such as election to find child birth date.

Month: More detailed "Calendar of Local events" can be used. Examples such as ploughing and harvest and religious holidays. A calendar of events should be drawn by health workers for use.

INTERPRETING GROWTH CURVE:

Growth curve interpretation is a linking step between taking the weight and plotting it, on the one hand and sharing advice and ideas with the mother (Counselling) on the other hand.

NOTE THE FOLLOWING:

Direction of growth curve is most important and should be watched very carefully. See fig. 3. Single weight on the curve does not reflect what is going on with the growth curve. See fig. 3.

Dot C is a single weight and two possible curves are drawn to illustrate this point. An infant whose weight moves along curve BC is doing well. One whose weight follows AXC has an abnormal curve (VERY DANGEROUS) XC.

If a child's weight is increasing and the curve is going upwards, even if he is below the third percentile line of the chart, that child is growing well. The direction of growth curve is more important than the position of a single weight on the growth curve. Changes in growth curve can be seen over a short period of time compared to changes in nutritional status. The child health card therefore is a more sensitive indicator of child's current health, and is a better feed back in rehabilitation interventions.

COUNSELLING THE MOTHERS:

This represents the final yet the most essential sub-task of performing growth monitoring and promotion. It engages meaningful dialogue to come out with the best action she can take, to promote good health for her child. Small groups of mothers allow for more personal sharing of ideas and advice. Health workers facilitate counselling and must learn to listen to mothers

and transfer effective and credible knowledge into action. This success of a mother whose children are growing well become the best source of information for advice to their mothers.

WHEN SHOULD GROWTH MONITORING AND PROMOTION START.

In order to detect growth failure, growth monitoring should start as early as possible, soon after birth, effective growth promotion focusses on the youngest ages and attempts are made early to foster participatory action by mothers. There are two major advantages of starting growth monitoring/promotion early:-

(i) growth failure can be detected early for it to be corrected before the child becomes malnourished;

(ii) growth promotion is easier to initiate in early infancy when positive growth can be used as positive reinforcement. During early infancy mothers have more control over the environment of their children, are prepared to devote more time and efforts to the health of their children and can be effectively used as agents of change.

HOW OFTEN SHOULD THE CHILD BE SEEN FOR GROWTH MONITORING AND PROMOTION

It is desirable that sessions of growth monitoring/promotion should coincide with immunization visits in the first half of infancy. Thereafter young children should be monitored and promoted regularly, at least once every two months,up to the age of thirty six months. During the fourth and fifth years, monitoring/promotion can be carried out once every three or four months.

THE ROLE OF THE MOTHER IN GROWTH MONITORING AND PROMOTION

Growth monitoring and promotion is a communication strategy that relies heavily on the full participation of the mother in recognizing growth faltering and in action that she can take to correct it. This places the mother at the centre of success of the programme. She is the most

important child health worker in this respect. She must therefore, be empowered not only to physically participate in the process of taking and recording weights but also she should be made aware of the need or demand for growth monitoring and possible solutions to this need. She, then, will be able to cooperate and be involved in the programmes, ensuring their success.

It is now accepted that even illiterate mothers have the capacity and motivation, when approached properly, to weigh their children accurately and interpret the growth curve, discuss and share their ideas with others. Mothers who are doing well will give the best clues of bringing up normal healthy children. So the health worker plays a facilitator's role in this case. The message of good health is no longer abstract and understood only by health workers.

Growth monitoring becomes a tool which visualizes growth to mother and health worker thus facilitating useful discussions of determining the most appropriate action to be taken to promote health.

GROWTH MONITORING AND PROMOTION IN THE COMMUNITY

Growth monitoring is a well recognised low cost-effective health strategy for child survival and development. Communities should have effective growth monitoring programmes built within their Primary Health Care (PHC). Such programmes should make growth visible in the community. There are other ways in which such programmes have been utilized. These include, as an education tool, as an entry point to PHC (6) and as a means to providing PHC in the communities (7).

Majority of community growth monitoring programmes are small and are run by non-governmental organizations. There is a need to equip the medical officer, the leader of the health team in the community, with relevant skills to establish growth monitoring programmes. With the development of a National Programme, the medical officer could be relied on to implement the same in the communities. However, for each community growth monitoring

programme, medical officers should work closely with the community in developing and implementing the same. Such programmes should create a sense of self-reliance and community response to ensure sustained health of the children.

These are four essential tasks of establishing growth monitoring programme in the community. These are listed below:-

1. Mobilizing or assessing the need for a growth monitoring and setting priorities in the community;
2. Mobilizing the community, and the resources to support the programme;
3. Planning growth monitoring programme;
4. Implementing and evaluating the programme;

Full community participation at all stages is essential for the success of the programme.

ASSESSMENT OF COMMUNITY NEED:

Primary data can be obtained by carrying our nutritional surveys in the community. The use of Master Charts has also been suggested as a means to assess growth monitoring needs in the community.

MASTER CHART

The master chart could be designed for each month or for a single session in a given community or service point, such as a Health Centre.

NOTE:

1. One master chart should be used for each service point;
2. This master chart should be clearly identified regarding
   - Centre of service point
   - date, month and year

- day of work

3. On each master chart a particular child weight should be plotted only once for a given visit using a small dot.

PERCENTAGE OF LOW-WEIGHT-FOR-AGE

At the end of the month or a session, all dots above and below bottom line are counted separately (those on line are counted as being above. Infants and children one year and above should be counted separately. The findings are tabulated as in Table 2.

TABLE 2. PERCENTAGE OF LOW WEIGHT FOR AGE

	infants	Children
No. above line (x)	-	-
No. below line (y)	-	-
Total number = (x + y)	-	-

$$\% \text{ Underweight} = \frac{y}{(x + y)} \times 100$$

The information obtained each month or session, as the case may be, can be recorded over a given period, such as a year and can be represented as histograms to illustrate the magnitude and pattern of low weight-for-age in a given community.

Secondly, data may be available regarding the need for growth monitoring. This should be collected as well. Then the data collected should be analyzed and the problem categorized.

MOBILIZING THE COMMUNITY AND RESOURCES FOR SUPPORTING THE PROGRAMME

The community leaders should be identified and contacted. The need for growth monitoring should be shared with them by explaining the extent of the problem of malnutrition in the community. The advantages of growth monitoring programme in ensuring child survival in the community should be clearly explained to these leaders who should then develop a plan of disseminating this information to the community as a whole. The community should organize a meeting convened to share this information and work together to formulate an intervention programme.

Resources to support the community growth monitoring programme should also be mobilized. The Medical Officer working together with the community should define the needed resources and identify those that can be made available internally and externally. Such resources should then be tapped by the community with the help of the doctor, e.g from fund-raising activities and procurement of tools such as scales.

PLANNING GROWTH MONITORING PROGRAMME

The doctor participates in the planning process of a community programme. The roles of plan of action should be defined for each worker and performance objectives should be set for the different individuals involved. The schedule of activities should be drawn up and places of carrying out these sessions should be identified.

Training may be required if the necessary skills for Community Health Workers need improvement, and if no PHC activities are present in the community. Full community participation throughout this stage is vital to come up with the most appropriate and acceptable plan of action for a given community so as to ensure success of the programmes. Special population characteristics of a given community are likely to vary from one place to another.

IMPLEMENTATION AND EVALUATING THE PROGRAMME

This is when the planned programme is carried out. The progress achieved has to be monitored and feed back given to those involved. The doctor has to coordinate these programme activities and other PHC activities. Suggested adjustments have to be made, to complete the task of the various roles chosen. Evaluation of programmes could be an on-going process such as noting the attendance at various sessions as well as evaluation after a specified period of time.

HEALTH EDUCATION FOR GROWTH MONITORING

This is an important tool in a community. A good health education programme within PHC should emphasize the role played by Growth Monitoring in Child Survival and Development. However, relevant Health Education (such as Nutrition) should be integrated into community growth monitoring programmes. The health workers involved in growth monitoring can be brought together from time to time for refresher courses, to up-date their knowledge and skills.

Such occasions should avail them the opportunity of sharing their experiences, discuss their problems and offer solutions to some of the problems encountered. Teaching materials and other visual aids could be availed to them to increase their knowledge and skills. Drama and song could be used as health education for both the community and health workers.

OPERATIONAL RESEARCH FOR GROWTH MONITORING AND PROMOTION

The medical officer should be able to conduct operational research in growth monitoring. This type of research is not only essential for defining growth monitoring need in the community but also in identifying the best approach in implementing and evaluating such programmes. The information generated is then useful to policy makers.

SELF EVALUATION QUESTION

1. Why is Growth Monitoring/Promotion important to:-
   (a). an individual child
   (b). a community
2. Discuss the major difference between nutritional assessment and growth monitoring;
3. Compare and contrast a growth monitoring session at a health centre and at a village outreach session. Point out the advantages and disadvantages of each;
4. Describe how you would set-up a growth monitoring/promotion programme in a small rural fishing village;
5. Outline the role of health education in the promotion of growth monitoring in the community.

BIBLIOGRAPHY

1. Janeway C.: The State of Worlds Children 1983. pp 64;
2. Growth Monitoring UNICEF: Social statistics bulletin vol. 6 1983 pp. 1;
3. Rodhe, J. E. : Beyond Survival; promoting health growth, Indian Journal Paediatrics (Suppl.) 1988. 55 85;
4. Lalitha, N. V.. and Standley: Training workers and supervisors in growth monitoring. Indian Journal Paediatrics (Suppl.) 1988, 55, 548;
5. Griffiths M . I Growth Monitoring:- Making it a tool for education. Indian Journal of Paediatrics (Suppl.) 1988. 55. 559 - 566;
6. Genece E., and Rohde J. E.: Growth Monitoring as entry point for Primary Health Care. Indian Journal of Pediatrics (Suppl.) 1988. 55.S 78 - 83;
7. Cowman H: Growth Monitoring as a critical means to provide primary health care. Indian Journal Paediatrics (Suppl.) 1988 55, 574 - 577.

CHAPTER 4

CHILDHOOD IMMUNIZATION

INTRODUCTION

Immunization, an important element of primary health care is one of the most powerful and cost-effective means of preventing infectious diseases but remains tragically under-utilized. Expansion of immunization coverage is a necessary and important step towards the international goal of "Health for All by the year 2000". Immunizing all children against basic immunizable diseases by the year 1990" was established as a major milestone towards the broader primary health care goal. In support of these primary health care goals, UNICEF's strategy for a "Child Survival and Development Revolution" highlights immunization along with other selected low cost, effective interventions.

OBJECTIVES

At the end of this chapter you should be able to:

1. List immunizable diseases;
2. Identify the immunizable diseases included in the Expanded Programme on Immunization (EPI);
3. Outline the immunization coverage in developing countries;
4. List immunization delivery strategies;

5. Describe the immunization schedule for your country;
6. Administer vaccines;
7. Describe the vaccine cold chain;
8. Explain immunization problems;
9. Indicate effectiveness of EPI vaccines;
10. Educate health workers and the community on immunization;
11. Conduct disease surveillance and evaluate immunization programme;
12. Indicate possible future developments in immunization.

LEARNING ACTIVITIES

(a) Observe health workers in a health care facility administering vaccines. Note the various steps from the time that parents enter the facility to the time they leave. Evaluate the health team performance. Use instructions for vaccine administration indicated in this chapter as your guide. You can do this in groups of five to seven students;

(b) Participate in administration of vaccines in the same facility under supervision;

(c) How is the immunization programme organized in this facility. What are the immunization delivery strategies involved? What problems do the health workers encounter in performing their tasks;

(d) Interview five parents attending this facility, picked at random, and ask them when they last brought their children to be immunized. Determine their source of information regarding immunization;

(e) The student should observe missed opportunities of immunization;

(f) Provide a feed back to the health workers in the facility on your experience;

(g) Discuss and analyze your experience gained from this visit with your group member and submit a report to the tutor/teacher.

BASIC CONCEPTS

1. **General Immunity:-** General immunity or natural immunity is a general and immunologically indicated resistance to infection with low microbial organisms;

2. **Specific Immunity:-** This refers to immunologically mediated responses of the host required to rid and protect the host from infection with virulent microbes. Such a specific immunity is an acquired immunity that may be acquired either actively or passively.

3. **Active Immunity:-** This refers to the indigenous development of specific immunity in response to contact with microbial antigens. The microbial antigen may be derived from either intact living microbial organism or from non-living microbial antigens.

4. **Non-active Immunity:-** Is spontaneously acquired in that it results from random community acquired infections;

5. **Immunoprophylaxis:-** Or electively induced is the subject of this chapter. This may be achieved with antigens of either living or non-living microbes. Example of attenuated live vaccines include polio (Sabin), measles and mumps virus vaccine.

6. **Passive Immunity:-** Immunity may be acquired from performed host-immune factors (humoral antibodies, transfer factor, or competent cells) from an exogenous source. Examples include transplacental transfer of maternal IgG to newborn infants or the administration of immune serum globulin.

IMMUNIZABLE DISEASES

The following are diseases for which vaccines have been developed:

Chicken pox	Influenza	Cholera
Polio	Smallpox	Diphtheria
Plague	Measles	Hemophilus influenza Type B
Rabies	Mumps	Tuberculosis
Hepatitis B	Tetanus	Meningococcal Infections
Yellow Fever	Typhoid Fever	
Rubella	Pertussis	
Typhus	Pneumococcal Infections	

Some vaccines have only limited utility in routine primary health care activities but may be used for epidemic control or other special circumstances. Several of the vaccines for the above listed disease can be mixed in a combined vaccine DPT (diphtheria-pertussis-tetanus) and MMR (measles-mumps-rubella) are the most common examples. Because smallpox has been eradicated this vaccine is no longer of use in general population.

IMMUNIZABLE DISEASES IN THE EXPANDED PROGRAMME ON IMMUNIZATION

The World Health Organization (WHO) Expanded Programme on Immunization (EPI) focussed on six diseases:

1. Measles affects nearby all unimmunized children and kills over two million children annually;
2. Pertussis kills some 600,000 children each year and affects millions more;
3. Neonatal tetanus contracted through contamination of the umbilical cord at birth, kills at least 800,000 each year;
4. Tuberculosis which each year attacks some ten million, can be especially severe in young children;
5. Polio is the major cause of lameness in the developing world;
6. Diphtheria is less common but kills ten to fifteen percent of the victims.

The challenge is to deliver the basic vaccine to all infants and tetanus toxoid to all pregnant women.

IMMUNIZATION DELIVERY STRATEGIES

The options in the delivery of immunization are:-

(a) Fixed facilities delivery;

(b) Outreach from fixed facility delivery;

(c) Mobile teams;

(d) Mass campaigns.

IMMUNIZATION SCHEDULE

Immunization scheduling is affected by two biomedical factors:-

(a) The age at which the infant can develop active antibodies;

(b) The number of vaccine doses which must be given.

It is also greatly affected by the capabilities of the health delivery system.

The EPI recommended immunization schedule is as follows:

(May vary from country to country check Immunization Schedule in your own country).

Age	Vaccine
Birth	BCG
6 Weeks	DPT/OPV
10 Weeks	DPT/OPV
14 Weeks	DPT/OPV
9 Months	Measles

KEY:

BCG = Bacile-Calmette-Guerin

OPV = Oral Polio Vaccine

Although the EPI does not recommend boosters, many experts recommend booster doses to be given as follows:

DT, OPV, at eighteen months and five years of age.

Td (adult tetanus toxoid and diphtheria toxoid) at ten years.

Note reduced dose of diphtheria).

Recently, it is now recommended to give four doses of OPV in the first year of life. The extra OPV dose can be given either with the BCG at birth or with the measles vaccine at 9 months.

ADMINISTRATION OF VACCINES

IMMUNIZING TECHNIQUE

1. Wash your hands before handling vaccines;
2. Ensure that you are working in a clean and organized environment;
3. Clean and rinse your equipment thoroughly before sterilizing them;
4. If for sterilization you are using boiling method then do the following:-

(a) Ensure that boiling water covers all the equipment and boil for at least 20 minutes;

(b) Ensure that sterilizer top or lid is properly in place during boiling;

(c) For steam sterilizer, read the manufacturer's instructions and follow them strictly;

(d) Use ONE sterile needle and syringe per injection per child.

VACCINES

1. All vaccines must be stored between 0 - 8 degrees centigrade at all times;
2. Ensure DPT and TT (tetanus toxoid) are never frozen while in storage because they lose potency and become useless;
3. Polio and measles are most sensitive and delicate;
4. Check expiry date and name of vaccine before drawing it for administration;
5. Discard any opened but unused vaccine at the end of the day. Open a new vial even if only one child remains to be vaccinated;
6. For BCG, remember to reconstitute a new vial every four hours;

VACCINE STABILITY

Table 1 indicates the stability of the EPI vaccines:

Vaccine	Stability at 37°C
Measles	Approximately one week
BCG	Approximately one week
Oral Polio	Approximately one day

DPT	Approximately one week
Tetanus Toxoid	Approximately two months

VACCINE DOSAGE AND ROUTES OF ADMINISTRATION

1. BCG is given intradermally into the outer volar aspects of the left forearm at the junction of the upper and middle thirds. Since BCG dose varies with age and manufacturer, carefully read the manufacturer's instructions;
2. For oral polio vaccine,give 2 drops orally;
3. For DPT vaccine, 0.5ml is given intra-muscularly in the anterior mid thigh in the quadriceps muscle;
4. 0.5mls of measles vaccine is given intramuscularly into the right deltoid muscle.
5. For the tetanus toxoid vaccine for antenatal mothers, 0.5mls is given intra muscularly into the left deltoid muscle. Give two doses at four weeks interval as early in pregnancy as possible. Give one booster dose with subsequent pregnancy. Remember to tell the mother about the side effects of each type of vaccine given to her child and advise her on what to do about them.

The WHO now recommends that all women of child-bearing age should be immunized with tetanus toxoid. See the WHO update- September 1988 below.

RECORD KEEPING

(a) Enter the daily immunizations onto the summary sheet every day;

(b) Record on the child health card the immunization given and the dates on which they are given;

(c) Remember to give the mother the return date, and stress the importance of completing all the immunizations.

COLD CHAIN DEFINITION

The cold chain is the system that ensures that the vaccines are kept below 8_oC during transportation from the manufacturer to the people to be vaccinated.

The cold chain is necessary because vaccines lose their potency when exposed to high temperatures. Successive exposure have cumulative impact on vaccine potency. Once lost, potency cannot be restored.

LEVEL OF THE COLD CHAIN

A typical cold chain consists of four levels:-

(a) The central stores, located in the national capital or other major city;

(b) The regional store, located in a major provincial city;

(c) The health centre store, often located in a large town;

(d) The local health post or other location where vaccinations are given.

MAINTENANCE OF THE COLD CHAIN

Breaks in the cold chain may occur at any of these levels. At every level of the cold chain, the key elements are:-

1. Established procedures for transport, storage and monitoring of the vaccines;
2. Trained, well-supervised personnel able to maintain and monitor vaccine distribution according to established procedures;
3. Well maintained equipment to store and transport vaccines at the proper temperature.

IMMUNIZATION PROBLEMS

Although no vaccine is totally without adverse reactions, the risks of serious complications from vaccines used in the EPI are much lower than the risks from the natural diseases.

Lack of resources which include staff, supplies and equipment is the major constraint to the delivery of effective immunization services in developing countries. In tropical environment, with unreliable electricity supplies and lacking vehicles to carry the vaccines, the cold chain is highly vulnerable to interruption with consequent loss of potency of the vaccine.

Important reasons for the less than optimal immunization coverage include postponement of immunization of children who are ill, who have an upper respiratory infection, who have a fever or who are malnourished. Yet these are the very children who most need immunization. The only major contraindication to immunization is severe illness requiring hospitalization. Common side effects of vaccines are mild and the severe ones are rare:-

(a) In some cases, measles vaccination produces a mild fever, easily controlled by analgesics, and a rash, which may occur eight to twelve days after vaccination;

(b) Reactions to oral polio vaccine, including a paralysis similar to poliomyelitis, are very rare-perhaps one in every million doses;

(c) BCG vaccination will cause a small sore to develop at the vaccination site-the sore usually disappears after one or two months. Rarely this sore will become a chronic ulcer;

(d) BCG lymphadenitis with abscess formation is becoming more common;

(e) Most common side effects are infection and abscesses caused by contaminated needles and syringes.

EFFECTIVENESS OF VACCINES

Vaccines differ in their effectiveness, that is the ability to produce immunity in a susceptible population vaccinated under optimal conditions. Table II shows the effectiveness of various vaccines.

TABLE II: VACCINE EFFECTIVENESS

DISEASE	EFFECTIVENESS
Measles	> 95%
Polio	> 95%
Diphtheria	> 95%
Pertussis	> 60%
Tetanus	> 95%
Tetanus (Women)	> 95%

The effectiveness of BCG vaccine is currently controversial.

HEALTH EDUCATION

EDUCTION AND SUPERVISING HEALTH WORKERS

Personnel in immunization programme perform a wide variety of tasks ranging from communicating with clients to carrying out technical procedures. Training personnel to carry out those tasks and supervising them as they do them are essential to the success of immunization programmes. WHO, PAHO (Pan American Health Organization) and UNICEF have developed courses and training materials to teach supervisory and operational skills at all

levels. In addition several countries have established their own training programmes. To ensure that all children needing immunization are properly vaccinated with potent vaccines, field workers must learn to:

(a) Explain the benefits and possible side effects of immunization;

(b) Determine who should be immunized and recognize contraindications for vaccination;

(c) Use proper sterilization and vaccination techniques;

(d) Ensure that vaccines are kept at proper temperature;

(e) Keep complete and accurate records.

A good system of supervision is essential to a successful immunization programme. People always work more carefully when they know that their performance is being evaluated.

Essential to good supervision are:-

1. Sufficient funds for supervision at all levels;
2. Frequent supervisory visits to the field;
3. Written job description specifying performance standards for all tasks;
4. Check lists to guide supervisors in evaluating performance;
5. Recognition by supervisors of good performance;
6. Investigation to determine reasons for poor performance and to develop strategies for improvement;
7. Standardized training programmes for supervisors.

EDUCATING THE COMMUNITY

Many of the most effective immunization programmes have included aggressive communication activities. It does little good to provide immunization services unless parents are convinced that immunization is valuable, know where and when services are available and understand when children should receive vaccinations.

There are three important components of communication strategy:-

(a) **AUDIENCE:** The main audience of immunization programme is parents of young children;

(b) **MESSAGES:** These perform a dual role, first to create public awareness and support and second to provide the specific information that people need in order to use immunization services. The messages to be effective should be compatible with audience's attitudes, beliefs and experience;

(c) **COMMUNICATION: CHANNELS:**

Mass media can reach most people but person-to-person communication and other strategies are important to reinforce these media, particularly at antenatal clinics, under five clinics, out patient clinics and women's clubs etc.

SURVEILLANCE AND EVALUATION

The objective used to evaluate progress relate to access, immunization delivery, coverage and disease eradication.

The essential elements of a surveillance system are:-

(a) Disease recognition;

(b) Disease reporting, statistical aggregation and analysis

(c) Number of cases;

(d) Number of deaths;

(e) Characteristics of cases;

(f) Location and date of outbreaks;

(g) Immunization status by vaccine, dose and age group;

(h) Feed back and utilization of results.

There are two measurement systems used in immunization coverage, one based on service statistics, the other on sample surveys.

Evaluation assesses performance at all levels based on predetermined objectives.

NEW DEVELOPMENTS

New biotechnology, including recombinant DNA, monochronal antibody and protein synthesis has spurred vaccine research. The diseases where such is currently underway include:-

1. malaria;
2. Rota virus diarrhoeal disease;
3. AIDS (Acquired Immunodeficiency Syndrome);
4. Respiratory syncytial virus infection;
5. Leprosy;
6. Dengue;
7. African hemorrhagic fever;
8. Sexually transmitted diseases e.g. gonorrhoea and genital herpes.

New vaccines against cholera and typhoid fever are being developed to replace the current ones which are only partially effective and produce high rates of side effect.

REFERENCES

1. EPI Overview in the African Region WHO EPI/GAG/92/WP2;

2. "Strategies for the Global Eradication of Poliomyelitis by the year 2,000" Wright et all, New England Journal of Medicine 325: 1774 - 1779, 1991;

3. Outbreak of paralytic poliomyelitic in Oman: Evidence for widespread transmission among fully vaccinated children. Sutter et al Lancet 338: 715 - 20, 1991;

4. KEPI, Immunization Manual for Medical Students and Physicians Onyango et al; University of Nairobi, Faculty of Medicine Publication;

5. The Gambia Hepatitis Study Group Cancer Research 47: 4785 - 5787, 1987;

6. Safety and efficacy of high titre measles vaccine at six months of age. Wkly Epidm. Rec. 66: 249 - 256, 1991.

CHAPTER 5

NUTRITION

INTRODUCTION

The number of children dying of malnutrition in developing countries is immense. Basic nutrients in many foods are essential for growth and development of the body. Good nutrition is therefore a pre-requisite to good health. And its provision is one of the major aspects of primary health care.

OBJECTIVES

At the end of the chapter you should be able to:-

1. Assess the nutritional status of the child and the community;
2. Describe the appropriate feeding patterns for the child and mother;
3. Identify the causes of nutritional disorders;
4. Describe eight common nutritional disorders;
5. Treat eight common nutritional disorders;
6. Prevent the occurrence of eight nutritional disorders;
7. Promote good nutrition in the child and the mother;
8. Describe the roles of a doctor in Primary Health Care in the promotion of good nutrition.

LEARNING ACTIVITIES

(a) Visit your local market. List the different foods sold and their cost. Classify, them according to their nutritional content;

(b) Visit the nearest Under Five Clinic. Measure the weights, heights, mid-arm circumferences and the head circumferences of children being brought to the clinic before they are seen by the health worker incharge. Discuss with him/her how these parameters are used to assess the nutritional status of a child.

(c) Visit a health centre and list the different nutritional disorders being treated. Describe their clinical features and describe the way they are being managed and the counselling the mothers/guardians are receiving.

NUTRITIONAL ASSESSMENT

Assessment of the nutritional status of the child and the community will help you identify nutritional disorders.

The assessment is carried out in the following ways:-

(a) **Child**

(i) by general physical examination;

(ii) measurement of weight, height or length, midarm circumference and head circumference. These parameters are compared to the accepted standards for particular age. Compare results with standard reference charts in a Paediatrics textbook, and plot them on the child growth chart.

(b) **Community**

(i) by carrying our nutritional surveys in the community. This is done by clinically examining the individuals and measuring the parameters mentioned above in several sample groups in the community. Data obtained is analyzed with the help of standard reference charts. Another method is the use of the NABARRO THINNESS CHART, which is very helpful especially where ages are not known.

jellies and soft drinks add little except calories to the diet, these calories are referred to as empty calories.

VITAMINS

The word vitamin refers to organic compounds that are required in minute amounts to catalyze cellular metabolism essential for maintenance of growth of an individual. Sources of vitamins include bread, cereals, fruits, vegetables, meat, milk, dairy products, fats and oils.

1. **Vitamin A**

   Vitamin A aldehyde combines with specific proteins to form the retinal pigments rhodopsin and iodopsin, for vision in dimlight, bone and tooth developments, formation and maturation of epithelia of skin, eyes, digestive, respiratory, urinary and reproductive tracts.

2. **Niacin**

   Active constituent of co-enzymes I and II, cofactors in a number of dehydrogenase system. Its deficiency leads to pellagra.

3. **Folic Acid**

   Concerned with formation and metabolism of one carbon unit, hence participates in synthesis of purines, pyrimidine, nucleoproteins and methyl groups. Its deficiency leads to megaloblastic anaemia.

4. **Vitamin D.**

   Regulates absorption and deposition of calcium and phosphorus, presumably by affecting permeability of intestinal membrane to calcium. Its deficiency leads to rickets.

MINERALS

The minerals have varying physiologic roles. The mineral content of the foetus is about 3% of the body weight at birth. It increases continuously throughout childhood, both absolutely and relatively. In the adult the mineral content is 4.35% of the body weight. The principal cations are calcium, magnesium, potassium and sodium, the comparable anions are phosphorous, important organic complexes. The trace elements fluorine, copper, zinc chlorium and manganese have known metabolic roles.

FOETUS

Good nutrition of the mother during pregnancy will ensure good nutrition for the unborn child. The use of food or nutrient supplements in pregnancy may be necessary and varies with particular circumstances and problems. Women who are pregnant are often given folic acid and ferrous sulphate supplements to prevent anaemia during pregnancy.

THE INFANT

Breast-feeding is the natural way a young child should be fed. It reduces infant morbidity and mortality.

Breast milk is the perfect food for the baby. It has the right amounts of basic nutrients required for growth. The milk that comes from the mother's breast during the first few days is called colostrum. This milk contains the basic body building nutrients as well as antibodies which give the newborn baby resistance to infection at a time it is susceptible to illnesses. Mothers should start breast-feeding as soon as possible after birth. Mothers should breast-feed on demand. The more the baby sucks the more milk the mother will produce. Advantages of breast feeding include:-

It is always available, at a correct temperature, does not contain pathogenic microorganisms, is always fresh, portable, helps suppress ovulation and is thus an

important biological mechanism for the spacing of children. It fosters a closer maternal-child bonding.

Recently UNICEF and WHO launched the Baby Friendly Health Initiative, which encourages breast feeding for as long as possible, and discourages free distribution of artificial milk preparations. Hospitals which have a written policy on breast feeding and which trains their staff to correctly advise mothers on breast feeding and which have fulfilled all the twelve criteria on breast feeding (see UNICEF state of world's children 1992) are given a plaque to show that they are baby friendly (and women friendly).

There are very few permanent contraindications to breast feeding:-

(a) A case of twins or triplets may require supplemented feeding with artificial milk in addition to breast milk;

(b) Acutely ill mother - breast-feeding can resume once mother is well;

(c) Maternal T.B. - continue breast-feeding. Start child on anti. T.B. treatment for at least six months;

(d) Working mothers - baby can be fed with expressed breast milk;

(e) Cracked nipples or breast abscess, let baby feed on the other nipple (breast) until the breast obscess is treated;

(f) Mother is HIV positive, advise against breast feeding if baby is known to be HIV negative. If mother's HIV status is unknown encourage her to breast feed;

(g) Baby with cleft lip - feed baby with long nipple using mother's expressed breast milk.

WEANING The process of introducing other foods to an infant, other than milk, is known as weaning. When a child reaches four to five months of age weaning may be necessary to supplement breast milk. But since the mother's milk is a great source of proteins for a child, breast feeding should continue until the child is over eighteen months. Most babies may give up breast feeding between the age of one and three years.

Breastfeeding should continue during a diarrhoeal episode. The infant should be treated with O.R.S. The mother should for example drink a lot of fluids everyday as well as eat energy, protein and body building foods. She should take plenty of rest.

Weaning should be introduced slowly between four and six months. The foods should be of variety and containing the basic nutrients. One type of food should be introduced at a time.

CAUSES OF NUTRITIONAL DISORDERS

Essentially the cause of nutritional disorders is an imbalance between the individuals nutrient requirement and the dietary intake.

NUTRITIONAL DISORDERS

Nutritional problems in children result in retardation of physical and mental development. They adversely add to the cost of providing primary health care to the community.
Nutritional disorders may be divided into four major groups:-

(a) Protein energy malnutrition which consists of kwashiorkor, marasmus and marasmic kwashiorkor;

(b) Vitamin deficiencies for instance vitamin A deficiency, niacin deficiency and vitamin D deficiency;

(c) Mineral deficiencies for example iron and iodine deficiencies;

(d) Overnutrition leading to obesity.

PROTEIN ENERGY MALNUTRITION (PEM)

It is a result of deficiency of both calories and proteins. In its gross form protein-energy-malnutrition presents itself either as kwashiorkor or marasmus or a mixture of the two namely, marasmic kwashiorkor.

KWASHIORKOR

Kwashiorkor is a form of severe protein energy malnutrition which usually occurs between the ages of one and three years, protein is the main deficient nutrient. The clinical signs of kwashiorkor vary from child to child and also in different parts of the world but can be divided into those that are:-

(i) always present;
(ii) usually present;
(iii) occasionally present.

Always present:

(i) oedema;
(ii) growth failure resulting in weight loss. However body weight is between 60 - 80% of expected weight;
(iii) wasted muscles but subcutaneous fat is retained. The child uses up his muscles to provide protein and because of the biochemical changes, his fat cannot be used for energy or growth;
(iv) Misery. Shown by whining cry, irritability and later by lack of interest.

Usually present:

One or more of the following signs are usually present,but none is absolutely necessary to make a diagnosis.

1. Dark-coloured patches of skin peeling off leaving a very light coloured skin or ulcers beneath. Mostly seen on the legs and buttocks;
2. Ulcers and cracks of the skin especially seen over pressure points, behind and around the ears.
3. Signs of associated vitamin deficiency e.g angular stomatitis, and bright red tongue from lack of riboflavin;
4. Large liver. The enlargement is due to fatty change;

5. Low serum albumin;
6. Ketonuria in the early stages of disease;
7. Low blood glucose levels;
8. Low potassium, magnesium, amino acids in serum as well as cholesterol;
9. Low serum enzymes e.g. esterase, cholinesterase etc.

Differential Diagnosis of Kwashiorkor

(a) severe anaemia;

(b) nephrotic syndrome;

(c) heart failure.

NUTRITIONAL MARASMUS

Results from insufficient food intake or lack of calories and energy usually occurring in the first three years of life.

Disease picture consists of clinical signs which are:-

Always present:-

1. Growth failure as shown by body weight, which is extremely low for age and height, weight is less than 60% of expected body weight;
2. Muscles wasting and loss of subcutaneous fat. in severe cases, the child has a little old man appearance;
3. Child very alert and hungry.

Sometimes present:-

(a) Loose stools usually because of infective diarrhoea,
(b) Hair changes similar to those of kwashiorkor;
(c) Signs of associated vitamin deficiency;
(d) Dehydration from frequent diarrhoea;
(e) Good appetite.

In Contrast to Kwashiorkor, Children with Nutritional Marasmus

(i) are often under one year of age;
(ii) are obviously thin and wasted;
(iii) have no oedema;
(iv) are not miserable and
(v) have a good appetite

MARASMIC KWASHIORKOR

Children whose weights are less than 60% of reference weight for age who have oedema are diagnosed as having marasmic kwashiorkor.

Wellcome Classification for Protein Energy Malnutrition

Kwashiorkor:- Body weight is 60 - 80% of expected, plus oedema;
Marasmus:- Body weight is less than 60% of expected and no oedema;
Marasmic Kwashiorkor:- Body weight is less than 60% of expected with oedema present.

VITAMIN DEFICIENCIES

VITAMIN A DEFICIENCY

Vitamin A deficiency causes xerophthalmia which causes partial or total blindness in young children and is the leading cause of blindness among children in many developing countries. World wide incidence of vitamin A related blindness ranges from 100,000 to 250,000 cases per year. Vitamin A deficiency may be identified by the following:-

(a) Low levels of plasma vitamin A (Below 10 mcg/100ml);

(b) Qualitative dietary surveys;

(c) Night blindness;

(d) Conjunctival xerosis - dryness, thickening and vertical shrinking/wrinkling of the bulbar conjunctiva;

(e) Bitot's spot - small foamy, superficial plague on the temporal conjunctiva;

(f) Corneal xerosis - cornea appears rough and lacks lustre;
Corneal ulceration;

(g) Keratomalacia - softening of the cornea that leads to permanent scaring and deformity of the cornea.

VITAMIN D. DEFICIENCY

Vitamin D, a fat soluble vitamin, occurs in most animals fats, for example, milk, butter, egg yoke and liver. In groups where diet contributes little, vitamin D requirements are dependent on exposure to sunlight. The ultraviolet rays of the sun acting on the skin converts the 7 dehydrocholesterol present in the skin to cholecalciferol (Vitamin D3). On absorption from the skin it accumulates rapidly in the liver where it is converted to 25 Hydroxy cholecalciferol. Further hydroxylation occurs in the kidney to given rise to 1, 25 Dihydroxy cholecalciferol which is the active form of vitamin D and behaves like a calcium and phosphates mobilizing hormone in the body. Vitamin D deficiency leads to rickets. The basic lesion is retardation of

bone formation, so that collagen is formed without concomitant impregnation with bone crystal. In non-growing bone it leads to softening and deformity (osteomalacia) and in the growing child there are skeletal changes of rickets.

These being:-

(a) Delay in closure of anterior fontanelle;
(b) Frontal bossing and parietal prominence;
(c) Enlarged epiphyses of limb bones best seen at wrists and ankles;
(d) Bowing of the legs and pelvis;
(e) Cupping and fraying of the epiphyses as seen on x-ray;
(f) Increased serum alkaline phosphatase;
(g) Reduced serum phosphorus.

PELLAGRA (NIACIN DEFICIENCY)

Has an insidious onset of anorexia, weakness, numbness and dizziness. Eventually the classic triad of Diarrhoea, Dermatitis and Dementia follow. Diagnosis is based on nutritional history, physical findings and a prompt response to niacin given as 100mg/day or oral nicotinamide.

MINERAL DEFICIENCIES

NUTRITIONAL ANAEMIA

Iron deficiency anaemia is common in children and women. Although iron deficiency is the most common cause of nutritional anaemia, folate deficiency can be a contributory factor among pregnant and lactating women.

Causes of Iron Deficiency Anaemia are:-

1. Intrauterine:- Twin to twin placental vascular connection;
2. Perinatal:- Loss from the baby via the cord;

3. Postnatal:- Iatrogenic (diagnostic procedures);
4. Rapid growth with inadequate iron intake;
5. Blood loss from any site;
6. Pulmonary hemosiderosis;
7. Intestinal parasites e.g. hookworm;

The sequence of events in iron-deficiency anaemia is decrease in available iron with a reduction of Ferritin levels to less than 10 ng/ml. Serum iron levels fall and total iron binding capacity increases. A peripherical blood smear shows microcytic hypochromic red blood cells.

ENDEMIC GOITER

Endemic goiter is said to occur when there is a palpable enlargement of the thyroid gland in at least 30% of the adult population in a defined locality. It is common among people living in mountainous and often remote areas.

Goiters become clinically obvious around puberty. In males there is a regression with age whereas in females, the goiter often enlarges with each pregnancy so that the biggest goiters are seen in middle aged or older women. Of greater concern are the effects of iodine deficiency during early pregnancy on the mental development of the foetus. Goiter has been associated with endemic cretinism and diminished mental competence.

Endemic goiter is only found where there is a low intake of iodine. And the following classification is recommended for grading endemic goiters.

Grade	Description of thyroid gland
0	No enlargement
1	Enlarged and palpable but not visible when the head is thrown back;
2	Enlarged and palpable, visible when the head is extended;

3 Visible from a distance;

4 Monstrous goiters

Treatment of Goiter

Partial thyroidectomy if goiter is very large. Total thyroidectomy will require thyroid hormone replacement.

Prevention of Endemic Goiter

Iodized salt (1mg of iodine per 100 gm of salt);

1 - 2 drops of saturated solution of potassium iodine per week;

Iodination of water supply is sometimes recommended where salt is not iodized.

TREATMENT OF NUTRITIONAL DISORDERS

PROTEIN ENERGY MALNUTRITION

Even though marasmus and kwashiorkor have different clinical signs, the treatment is the same. The principle of treatment are as follows:

(a) Supply a high-energy diet with all nutrients (especially protein) in proportion, in a digestible and easily given (usually liquid) form;

(b) Treat concomitant infections e.g respiratory, skin, malaria, hookworm etc.; treat diarrhoea and associated mineral and vitamin deficiencies, treat anaemia.

(c) Ensure attention and affectionate contact of child with mother (if present) or others, including health staff. The specific treatment of PEM is done in stages, that is (a) the first week of treatment (b) later treatment and (c) rehabilitation.

The First Week of Treatment

1. Treatment is concentrated on medical management;
2. Dehydration and mineral imbalance must be recorded;
3. Prevent hypothermia and hypoglycemia;
4. Half strength milk formulae should be given frequently two to three hourly;
5. Breast feeding should be continued;
6. Treat vitamin deficiency particularly vitamin A, B, C, D.;
7. When appetite improves give full strength milk mixtures. For the first four to five day give 125 ml/kg of feed. After this feed can be increased to 150ml/kg per day give every four hours;
8. Child may be fed by cup, spoon or by nasogastric tube. Potassium and magnesium should be replaced. These can be added to the mild feeds. Iron and folic acid supplementation is desirable and children with PEM especially kwashiorkor are often anaemic;

   Antibiotics should be given to treat infections as indicated. A three day course of chloroquine should be given if malaria parasites are identified. Intestinal worms should also be treated as the child begins to recover. Vitamin A is given in prophylactic doses orally or by intramuscular injection.

(b) **Later Treatment**

Recovery should commence within a week. In kwashiorkor this is shown by disappearing oedema, the child taking interest in his surroundings, weight gain following an initial loss of oedema, at this time, medical management gives way to dietary therapy and preparation for return home.

(c) **Rehabilitation**

Children should be admitted with their mother to the hospital or can be treated in nutrition rehabilitation centres. Key members of the family should be educated in the

The First Week of Treatment

1. Treatment is concentrated on medical management;
2. Dehydration and mineral imbalance must be recorded;
3. Prevent hypothermia and hypoglycemia;
4. Half strength milk formulae should be given frequently two to three hourly;
5. Breast feeding should be continued;
6. Treat vitamin deficiency particularly vitamin A, B, C, D.;
7. When appetite improves give full strength milk mixtures. For the first four to five days give 125 ml/kg of feed. After this feed can be increased to 150ml/kg per day given every four hours;
8. Child may be fed by cup, spoon or by nasogastric tube. Potassium and magnesium should be replaced. These can be added to the mild feeds. Iron and folic acid supplementation is desirable and children with PEM especially kwashiorkor are often anaemic;

   Antibiotics should be given to treat infections as indicated. A three day course of chloroquine should be given if malaria parasites are identified. Intestinal worms should also be treated as the child begins to recover. Vitamin A is given in prophylactic doses orally or by intramuscular injection.

(b) **Later Treatment**

Recovery should commence within a week. In kwashiorkor this is shown by disappearing oedema, the child taking interest in his surroundings, weight gain following an initial loss of oedema, at this time, medical management gives way to dietary therapy and preparation for return home.

(c) **Rehabilitation**

Children should be admitted with their mother to the hospital or can be treated in nutrition rehabilitation centres. Key members of the family should be educated in the

diet to be followed on return home. Cooperation and assistance of local authorities such as the social welfare officer and nutritionists should be sought. Mother should be taught the best ways to budget, what foods to buy and how to grow certain foods and vegetables at home to supplement family income.

NUTRITIONAL ANAEMIAS

Awareness of the leading causes of anaemia (for example nutritional, infections, infestations and hereditary anaemias) among various age groups for a given community allows for presumptive diagnosis and treatment of anaemia.

Iron deficiency anaemia is treated by administration of ferrous sulphate 6mg/kg of elementary iron in three divided doses. It is given for one month or more until the haemoglobin levels come back to normal. Foods containing iron should be given and other causes of anaemia, namely malaria, intestinal worms (hook worms) should be treated.

VITAMIN A DEFICIENCY

In the treatment of vitamin A deficiency, early recognition of xerophthalmia is essential. This is a medical emergency and requires immediated administration of an intramuscular injection of vitamin A.

(a)	immediately on diagnosis	100,000 units i.m oral or I.V
(b)	Following day	100,000 units orally
(c)	Prior to discharge or 1 - 2	100,000 units i.m or orally weeks later

For children less than one year reduce the dose by half.

Recent research shows a close relationship of measles with xerophthalmia. It is recommended that measles treatment should include vitamin A supplementation.

VITAMIN D DEFICIENCY

Treatment of rickets is with administration of vitamin D 2000 IU daily for 2 - 4 weeks reducing to 1000 IU for several months.

7. PREVENTION OF NUTRITIONAL DISORDERS

PROTEIN ENERGY MALNUTRITION

To prevent malnutrition continuous monitoring of the nutritional status of vulnerable groups should be done so that remedial measures can be started promptly. The people in the community must know and practice the following:-

1. Breast feed for twelve months and longer if possible;
2. Introduce weaning foods at four to six months of age;
3. Immunizations to be carried out;
4. Early treatment and prevention of diarrhoeal disease;
5. Add oil and protein rich foods, particularly from animal source to the gruel or staple of young children;
6. Feed young children at least four times a day;
7. Eat an extra meal a day during pregnancy and lactation, or after an episode of diarrhoea, for at least one week after diarrhoea is over;
8. Add fruits and dark-green leaves to the diet of whole family and give a variety;
9. Prepare and store food hygienically;
10. Sickness should be treated promptly.

Other measures which may be effective include giving advice on family planning and increased household food security.

EVALUATION EXERCISE

1. Describe ways in which you can assess the nutritional status of a child and the community;
2. Give advantages of breast feeding;
3. What are the common causes of malnutrition in children?
4. Write short notes on the following:-
   (a) Weaning;
   (b) Iron deficiency Anaemia;
   (c) The role of a doctor in primary health care in the promotion of good nutrition.

BIBLIOGRAPHY

1. Vitamin A supplements. A guide to their use in the treatment and prevention of Vitamin A deficiency and xerophthalmia. Prepared by a WHO/UNICEF/IVACG Task Force 1988.
2. Module for Education for Child Survival and Development in Eastern and Southern Africa UNICEF 1987.
3. Current medical diagnosis and treatment 1986.
4. Nelson text book of paediatrics, 12th Edition.
5. Short Textbook of Preventive Medicine for the Tropics, A.U. Lucas et al 2nd Edition 1984.
6. Child Health in the Tropics, DP Jelliffee et al, 5th Edition 1985.

ii Naborro Thinnes Chart, Designed for maintenance of good nutrition of practically all health people in the USA;
Source: Nelsons Text Book of Paediatrics page 137 of the 12th Edition.

iii. Chart showing approximate composition of colostrum human milk and cow's milk.
Source: Page 155 Nelsons Text Book of Paediatrics 12th Edition.

iv. Chart showing nutrition value of common available tropical foods.
Source: Page 47 of Paediatric Practice in Developing countries by G. J. Ibrahim (c) 1981, 1987 reprint.

CHAPTER 6

ACUTE DIARRHOEA IN CHILDREN

INTRODUCTION

Acute diarrhoeal diseases are a major cause of morbidity and mortality in children in developing countries. W.H. O. has estimated that each year there are 1.3 billion episodes of diarrhoea causing 3 to 5 million deaths in children under five years of age. Overall a quarter to one third of all childhood deaths are due to diarrhoea the majority of whom are children under two years of age. By the time he reaches his 5th birthday,an average child has spent a total of four to five months of his life suffering from diarrhoea. An average of 25 to 30% of all paediatric admissions in most developing countries are a result of acute diarrhoea. At least one billion dollars is spent annually on ineffective treatment for diarrhoea.

The use of oral rehydration solutions as part of correct case management for diarrhoea both at home and at health institutions has simplified the treatment of acute diarrhoea and is saving many lives of children.

OBJECTIVES

At the end of this chapter a student should be able to:-

(1) Define diarrhoea and distinguish between acute and persistent (chronic) diarrhoea;

(2) Describe the problem of diarrhoeal disease as a major cause of childhood mortality and morbidity;

(3) List the predisposing factors and aetiology of acute diarrhoea in children;

(4) Enumerate the complications of diarrhoea and explain how diarrhoea causes dehydration;

(5) Classify dehydration;

(6) Plan correct case management and describe the role of ORT in a national CDD programme;

(7) Outline strategies to prevent and control diarrhoea in children.

LEARNING EXPERIENCE

Visit a local children's hospital or clinic and:-

(a) Observe how many children are admitted for acute diarrhoea;

(b) Check the hospital register to see the peak season of diarrhoea in your area and the mortality from diarrhoea;

(c) Observe and then participate in assessing degree of dehydration;

(d) Calculate amount of fluid required by a child with moderate dehydration and assist the mother in giving ORS to her child;

(e) Advise the mother on how to manage and prevent diarrhoea at home.

CASE ILLUSTRATION

Monde, a twelve months old child from Kalingalinga shanty compound is admitted to a local hospital with a two days history of diarrhoea, vomiting and fever. She passed five watery, foul smelling stools with mucus in less than six hours. The child was previously well and was breast fed for six months only. The mother who is single, had to start work as a nanny, so her twelve years old sister who is a school dropout looks after the baby while the mother is at work. She feeds the child on maize meal porridge and fresh cow's milk. They draw water from a well one kilometer away and the family uses a pit latrine.

On examination the child is febrile with temperature of 39°C. She is weak, the eyes appear sunken, the mouth is dry and the fontanelle is depressed. The pulse is weak and fast and the skin turgor is reduced. The child's weight is 6kg which is the same weight as a month ago at the children's clinic. The breathing is fast but the chest is clear to auscultation. The child has

not passed any urine during the previous four hours:

(1) Assess the degree of dehydration in this child;

(2) Outline basic treatment required;

(3) What are the predisposing factors to diarrhoea in this child;

(4) Advise the mother on how to prevent future episodes of diarrhoea, and dehydration.

DEFINITION OF DIARRHOEA

Diarrhoea is the frequent passage of watery stools, usually three or more per day. The frequent passage of normal stools is not diarrhoea. Some infants may have up to eight normal stools per day,usually after each feed (Gastrocolic reflex). This is not diarrhoea The number of stools passed is often determined by the child's diet.

ACUTE VERSUS CHRONIC DIARRHOEA

Acute diarrhoea usually lasts for a few days and often starts suddenly. Chronic or persistent diarrhoea usually lasts for two weeks or more and may be a result of chronic infection, malabsorption or immunodeficiency state.

Predisposing Factors to Diarrhoea

(1) Bottle feeding

(2) Poor weaning practices i.e early introduction of solid foods and artificial milk to children under six months of age;

(3) Inadequate clean water supply;

(4) Faecally contaminated water;

(5) Poor personal and domestic hygiene;

(6) Improper food storage and preparation;

(7) Lack of immunization;

(8) Immunologically compromised patients;

(9) Malnutrition.

Aetiology of Acute Diarrhoea

A cause of acute diarrhoea in children is identifiable in 50 to 70% of cases. However, laboratory diagnosis contributes little to management of a child with acute diarrhoea.

1. **Viral Causes**

   Human Rota Virus, Norwalk like virus, CMV, adenovirus and measles. In a recent study at the University Teaching Hospital in Lusaka, the Humanrotavirus accounted for 41% of acute diarrhoea in children under five years of age.

2. **Bacterial Causes**

   E. Coli, Shigella, Salmonella, Campylobacter, Yersinia, Vibrio cholera, T.B, Staphylococcus, clostridium perfringes

3. **Protozoa**

   Giardia lamblia, Entamoeba histolytica, Balantidium coli, Cryptosporidium

4. **Helminths**

   Ascariasis, enterobias, Trichuris trichura, Ancylostomiasis, Schistosomiasis.

5. **Mycoses**

   Candida albicans

6. **Parenteral Diarrhoea**

   Diarrhoea usually associated with systemic infection e.g Otitis media, Pneumonia, Tonsillitis, Urinary tract infection, etc. It is now believed that in many cases of so called parenteral diarrhoea, the systemic infection is just coincidental and that an enteric cause of the diarrhoea can be identified.

7. Prolonged use of Broad Spectrum Antibiotics.

COMPLICATIONS OF DIARRHOEA ARE:

a. Dehydration
b. Fever
c. Acidosis
d. Electrolyte imbalance
e. Shock
f. Acute renal failure
g. Chronic diarrhoea
h. Malnutrition
i. Anaemia
j. Convulsions
k. Malabsorption
l. Death

DEHYDRATION:

This is a dangerous complication of acute diarrhoea due to rapid loss of water and electrolytes from the body. Normally water and salt loss from the body occurs through stool, urine, and through sweat and breathing. This is compensated for by water and salt intake in drinks and food. In case of diarrhoea, there is either a rapid loss of fluid and electrolytes by osmosis (osmotic diarrhoea) or there is active secretion of sodium from the intestinal mucosa followed by water and electrolyte loss (secretory diarrhoea e.g in cholera). Dehydration is most severe in young children because, children have a higher percentage of body water (70 - 75%) compared to adults (55 - 60%), hence water loss is more rapid in children. In addition water intake in children is less, and vomiting is more frequent, contributing to the fluid deficit.

ASSESSMENT OF DEHYDRATION

Dehydration can be classified clinically as mild, moderate or severe.

MILD DEHYDRATION

Usually such a child has lost less than 3 - 5% of his body weight (depending on whether he is below two years of age, (See Table 1) when the higher figure is applicable.

MODERATE DEHYDRATION

Such a child may have lost up to 6 - 9% of his body weight and has signs of dehydration (See Table 1).

SEVERE DEHYDRATION

Such a child has lost over 10% of his body weight, and may have signs of shock including drowsiness and coma (See Table 1).

Dehydration may also be classified as:-

(a) Isotonic
(b) Hypotonic (Hyponatraemic)
(c) Hypertonic (Hypernatraemic)

(a) **Isotonic Dehydration**

Usually the most common type. There is equal loss of water and electrolytes. So serum sodium is normal.

(b) **Hypotonic Dehydration**

Loss of electrolytes (Sodium) is more than loss of water or there may be excess intake of water alone. Serum sodium is low (less than 130 m Eq/L)

TABLE 1

ASSESSMENT OF DEHYDRATION

	Mild Dehydration	Moderate Dehydration	Severe Dehydration
1. History of			
a. Diarrhoea	Less than four per day	Four to ten episodes	More than ten episodes
b. Vomiting	None or small amount	Some	very frequent
c. Thirst	Normal	Increased	Unable to drink
d. Urine Output	Normal	Small, dark amount	No urine for six hours
2. Appearance			
a. General	Well and alert	Sleepy, irritable	Drowsy, unconscious
b. Tears	Present	Absent	Absent
c. Eyes	Normal	Sunken	Very dry and sunken
d. Mouth, tongue	Wet	Dry	Very dry
e. Breathing	Normal	Fast	very fast and deep
3. Feel			
a. Skin	A pinch goes back quickly	A pinch goes back slowly	A pinch goes back very slowly
b. Pulse	Normal	Faster than normal	Very fast, weak or is impalpable able
c. Fontanelle	Normal	Sunken	Very sunken
4. Temperature	Usually normal	Normal or slightly increased	Increased or decreased
5. Weight	Mild weight loss Less than 5% (Children under two years). Less than 3% (children over two years)	Loss of 6 - 10% of body weight. (10% for children under 2 years) (6% children over 2 years)	Loss of over 10% of body weight.

(c) **Hypertonic Dehydration**

There is increased water loss compared to electrolyte loss, hence serum sodium is high (more than 150 m Eq/L). May also be a result of administration of highly concentrated salt solution either orally or intravenously. Hypertonic dehydration may cause fever, convulsions and intracranial haemorhage.

MANAGEMENT OF A DEHYDRATED CHILD

1. Laboratory Diagnosis

Laboratory investigations are not usually indicated in most cases of acute diarrhoea as this rarely influences the treatment of the child.

However if the child has bloody stools, is anaemic, is febrile, jaundiced or has other evidence of systemic infection e.g pneumonia, then appropriate laboratory investigations should be done, after thorough physical examination.

Lab investigations may include:-

1. Hb, WBC, Diff, ESR;
2. M.P slide
3. Stool and urine microscopy, (Stool electron microscopy for Rota virus)
4. Stool culture
5. Blood culture
6. Blood urea and electrolytes
7. Blood acid base status
8. Chest X-RAY
9. Widal test

2. Treatment of Acute Diarrhoea

Treatment at Home

Treatment of acute diarrhoea must begin at home by the mother, to prevent dehydration, The mother should do the following:

a. Give oral fluids to the child, such as ORS, rice water, maize gruel solution, weak tea or sugar salt solution;

b. Continue breast feeding and give other foods which the child likes. Increase number of feeds to five to seven times a day;

c. The mother should be taught to recognize signs of dehydration such as dry mouth and tongue, sunken eyes, fever, poor urine output, drowsiness, refusal to drink or suck and take her child to the nearest health centre. She should continue to give oral fluids on the way.

Treatment

At Health Centre/Hospital

Give Correct Case Management:-

a. Take a quick history and examine the child quickly to assess degree of dehydration and rule out systemic infections;

b. Estimate amount of fluid required and start oral rehydration therapy quickly;

c. Continue breast feeding on demand in small children and give frequent feeds to older children 4 to 6 hourly;

d. If child vomits wait for ten minutes and continue giving O.R.S. starting with smaller quantities of fluid using spoon and cup. Vomiting may be caused by drinking very fast in a child who is thirsty, or by metabolic acidosis, or even by fever. O.R.S. per se does not cause vomiting and latter may even stop after the acidosis has been treated.

e. Once a child is better hydrated, show the mother how to prepare and give O.R.S at home. After each loose stool she should give:-
50 - 100 mls (a quarter to one half cup) of ORS for a child less than two years.
or 100 - 200 mls for older children.

f. Show the mother how to prepare O.R.S at home, in the following way;-

1. Wash hands with soap and water;
2. Measure one littre of clean water (preferably cool boiled water) into a clean one littre container (by measuring 5 cupfuls of 200mls each), or using coca cola bottle (300 mls);

3. Add one level spoonful of salt to the 1,000 mls of fluid and mix well;
4. Taste the salt solution. It should not taste more salty than tears. If it does discard and start again;
5. Add 8 level teaspoonfuls of sugar and mix well;
6. Taste the solution and then give the child.

ORAL REHYDRATION THERAPY USING NASOGASTRIC TUBE

If the child cannot drink but is not in shock, ORS can be given using a nasogastric tube at a rate of 20 mls per kg per hour. If the patient's abdomen gets swollen, discontinue the nasogastric tube and give intravenous fluids.

Treatment of mild and moderate dehydration can be accomplished using oral rehydration solution only. However for a child who is severely dehydrated who is in a state of shock or is drowsy intravenous fluids should commence immediately for at least up to four to six hours, and then switch to oral fluids if the patient can now tolerate oral fluids.

COMPOSITION OF ORAL REHYDRATION SALT PACKETS

	Ingredient	Amount
1.	Sodium chloride	3.5 grams
2.	Glucose	20 grams
	or	
	Glucose MonohydratE	22 grams
	or	
	Sucrose (Common Sugar)	40 grams
3.	Sodium Citrate	2.9 grams
	or	
	Sodium Bicarbonate	2.5 grams
4.	Potassium Chloride	1.5 grams

This is mixed with one littre of drinking water to constitute ORS mixture.

How to Estimate Fluid Deficit

A child with acute diarrhoea and dehydration will require the following fluid therapy.

1. **Replacement of Fluid Deficit**

   This is calculated on the basis of degree of dehydration and average (normal) weight of the child for age.

   a. A mildly dehydrated child under two years of age has lost 50mls per kg (30 mls per kg for older children);

   b. A moderately dehydrated child has lost 100mls per kg. (60 mls per kg for children over two years);

   c. A severely dehydrated child has lost 150 mls per kg (90 mls per kg for children over two years of age)

So a one year old child whose weight is 10kg (before the diarrhoea episode), who is moderately dehydrated has a fluid deficit of 10 kg x 100 mls = 1,000 mls)

2. **Approximate Daily Maintenance Fluid Therapy**

   This varies according to age

Small infants (0 - 3 months)	150 mls/kg/24hrs
Large infants (4 - 12 months)	120 mls/kg/24hrs
Children over 1 year	100 mls/kg/24hrs
Adults	75 mls/kg/24hrs

   So maintenance Fluid Therapy for this child is 100 x 10 kg = 1,000 mls in 24 hours.

3. **Ongoing losses** which are calculated on the basis of number of loose stools and vomiting episodes in the previous six hours. For each watery stool replace loss according to age.

Under 6 months	20 - 50 mls per stool
6 to 24 months	50 - 100 mls per stool
Children over 2 years	100 - 200 mls per stool
Adults	200 - 400 mls per stool

4. Insensible fluid loss in case of fever, rapid breathing or body exposure (in newborn nurseries). This may amount to 10 - 15% of maintenance fluid therapy.
5. A one year old child who weighs 10kg who is moderately dehydrated and has no significant ongoing losses will need:-

   100 mls x 10 = 1,000 mls Fluid Deficit

   100 mls x 10 = 1,000 mls Maintenance Therapy

   Total = 2,000 mls in 24 hours

   Normally 75% of deficit is replaced in the first 24 hours. The balance is replaced during the next 24 - 36 hours.
6. A severely dehydrated child who is in shock, requires immediate replacement of intravascular fluid loses which is calculated at 20 - 30mls per kg and given intravenously within two hours to treat the shock state. After that normal fluid therapy is calculated as above (provided the shock state is reversed).

Role of Antimicrobial Therapy in Acute Diarrhoea

Acute diarrhoea is a self limiting disease usually lasting for several days only. The most important treatment therefore, irrespective of cause of the diarrhoea, is to replace fluid and electrolyte loss, using oral rehydration salt solution and to increase feeding during and immediately after the diarrhoeal episode.

Oral rehydration therapy does not stop the diarrhoea per se. but prevents or treats the dreaded complication of severe dehydration.

Antimicrobial therapy is therefore rarely indicated in acute diarrhoea. At least 90% of pateints with acute diarrhoea do not require antimicrobial therapy.

Disadvantages of Drug Therapy in Acute Diarrhoea

1. Markedly increases cost of treatment;
2. May prolong diarrhoea particularly if broadspectrum antibiotics are used, which change the gut flora;
3. Psychological dependency of the mother who will expect antibiotics for her child every time he has diarrhoea;

4. Distracts the mother from concentrating on the most important treatment which is replacement of fluid and electrolyte loss;
5. Strong antimotility drugs such as loperamide (Imodium) Diphenoxylate (Lomotil) and herbal medicines may cause severe complications of paralytic ileus and in the case of herbal medicines they cause acute renal shut down and hepatic failure.

Antibiotics should therefore be used very judiciously, with specific indications backed by laboratory results, and should be limited to less than one week of treatment.

Antimicrobial therapy are indicated in the <u>following specific causes of diarrhoea</u>.

1. <u>Cholera</u>
   (a) Tetracycline 50mg/kg/day for 7 days
   (b) Chemoprophylaxis for contacts or family adult members Tetracycline -----> 500 mg B.D for two days
   Children (5 to 12 years) 125mg B.D for two days
   Children under five years 50mg B. D for two days
   Doxycycline single dose may be used as alternative for chemoprophylaxis.
   Adults 300 mg start
   Children 6mg per kg as single dose

2. <u>Shigella Dysentry</u>
   Trimethoprim - Sulfamethoxazole (Septrin) 100mg per kg of Trimethoprim and 50mg per kg of Sulfamethoxazole. Give for five to seven days. Ampicillin may be used if culture sensitivity studies are positive.

3. <u>Salmonellosis (Non Typhoidal)</u>
   No antibiotics indicated

4. <u>Typhoid</u>
   Chloramphenicol 50 - 100 mg/kg/day for ten days. Other drugs which may be indicated by sensitivity studies are ampicillin, amoxycillin and trimethoprim - sulfamethoxazole (Septrin)

5. **Campylobacter**

Erythromycin 40mg/kg/day x seven days.

Furazolidine 5mg/kg/day x seven days

Tetracycline 50mg/kg/day x seven days (only in children over eight days of age to avoid complication of dental discoloration).

6. **E. Coli**

May not require antibiotics unless the diarrhoea is severe or recurring.

Antibiotics indicated are:

Trimethoprim - Sulfamethoxazole or Neomycin.

8. **Giardiasis**

Metronidazole (Flagyl) 50mg/kg/day x ten days.

Furazolidine 8mg/kg as single dose.

9 **Entaamoeba Histolytica**

Metronidazole x ten days.

Emetine

10. **Yersinia** (May mimic appendicitis)

Streptomycin

Tetracycline

Chloramphenicol

Sulphonamides

11. **Candida Albicans**

Mycostatin

Nizoral

12. **Cryptosporidium**

Fluocytocine

ge to avoid

Other Drugs Used in Treatment of Acute Diarrhoea

1. **Antidiarrhoeal Mixtures**

These should not be used and ought to be removed from all national formularies: Examples are:

(a) Adsorbants - Kaolin, pectin, activated charcoal, bismuth.

(b) Opiates, opiate like compounds and inhibitors of intestinal motility e.g Tincture of opium and codeine

(c) Diphenoxylate with atropine (Lomotil)
Loperamide (Imodium)

(d) **Herbal medicines**

All this should never be given to children. Antimotility drugs are often used in adults with persistent diarrhoea particularly in immunologically compromised patients.

1. **Antiemetics**

e.g chlorpromazine (Largactil) and Promethazine (Phenergan) are often given to a child with persistent vomiting. There is a danger of sedating the child and hence interrupting O.R.T. Use of O.R.S in small quantities will minimize vomiting and treat the acidosis, which together with the dehydration (thirst), fever and gastroenteritis are commonest causes of vomiting in acute diarrhoea.

2. **Antipyretics**

Paracetamol, tepid sponging may be used to bring down high temperatures which may cause febrile convulsions. Malaria should be ruled out. Treat systemic infections if diagnosed.

Prevention of Acute Diarrhoea and Its Complications

The National Control of Diarrhoeal Diseases (CDD) Programme should intensify health education programmes on radio, T.V. newspapers and in the community to heighten public awareness of the dangers of diarrhoea and how it can be treated early to prevent dehydration,

malnutrition and death. The National CDD manager should ensure the following:-

1. Regular training of health staff, who will train others and mothers to ensure correct case management of acute diarrhoea both at home and in health facilities;
2. Breast feeding should be continued for one year or for as long as possible. Children should continue feeding and receive extra nutrition during and after an episode of diarrhoea.
3. Improve weaning practices by introducing nutritious food between four to six months of age, while continuing breast feeding.
4. Immunizations must be up to date;
5. Use of clean water which must be boiled if the source of water is not protected;
6. Promote handwashing always before handling food and after use of toilet;
7. Proper stool disposal. Communities to be encouraged to build latrine and use them. Latrines should be constructed in a safe way for child use.
8. Latrines should be constructed far away from water source (at least 10 metres away) to prevent faecal contamination of water source.
9. Regular (annual) evaluation of CDD programmes to monitor impact on child health.

REFERENCES

1. Treatment and prevention of acute diarrhoea, guidelines for trainers of health workers, WHO Booklet 1985.
2. Lepage P. Food Based Oral Rehydration Salt solution for acute childhood diarrhoea. Lancet ii: 868 (1989).
3. Cruz J.R. Protection by breastfeeding against gastrointestinal infection and disease in infancy.
   In: Breastfeeding, nutrition, infection and infant growth in developed and emerging countries, ARTS Biomedical published and distributors PP 186-194 (1990)
4. A manual for the treatment of diarrhoea, WHO/CDD/SER/80.4, Rev.2 (1991).
5. Jelifffe D.B. and Jeliffe E.F.P Dietary management of young children, with acute diarrhoea. A manual for managers of health programmes. 2nd edition (1991).
6. Huilan S, et al Etiology of acute diarrhoea among children in developing countries. A multicentre study in five countries. Bulletin of the World Health Organization 1991, 69: 549 - 555.

CHAPTER 7

ACUTE RESPIRATORY INFECTIONS (A.R.I.)

INTRODUCTION

Infections of the respiratory tract from the nose to the alveoli, can be divided into upper respiratory tract infections such as;- coryza, otitis media, sinusitis, pharyngitis, and tonsillitis, and lower respiratory tract infections which include laryngo-tracheo-bronchitis (LTB), bronchitis, bronchiolitis, and pneumonia.

ARI is one of the most common causes of morbidity and mortality in infants and young children especially in the developing countries. Children aged under five years get about four (4) to eight (8) ARI attacks per child per year. It accounts for 40% - 60% of outpatients, 30% - 50 % of paediatric admissions, and 20% - 50% of deaths among children aged less than five years in developing countries. (1-5).

OBJECTIVES

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

(a) Describe the respiratory system;

(b) List the different syndromes of the respiratory system and describe their management and complications;

(c) State the attack rates of ARI per child per year, the proportion of outpatient visits, inpatient admissions due to ARI and the contribution of ARI to under five mortality;

(d) State the risk factors for ARI in children;

(e) List the three (3) most common bacterial and five (5) Common viral causes of ARI in children;

(f) Describe the Standard ARI case management: assess, classify and treat;

(g) Describe the three (3) phases of implementation of the Standard ARI case management;

(h) Give one specific means of prevention of ARI, and four non- specific measures, and describe the importance of health education in prevention of ARI.

LEARNING EXPERIENCE

(i) Practice examining infants and children with and without ARI and presenting them to the instructor;

(ii) Form small group discussions using the case illustration and objectives with the student presenting the management to his/her colleagues and the teacher acting as a resource person;

(iii) Practice counting the respiratory rates, identifying chest indrawing, stridor, wheeze, abnormally sleepy state and severe malnutrition;

(iv) review the ARI slide set: aetiology and epidemiology (slide 1 to 16), and standard ARI case management (slide 1 to 32);

(v) Review the ARI case management video;

(vi) Read the WHO manual on "Management of the Young Child with ARI; Supervisory Skills", WHO 1991;

(vii) Read the WHO manual on the "Outpatient management of young children with ARI", WHO 1992;

(viii) Read the WHO manual on "ARi in children: case management in small hospitals in the developing countries; a manual for doctors and other Senior Health Workers" WHO 1991;

(ix) Read the WHO document on "technical basis for the WHO recommendations on management of pneumonia in children at first level health facilities" WHO 1991;

(x) Read the WHO document on "Antibiotics in the treatment of ARI in young children" WHO 1990.

AETIOLOGY AND EPIDEMIOLOGY

Incidence and Impact of ARI on Child Health

One quarter to one third of the under five mortality in developing countries is due to ARI. Although the incidence of ARI is the same all over the world (about 4 to 8 attacks per child per year), there are marked differences in the magnitude of, and aetiology of severe ARI between developing and developed countries (1, 2, 6).

ARI accounts for 40% to 60% of paediatric clinic visits and 30% to 50% of paediatric hospital

admissions in most of the developing countries. In Kenya for example, ARI may account for as much as 19% to 40% of children's death and is the commonest cause of admission to paediatric wards (1, 3, 4, 5).

Aetiology

Pneumonia is the commonest cause of childhood admissions and fatality among the ARI syndromes. It contributes to 70% to 80% of ARI deaths in children (6). In developing countries the most common cause of pneumonia is bacterial infections, in contrast to the situation seen in the developed countries where viral infections seem to predominate.

The bacterial causes of pneumonia vary with age. In infants and young children, the most common bacteria are;

(a) Streptococcus pneumoniae;
(b) Haemophilus influenzae;
(c) Staphylococcus aureus (6,7,8).

In the young infants, (less than two months of age),

(d) Group B beta haemolytic streptococcus;
(d) Escherichia coli;
(e) Listeria monocytogenes;
(f) Chlamydia trachomatis.

are additional important causes of pneumonia.

Therefore, deaths from pneumonia in the developing countries can be prevented or greatly reduced by early detection and appropriate use of antibiotics.

It is also evident that viruses like;

(i) Respiratory syncitial virus (RSV);
(ii) Parainfluenzae;
(iii) Influenzae;
(iv) Adenovirus;
(vii) Measles.

are important and common causes of severe ARI in the developing countries in addition to bacterial pathogens cited above.

COMMON PREDISPOSING FACTORS FOR PNEUMONIA

One important reason why ARI are more severe in the developing countries than in the developed countries is the high prevalence of risk factors such as;

1. Malnutrition;
2. Low birth weight;
3. A large population of infants due to high birthrate;
4. Intercurrent infections such as measles, whooping cough, malaria and diarrhoea;
5. Overcrowding;
6. In-door air pollution;
7. Lack of immunization;
8. A decline in breastfeeding (in some countries).

The prevalence of malnutrition in most of the developing countries ranges from 20% to 60%, with the severe forms accounting for about 3% to 5%. Available evidence shows that the prevalence of pneumonia among the severely malnourished is as high as 72% (9), that pneumonia occurs 19 times more commonly in the malnourished than in the well nourished children (10), and that pneumonia death among the severely malnourished is 27 times higher than in the well nourished (11).

Morbidity and mortality from ARI tend to be higher in the younger age groups such that 30% of all deaths from ARI among children aged less than five (5) years is among infants aged less than two months.

There is evidence to suggest that diarrhoea and pneumonia may co-exist in a large proportion of hospitalized children in developing countries. Otieno, in her study of children aged under five years, admitted with diarrhoea, showed that as many as 77% had radiological pneumonia (12).

CLINICAL SIGNS AND THE DETECTION OF PNEUMONIA

The traditional approach in the diagnosis of the respiratory syndromes especially the diagnosis of pneumonia, is known to be associated with a significant degree of misdiagnosis. This is true even for highly qualified and experienced clinicians working in centres with good diagnostic facilities.

The majority of the population in most developing countries live in the rural areas which are served by relatively less equipped health facilities, and staffed by less trained health workers. Effective control of pneumonia requires its early detection and institution of appropriate antibiotic therapy. For this to be possible at all health facilities in the developing countries, simple criteria for diagnosis and management of pneumonia is required.

Since the inception of the global Programme for the Control of Acute Respiratory Infections (ARI) in 1984, many studies have been undertaken on clinical predictors of ARI (13,14,15,16). Based on these, the World Health Organisation (WHO) has developed guidelines for ARI case management, with emphasis on early detection and treatment of pneumonia. The criteria is action oriented, is both sensitive and specific for detection of pneumonia in children, and forms the main substance of the Standard ARI Case Management guidelines.

THE STANDARD A.R.I. CASE MANAGEMENT

The guidelines for Management of a child presenting with ARI emphasize the recognition and management of ARI at the outpatient level, be it at the dispensary, health centre, or hospital outpatient department. They should be simple enough to be effectively used by the community health workers and the mothers in the community to recognize early pneumonia, and therefore be able to seek early attention.

The detection of pneumonia is based on two important clinical parameters; respiratory rate and chest indrawing. As is shown in figure 1, every child presenting with a history of cough and/or difficult breathing must undergo a thorough assessment, be classified and be given appropriate treatment. For objective management, the children are divided into two groups based on age

as follows: two (2) months to five (5) years (the young child), and under two (2) months (the young infant).

Assessment (Figure 1)

For every child presenting with cough and/or difficult breathing, it is important to know the age, and the duration of cough. The clinical features detected during assessment will be very useful in classifying and treatment of the patient.

For the child aged two (2) months to five (5) years, the following must be asked and looked for;

(a) is the child able to drink?
(b) has the child had convulsions?
(c) is the child abnormally sleepy, or difficult to wake?
(d) does the child have stridor?
(e) is the child severely malnourished?
(f) does the child have chest indrawing?
(g) does the child have fast breathing?

For the child aged under two (2) months all the above parameters are important except, ability to drink and severe malnutrition, but the following are added;

(i) is the child able to feed?
(ii) does the child have fever?
(iii) does the child have a wheeze?

This group is specifically treated, because ARI mortality is higher and disease presentation and treatment are significantly different than in the older age group. Bacterial infections in this age group may present with non specific clinical signs making it difficult to distinguish pneumonia from sepsis and meningitis.

<u>Respiratory Rate</u>

Respiratory rate varies considerably with age. When using this parameter, the children are divided into three (3) groups and are considered to have increased respiratory rate as indicated below;

(a) for children aged under two (2) months, the respiratory rate cut off point is 60 per minute;

(b) for children aged two (2) months to 12 months, the respiratory rate cut off point is 50 per minute;

(c) for children aged 12 to 60 months the respiratory rate cut off point is 40 per minute.

Severity (Classification) of Illness (Figure 1)

It is important to note that under the classification section, the children aged two (2) months to five (5) years, have four (4) categories of severity of illness as follows: Very Severe Disease, Severe Pneumonia, Pneumonia, No pneumonia; cough or cold. The children under two (2) months of age on the other hand have three categories as follows: Very Severe Disease, Severe Pneumonia and No pneumonia: cough or cold. In this group (young infants) all pneumonias are severe, and must therefore be admitted for treatment, and should not be treated at home.

Very Severe Disease

This class includes all the severe conditions like, very severe pneumonia, severe bronchiolitis, septicaemia, meningitis, cerebral malaria, throat abscess. These conditions carry high case fatality rates, and must therefore be treated as in-patients. Delay in initiation of appropriate treatment is associated with greater morbidity and mortality in this category of conditions. A patient is put in this class on identification of a danger sign. For a child aged two (2) months to five (5) years the danger signs are; not able to drink, abnormally sleepy or difficult to wake, stridor, convulsions and severe malnutrition. For the child aged under two (2) months the danger signs are; refusal to suck, abnormally sleepy or difficult to wake, stridor, wheeze, convulsions and temperature instability i.e. low (i.e. less than $35.5^{0}C$) or high temperatures (i.e. more than $38^{0}C$).

Treatment (Figure 1)

In a population, about 80% of the children with ARI have no pneumonia. They have simple cough or cold. About 10% to 15% have pneumonia while 5% to 10% have Severe Pneumonia and Very Severe Disease.

Patients with Very Severe Disease and Severe Pneumonia should be hospitalized and treated with parenteral antibiotics, given appropriate supportive care and relevant investigations undertaken. Those with pneumonia can be treated with oral antibiotics at home. The antibiotics chosen for this purpose should be effective, cheap and safe. The WHO recommends the use of cotrimoxazole, amoxycillin, ampicillin or procaine penicillin for treatment of pneumonia on an out patient basis. The large majority of ARI with no Pneumonia but have simple cough or cold need no antibiotics. Antibiotics do not improve their conditions, and they (antibiotics) do not prevent these children from developing pneumonia. Mothers of such children should be given guidelines on home care essential for management of the children.

The Management of Child with a Wheeze

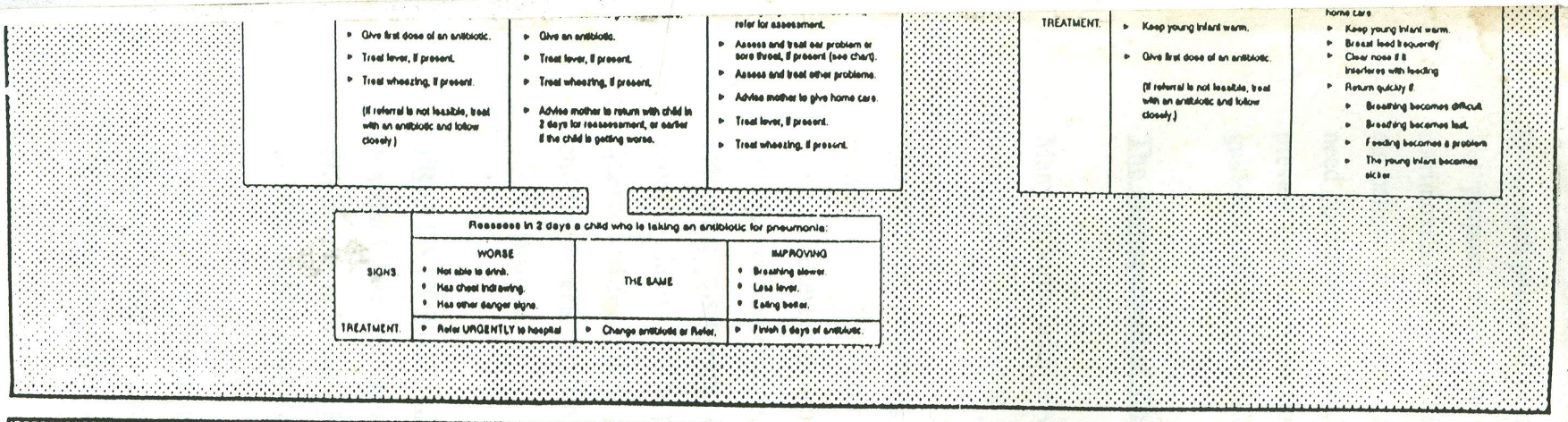
Many children with a wheeze present with either increased respiratory rate and/or chest indrawing. As many as 50% of such children will have pneumonia (17).

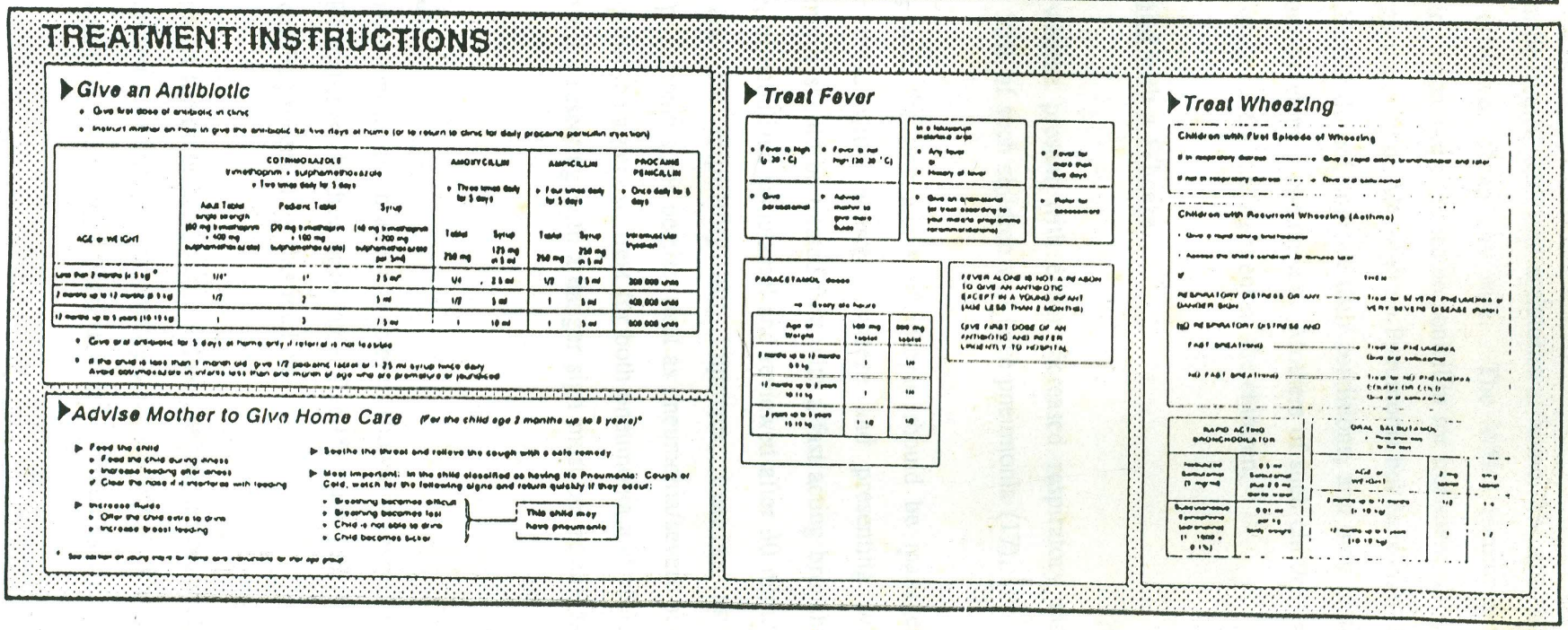
The children presenting with the first attack of wheeze should be managed as above for pneumonia. However those with recurrent wheeze and presenting with features of pneumonia/severe pneumonia should be treated first with a fast acting bronchodilator such as subcutaneous adrenaline, or nebulized salbutamol and reviewed after 30 minutes. If the chest indrawing disappears and the respiratory rate improves, treat as asthma with oral bronchodilators. If the pneumonia signs persist, treat as pneumonia/severe pneumonia. If the wheeze and features of pneumonia persist, treat for both pneumonia and wheeze. Note that a child with recurrent wheeze presenting with a danger sign must be treated as a case of Very Severe Disease.

PREVENTION OF A.R.I.

Standard ARI case management as given above, has been shown in several field studies to be effective in reducing ARI deaths in children aged under five (5) years (18,19,20,21). As much as 50% of ARI deaths can be prevented by this method.

Prevention of pneumonia on the other hand requires that the risk factors such as malnutrition, low birth weight, intercurrent infections, overcrowding and pollution are brought under control. Of these, vaccination against some of the infectious diseases such as measles and whooping

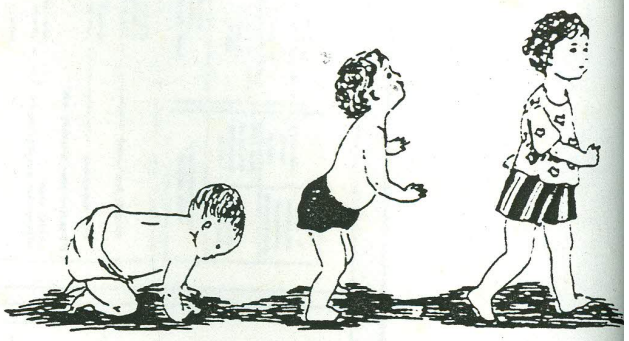




FOR CLARITY SEE TABLES TWO TO FOUR.

THE CHILD
AGE 2 MONTHS UP TO 5 YEARS

SIGNS:	• Not able to drink. • Convulsions. • Abnormally sleepy or difficult to wake, • Stridor in calm child, or • Severe malnutrition.
CLASSIFY AS:	VERY SEVERE DISEASE
TREATMENT:	▸ Refer URGENTLY to hospital. ▸ Give first dose of an antibiotic. ▸ Treat fever, if present. ▸ Treat wheezing, if present. ▸ If cerebral malaria is possible, give an antimalarial.



SIGNS:	• Chest indrawing. [If also recurrent wheezing, go directly to ▸ *Treat Wheezing*]	• No chest indrawing, and • Fast breathing (50 per minute or more if child 2 months up to 12 months; 40 per minute or more if child 12 months up to 5 years).	• No chest indrawing, and • No fast breathing (Less than 50 per minute if child 2 months up to 12 months; Less than 40 per minute if child 12 months up to 5 years).
CLASSIFY AS:	SEVERE PNEUMONIA	PNEUMONIA	NO PNEUMONIA: COUGH OR COLD
TREATMENT:	▸ Refer URGENTLY to hospital. ▸ Give first dose of an antibiotic. ▸ Treat fever, if present. ▸ Treat wheezing, if present. (If referral is not feasible, treat with an antibiotic and follow closely.)	▸ Advise mother to give home care. ▸ Give an antibiotic. ▸ Treat fever, if present. ▸ Treat wheezing, if present. ▸ Advise mother to return with child in 2 days for reassessment, or earlier if the child is getting worse.	▸ If coughing more than 30 days, refer for assessment. ▸ Assess and treat ear problem or sore throat, if present (see chart). ▸ Assess and treat other problems. ▸ Advise mother to give home care. ▸ Treat fever, if present. ▸ Treat wheezing, if present.

	Reassess in 2 days a child who is taking an antibiotic for pneumonia:		
SIGNS:	WORSE • Not able to drink. • Has chest indrawing. • Has other danger signs.	THE SAME	IMPROVING • Breathing slower. • Less fever. • Eating better.
TREATMENT:	▸ Refer URGENTLY to hospital.	▸ Change antibiotic or Refer.	▸ Finish 5 days of antibiotic.

ın Antibiotic

dose of antibiotic in clinic.

nother on how to give the antibiotic for five days at home (or to return to clinic for daily procaine penicillin injection).

IT	COTRIMOXAZOLE trimethoprim + sulphamethoxazole ▸ Two times daily for 5 days			AMOXYCILLIN ▸ Three times daily for 5 days.		AMPICILLIN ▸ Four times daily for 5 days.		PROCAINE PENICILLIN ▸ Once daily for 5 days.
	Adult Tablet single strength (80 mg trimethoprim + 400 mg sulphamethoxazole)	Pediatric Tablet (20 mg trimethoprim + 100 mg sulphamethoxazole)	Syrup (40 mg trimethoprim + 200 mg sulphamethoxazole per 5ml)	Tablet 250 mg	Syrup 125 mg in 5 ml	Tablet 250 mg	Syrup 250 mg in 5 ml	Intramuscular Injection
5 kg)+	1/4*	1*	2.5 ml*	1/4	2.5 ml	1/2	2.5 ml	200,000 units
nths (5-9 kg)	1/2	2	5 ml	1/2	5 ml	1	5 ml	400,000 units
rs (10-19 kg)	1	3	7.5 ml	1	10 ml	1	5 ml	800,000 units

antibiotic for 5 days at home only if referral is not feasible.

d is less than 1 month old, give 1/2 pediatric tablet or 1.25 ml syrup twice daily.
rimoxazole in infants less than one month of age who are premature or jaundiced.

e Mother to Give Home Care *(For the child age 2 months up to 5 years)**

child.
ne child during illness.
se feeding after illness.
he nose if it interferes with feeding.

fluids.
ne child extra to drink.
se breast-feeding.

▶ Soothe the throat and relieve the cough with a safe remedy.

▶ Most Important: In the child classified as having No Pneumonia: Cough or Cold, watch for the following signs and return quickly if they occur:

- ▸ Breathing becomes difficult.
- ▸ Breathing becomes fast.
- ▸ Child is not able to drink.
- ▸ Child becomes sicker.

This child may have pneumonia.

oung *intent for home care instructions for that age group.*

ever

ever is not gh (35-37 °C).	In a locality with malaria risk: • Any fever, or • History of fever.	• Fever for more than five days.
Advise mother to give more fluids.	▸ Give an antimalarial (or treat according to your malaria programme recommendations).	▸ Refer for assessment.

	100 mg tablet	200 mg tablet
	1	1/2
	1	1/2
	1 1/2	1/2

FEVER ALONE IS NOT A REASON TO GIVE AN ANTIBIOTIC EXCEPT IN A YOUNG INFANT (AGE LESS THAN 2 MONTHS).

GIVE FIRST DOSE OF AN ANTIBIOTIC AND REFER URGENTLY TO HOSPITAL.

▶ Treat Wheezing

Children with First Episode of Wheezing

If in respiratory distress ——→ Give a rapid-acting bronchodilator and refer.

If not in respiratory distress ——→ Give oral salbutamol.

Children with Recurrent Wheezing (Asthma)

- Give a rapid acting brochodilator
- Assess the child's condition 30 minutes later.

IF:	THEN:
RESPIRATORY DISTRESS OR ANY DANGER SIGN	Treat for SEVERE PNEUMONIA or VERY SEVERE DISEASE (Refer).
NO RESPIRATORY DISTRESS AND:	
FAST BREATHING	Treat for PNEUMONIA. Give oral salbutamol.
NO FAST BREATHING	Treat for NO PNEUMONIA: COUGH OR COLD. Give oral salbutamol.

RAPID ACTING BRONCHODILATOR	
Nebulized Salbutamol (5 mg/ml)	0.5 ml Salbutamol plus 2.0 ml sterile water
Subcutaneous Epinephrine (adrenaline) (1: 1000 = 0.1%)	0.01 ml per kg body weight

ORAL SALBUTAMOL ▸ Three times daily for five days		
AGE or WEIGHT	2 mg tablet	4mg tablet
2 months up to 12 months (< 10 kg)	1/2	1/4
12 months up to 5 years (10-19 kg)	1	1/2

TABLE 1

MANAGEMENT OF THE CHILD WITH COUGH OR DIFFICULT BREATHING

ASSESS

ASK:

- How old is the child?
- Is the child coughing? For how long?
- Age 2 months up to 5 years: Is the child able to drink?
  Age less than 2 months: Has the young infant stopped feeding well?
- Has the child had fever? For how long?
- Has the child had convulsions?

LOOK, LISTEN:

(Child must be calm)

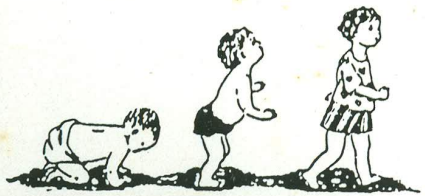
- Count the breaths in one minute.
- Look for chest indrawing.
- Look and listen for stridor.
- Look and listen for wheeze. Is it recurrent?
- See if the child is abnormally sleepy, or difficult to wake.
- Feel for fever or low body temperature (or measure temperature).
- Look for severe malnutrition.

CLASSIFY THE ILLNESS

THE CHILD
AGE 2 MONTHS UP TO 5 YEARS

Does child have danger signs?

SIGNS:	• Not able to drink, • Convulsions, • Abnormally sleepy or difficult to wake, • Stridor in calm child, or • Severe malnutrition.
CLASSIFY AS	VERY SEVERE DISEASE
TREATMENT:	▸ Refer URGENTLY to hospital. ▸ Give first dose of an antibiotic. ▸ Treat fever, if present. ▸ Treat wheezing, if present. ▸ If cerebral malaria is possible, give an antimalarial.



Does child have pneumonia?

SIGNS:	• Chest indrawing. (If also recurrent wheezing, go directly to ▸ *Treat Wheezing*)	• No chest indrawing, and • Fast breathing (50 per minute or more if child 2 months up to 12 months, 40 per minute or more if child 12 months up to 5 years)	• No chest indrawing, and • No fast breathing (Less than 50 per minute if child 2 months up to 12 months, Less than 40 per minute if child 12 months up to 5 years)
CLASSIFY AS:	SEVERE PNEUMONIA	PNEUMONIA	NO PNEUMONIA: COUGH OR COLD

THE YOUNG INFANT
(AGE LESS THAN 2 MONTHS)

SIGNS:	• Stopped feeding well, • Convulsions, • Abnormally sleepy or difficult to wake, • Stridor in calm child, • Wheezing, or • Fever or low body temperature.
CLASSIFY AS	VERY SEVERE DISEASE
TREATMENT:	▸ Refer URGENTLY to hospital. ▸ Keep young infant warm. ▸ Give first dose of an antibiotic.



SIGNS:	• Severe chest indrawing, or • Fast breathing (60 per minute or MORE)	• No severe chest indrawing, and • No fast breathing (LESS than 60 per minute)
CLASSIFY AS:	SEVERE PNEUMONIA	NO PNEUMONIA: COUGH OR COLD

TABLE 2

MANAGEMENT OF THE CHILD WITH COUGH OR DIFFICULT BREATHING

ASSESS

ASK:

- How old is the child?
- Is the child coughing? For how long?
- Age 2 months up to 5 years: Is the child able to drink?
  Age less than 2 months: Has the young infant stopped feeding well?
- Has the child had fever? For how long?
- Has the child had convulsions?

LOOK, LISTEN:

(Child must be calm)

- Count the breaths in one minute.
- Look for chest indrawing.
- Look and listen for stridor.
- Look and listen for wheeze. Is it recurrent?
- See if the child is abnormally sleepy or difficult to wake.
- Feel for fever or low body temperature (or measure temperature).
- Look for severe malnutrition.

cough is the most feasible strategy. By vaccinating children against measles and whooping cough, about a quarter of pneumonias are prevented.

Effective vaccine has been developed against haemophilus influenzae, but few efficacy studies have been carried out in the developing countries as it is relatively expensive. Vaccines for streptococcus pneumoniae and respiratory syncitial virus (RSV) still require perfection before they can be widely used. Breastfeeding should be encouraged and be exclusive in the first 4 to 6 months of age and should be continued for as long as possible.

REFERENCES

1. Bulla, A., Hitze, K.L. (1978) Acute respiratory infections: A review. Bull Wld Hlth Org. 56:481;
2. Pio, A. et al. (1984). The problem of Acute respiratory infections in children in developing countries. In Acute Respiratory Infections in Children. Proceedings of an International Workshop, Sydney, pp 3-16;
3. Shann, F., Hart, K., and Thomas, D. (1984). Acute Lower Respiratory Infections in children; possible criteria for selection of antibiotic therapy and hospital admission. Bull Wld Hlth Org. 62:749;
4. Wafula, E.M. and Onyango, F.E. (1986) Acute Respiratory Infections in developing countries. E Afr Med J. 63:211.
5. Mirza, N.M., Macharia, W.M., Wafula, E. M., Agwanda, R. and Onyango, F. E. (1990). A verbal autopsy: A tool for determining cause of death in a community. E Afr Med J. 67:693-698;
6. A programme for controlling acute respiratory infections in children, a memorandum from a WHO meeting (1984). Bull Wld Hlth Org. 62:42;
7. Shann F. (1986). Aetiology of severe pneumonia in children in developing countries. Ped Inf Dis. 5:247-252;
8. Wall, R.A. et al. (1986). The aetiology of lobar pneumonia in the Gambia. Bull Wld Hlth Org. 64:553-558;
9. Ngamau, D.W. (1990). Prevalence of Lower Respiratory Tract Infections in the Severely Malnourished Children. A Dissertation for Master of Medicine in Paediatrics and Child Health, University of Nairobi, Kenya;
10. James, J.W. (1972). Longitudinal study of morbidity of respiratory and diarrhoeal infections in malnourished chidren. Am J Clin Nutr. 25:690;

11. Tupasi, T.E., Velmonte, M.A., Sanvictores, M.E., Abraham, L., De Lem, L., Tan, S. A. and Miguel, C.A.. (1988). Determinants of morbidity and mortality due to acute respiratory infections. Implications for Interventions. J Inf Dis. 157:615;

12. Otieno J. A. (1992). Prevalence of persistent diarrhoea in children admitted at the Infectious Diseases Hospital, Kenyatta National Hospital. A Dissertation for Master of Medicine in Paediatrics and Child Health, University of Nairobi, Kenya;

13. Leventhal, J.M. (1982). Clinical predictors of pneumonia as a guide to ordering check roentgenograms. Pediatrics 21:730-734;

14. Campbell, H. et al. (1988). Assessment of clinical criteria for identification of severe acute lower respiratory tract infections in children. Lancet 2:742-743;

15. Wafula, E.M., Tindyebwa, D.B. and Onyango, F.E. (1989). The diagnostic value of various features for acute lower respiratory infection among under fives. E Afr Med J. 66:678-684;

16. Wariua, S. (1990). The clinical predictors of acute lower respiratory infections and oxygen denaturation in young children. A Dissertation for Master of Medicine in Paediatrics and Child Health, University of Nairobi, Kenya;

17. Wafula, E.M. and Muruka, F.J. (1984). Chest X-rays in children with acute respiratory infections or bronchospasm at Kenyatta National Hospital. E Afr Med J. 61:900-906;

18. Datta, n et al. (1987). Application of case management to the control of acute lower respiratory infections in low birth weight infants: a feasibility study. Bull Wld Hlth Org. 65:77-82;

19. Roesin, R. et al. (1990). ARI intervention study in Kediri, Indonesia. Bull Int Uni Agst Tb Lng Dis. 65:23;

20. Pandey, M.R. et al. (1989). Impact of a pilot on acute respiratory infection control programme in a rural community of the hill region of Nepal. Ann Trop Paed. 9:212-220;

21. Khan, A.J. et al. (1990). Acute respiratory infection in children: a case management intervention in Abbottabad District, Pakistan. Bull Wld Hlth Org. 68:577-585.

CHAPTER 8

MALARIA IN CHILDREN

INTRODUCTION:

It has been estimated that 90% of the African population live in malarious zones and malaria is a direct cause of approximately 12% of all deaths of African children below three years of age. Malaria is, therefore a threat to child survival and development. It is a major cause of foetal loss and low birth-weight (LBW) particularly in primiparous mothers. The risk of severe malaria is greatest during pregnancy, early puerperium, early childhood and in individuals where malaria coexists with other infections, stress or chronic diseases and in individuals with little or no immunity to malaria.

Protein energy malnutrition (PEM), anaemia and malaria often coexist and aggravate each other. The effect of malaria starting from pregnancy (anaemia, LBW and abortion), infancy (anaemia and death) and young children can result in:-

1. Sapping the energy and growth in children;
2. Poor education and stunted growth in children;
3. Low work output;
4. reduced or slow economic development.

Therefore, control of malaria as an integral part of primary health care (PHC) is very important for a healthy community.

OBJECTIVES

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

1. Explain the transmission of malaria;

2. Explain the epidemiology of malaria and measure the extent of the problem in your community;
3. Explain the pathophysiology of malaria in children including:-
   - the clinical features;
   - and diagnoses.
4. Enumerate complications of malaria in children;
5. Treat simple and severe attacks of malaria
6. Diagnose, explain and suggest treatment for drug resistance;
7. List methods of control and prevention of malaria.

LEARNING ACTIVITIES

1. During your paediatric rotation, make a clinical diagnosis of malaria and confirm it by laboratory investigations;
2. During your community assignment, estimate the frequency of malaria in schools based on the frequency of anaemia, hepatosplenomegaly and positive blood smear;
3. During your community assignment, determine the availability and common use of antimalarial drugs.

AETIOLOGY AND TRANSMISSION OF MALARIA

Malaria is caused by protozoa of the genus plasmodium. The species which affect man are P. Falciparum, P. Vivax, P. Malariae and P. Ovale. P. Falciparum is the most important cause of malaria in human beings. Transmission is from man to man by the following ways:-

(a) The bite of an infected mosquito;

(b) Placental infection from an infected mother. This occurs in endemic malarial areas;

(c) By transfusing infected blood.

Methods Used To Estimate Prevalence of Malaria.

The following are methods used to estimate the prevalence of malaria in a community:-

1. **Spleen Rate**

This method estimates the proportion of children in the age group two to ten years who have splenomegaly (see table 1 below).

Table 1: WHO Classification of Malaria Endemicity.

Malaria Endemicity	Spleen Rate (in children 2 - 10 years of age)
Hypoendemic	0 - 10%
Mesoendemic	11 - 50%
Hyperendemic	Spleen rates in children consistently over 75%

Splenic enlargement in adults with malaria is low, due to high adult tolerance to malaria.

2. **Parasite Rate**

This is a proportion of the population in which malaria parasites are found using either thin or thick blood films.

3. **Parasite Count**

This can be reported as parasites against leucocyte count for exact amount of blood related to a count. it can also be determined by serological tests.

PATHOGENESIS OF MALARIA INFECTION

Hemolysis and tissue ischaemia accounts for the majority of pathophysiological changes. The higher the parasite count the worse the prognosis.

Infected erythrocytes become sticky and are coated with fibrin which causes agglutination and obstruction in small vessels, thus leading to local hypoxia. In addition the following disturbances may occur:-

(1) **Anaemia**

- more severe with P. Falciparum because it invades red blood cells of all ages and frequently produces a high level of parasitemia;

Mechanisms of anaemia in malaria infection are:-

(a) direct lysis of red blood cells;

(b) splenic removal of parasitized red blood cells;

(c) autoimmune destruction of infected and non infected coated erythrocytes;

(d) reduced incorporation of iron into bone;

(e) increased fragility of red blood cells caused by dysfunction of Na+pump;

(f) impaired erythropoiesis due to direct bone narrow suppression from malarial toxin;

(g) increased intramedullary destruction of red blood cell precursors and erythrocyte maturation arrest from folic acid and PABA deficiencies.

2. **Hypoglycaemia**

Occurs due to depleted glycogen stores and competition for serum glucose by the parasite. Reduced food intake and the increased secretion of insulin in patients treated with quinine also contribute to hypoglycemia.

3. **Thrombocytopenia**

Can occur due to coagulation defects and splenic sequestration;

4. Hypergammaglobulinaemia, hypocholesterolaemia, hyperbilirubinemia and raised transsaminases do occur frequently due to fever and liver dysfunction. There is usually hepatomegaly due to congestion from parasitized cells in sinusoid and centrilobular veins and swollen parenchyme and kupffer cells;
5. Hyperkalemia and hyponatremia are seen in acute attacks of malaria. They are due to increased destruction of red blood cells and intravascular volume expansion occurring as a compensatory response to the vasodilatation caused by malaria toxins;
6. Acidosis can occur due to increased lactate and pyruvate production as the parasites use glucose;
7. Splenomegaly occurs due to hyperplasia of reticuloendothelial system and vascular congestion. Tropical splenomegaly syndrome (TSS) occurs with an abnormal immune response to persistent malarial antigen stimulation in an endemic region;
8. In the brain parasitized red blood cells are preferentially sequestrated in deep capillaries causing clogging and subsequent ischaemic changes, congestion oedema and cardiovascular system manifestations.

CLINICAL FEATURES

The clinical features of malaria in children are more variable unlike in the adult. The clinical picture of malaria attack depends on the child's age and immunity or tolerance to malaria and whether one is living in an endemic or non-endemic area.

Malaria in Endemic Areas:

The non-immune infants and children who contact malaria for the first time also have a variable clinical picture. They may present with restlessness, drowsiness, listlessness or refusal to feed. They may also have headache, nausea and pallor. A clear cut cold stage and rigor are uncommon. Vomiting can be severe causing dehydration and electrolyte imbalance. Fever is

invariable, often continuous although it may also be irregular. Convulsions often occur. Cerebral malaria is common and presents with:

Hyperpyrexia, impaired or loss of consciousness, convulsions and localized neurological signs.

DIAGNOSIS OF MALARIA

Definite diagnosis of malaria is made by establishing the presence of parasites in the blood by examining a blood smear. However, due to delays in blood testing in developing countries, malaria should be suspected in all cases of fever in endemic areas. Proper history taking through physical examination are mandatory to differentiate malaria from other febrile conditions such as urinary tract infection, meningitis, tonsillitis, viral infection etc. Some investigations (other than a blood smear) are also necessary in order to exclude the coexistence of the many problems in children in developing countries. Since a significant proportion of healthy children have low level malarial parasitemia throughout the year, the presence of malaria parasites in the blood of a patient with acute febrile illness might not necessarily indicate that malaria is the cause of the patient's illness.

Diagnosis of malaria may also be made by detection of antibodies in the blood of the patient by serological tests. Since malarial antibodies persist in the blood of the patient after the infection, these tests are therefore only useful for surveys or research work and in subjects in whom parasites are difficult to find.

COMPLICATIONS OF MALARIA

A. Vivax Quartan and Ovale Malaria

Complications of acute attacks of vivax, quartan or ovale malaria are relatively uncommon but the infection may undermine the general condition of the growing child

and aggravate other intercurrent diseases. High temperatures seldom persist for more than brief periods. Cerebral and intestinal symptoms are rare, but the nephrotic syndrome is a complication often seen with plasmodium malariae.

B **Falciparum Malaria**

The high invasive power of P. Falciparum leads to the rapid destruction of erythrocytes and the resulting anaemia can be very severe. Infection in which five to twenty percent of red blood cells contain parasites are uncommon. The progressive blood loss leads to anaemia and microthrombi formed by parasitized cells lead to local anoxia of various organs and the resulting changes in the brain, liver, kidney, bone marrow, lungs etc. are responsible for complications of falciparum malaria which can be very serious especially in those who have little immunity to the diseases. They occur in endemic regions most commonly between the ages of six months to three years and are responsible for almost all the deaths directly due to malaria in these areas. These severe (pernicious) attacks can develop with great suddenness and manifest themselves as:-

(a) Cerebral malaria;

(b) Gastrointestinal malaria with diarrhoea and vomiting;

(c) Hyperpyrexia;

(d) Severe anaemia (malarial anaemia). Packed cell volume is less than 20%;

(e) Algid malaria which presents as peripheral vascular collapse due to adrenal failure;

(f) Black water fever;

(g) Acute renal failure;

To these may be added:-

(h) Disseminated intravascular coagulation (DIC)

(i) Metabolic acidosis.

TREATMENT OF MALARIA

A. Drugs Used in the Treatment of Malaria

The following are groups of drugs currently available for the treatment of malaria:-

1. Cinchonaalkaloids - quinine, quinidine;
2. Aminoacridines - mepacrine;
3. 4 - aminoquinolines - chloroquine; amodiaquine, amopyroquine;
4. 8 - aminoquinolines - primaquine, pamaquine, quinocide;
5. Biquanides - proquanil, chlorproquanil;
6. Diaminopyrimidines - pyrimethamine, trimethoprim;
7. Sulphonamides e.g sulphadoxine, sulphametopyraxine, sulphamethoxazole and DDS;
8. Metioquine;
9. Antibiotic - tetracycline and clindamycin;
10. Qinghaosu.

B. Treatment of Malaria

Treatment of malaria in infants and children poses special problems because of the following reasons:-

(i) Acute attacks of malaria may be more severe than in adults;

(ii) Vomiting is common and reduces the treatment options as oral medication may not be possible;

(iii) Cerebral malaria is more common than in adults;

(iv) Gastrointestinal complication presenting with diarrhoea and vomiting can cause dehydration;

(v) Anaemia may be severe - so severe as to require blood transfusion;

(vi) Compliance with medications can be poor because children cannot be made to understand its importance, therefore, parents' health education and their cooperation are absolutely vital in the treatment of malaria.

Except in case of drug-resistance, quick actions chizonticides are more preferable than slow acting in the treatment of acute attacks of malaria. In this case the total dose is more important than the type of the drug used. Treatment of simple versus severe or complicated infection will be discussed separately thus:-

(a) **Treatment of a Simple Acute Attack of Malaria**

Unless there is resistance, chloroquine is the drug of first choice. The recommended total dose is 25 mg/kg of body weight administered in three days in single doses as follows:- 10mg/kg start followed by 5mg/kg six hours later then 5 mg/kg on the second day and 5 mg/kg on the third day. Amodiaquine is a potential alternate to chloroquine when there is chloroquine resistance. Another drug which can be used in case of chloroquine resistance is quinine given at a dose of 10mg/kg of body weight orally or by deep intramuscular injection eight hourly until the patient is able to take orally, then continued orally for seven days.

(b) **Treatment of a Severe or Complicated Infection**

P. Falciparum infection can cause a medical emergency of the first order especially when over 3% of the red blood cells are infected. These patients may present with convulsions, stupor, copious vomiting and diarrhoea, anaemia, acute abdominal crisis or acute renal failure. For these types of patients speed is absolutely vital in order to save them.

Therefore, quinine which has a more rapid schizonticidal action than the other fast acting schizonticidal drugs is the drug of first choice. It is given intravenously at a dose of 20 mg/kg of body weight for first dose diluted in 100 - 200 mls of 0.45% sodium chloride in 2.5% glucose and then 10 mg per kg every eight hours until the patient is well enough to take oral medications. Quinine intravenous infusion should be run slowly over thirty minutes to avoid cardiac complications including cardiac arrest.

Oral quinine should then be administered for seven to ten days. If quinine is not available, parental chloroquine, at a dose of 5 mg/kg of body weight twelve hourly, should be used. In addition to the correction of anaemia, hypolycaemia, water and electrolyte imbalance if they exist should be corrected.

MALARIA DRUG RESISTANCE

Malaria drug resistance is defined as the ability of a strain of a malarial parasite to survive and multiply inspite of an antimalarial drug in usual or even higher than usual doses. Drug resistance (R) is divided into three types depending on its severity viz:-

RI drug resistance with recrudescence. Parasites reappear in blood within fourteen days following initial clearing of symptoms and parasites;

RII drug resistance with low parasitemia which never clear completely;

RII drug resistance with persistently high parasitemia for twenty eight days.

There should be no re-infection and the drug given should be well tolerated. Clinically, drug resistance should be suspected when there is:-

(i) Persistence of fever and no improvement beyond forty eight hours after starting drug treatment;

(ii) Poor laboratory response to the antimalarial treatment when blood test is done daily as treatment proceeds.

Treatment of Patients With Chloroquine Resistance

Chloroquine resistance has been reported in many parts of the world including East and Central Africa. Resistance to Fansidar (pyrimethamine/sulfadiazine) has also been reported in East and Central Africa. However, quinine resistance has not been reported in this part of the world although it does exist in South East Asia. For chloroquine resistance, the following drugs can be used as alternatives:-

Amodiaquine

Parasites with RI, RII and RIII resistance to chloroquine may retain sensitivity or be less resistant to amodiaquine. This drug is therefore a useful substitute of chloroquine where oral treatment is required. Amodiaquine injection is not commercially available;

Quinine

Quinine can be given alone at a dose of 10 mg/kg per dose orally or parenterally every six hours for seven to ten days;

Quinine for three days followed by Fansidar single dose orally on the third day;

Fansidar alone as single dose orally;

Mefloquine alone;

Quinidine can be given in combination with Tetracycline for seven days. Tetracycline is not suitable for children below eight years of age;

Quinghaosu - no resistance noted yet.

MALARIA CONTROL

The World Health Organization (WHO) has defined levels of malaria control interventions (Tactical variants) with ultimate aim of malaria irradication. Malaria control is also part of Primary Health Care since 1978.

Tactical Variant I

Aims at reducing and preventing both mortality and morbidity due to malaria using antimalarial drugs. Essential drug programme should therefore be encouraged for efficient distribution of antimalarial drugs to the acutely ill patients.

Tractical Variant II

Aims at reducing and preventing both mortality and morbidity due to malaria. This calls for antimalarials for both curative and chemoprophylaxis to the high risk vulnerable groups which include:-

(a) The non-immune immigrants;

(b) The pregnant women;

(c) Underfives with special problems e.g sickle cell anaemia.

Tactical Variant III

This objective is to prevent mortality and reduce malaria prevalence and morbidity. It adds the reduction of man-vector contact to tactical variant II.

Tactical Variant IV

Aims at achieving country wide malaria control. It is concerned with surveillance after malaria control has been achieved and ensures that resurgence does not occur. The long term aim is eradication of malaria.

Drug Used for Chemoprophylaxis

The drug used for prophylaxis against malaria include:
pyrimethamine, proguanil, chloroquine, fansidar, metadelfin, darachlor and amodiaquine. For Tanzania resistance to pyrimethamine is very high and therefore this drug can no longer be used alone as a casual prophylactic.

Problems Associated with Chemoprophylaxis

1. Due to drug resistance it is not certain which prophylactic (single or combination) is the best for non immune immigrants and pregnant women whose choices are rather limited;
2. For underfives, chloroquine chemoprophylaxis is not advised except in those with special problems e.g sickle cell anaemia because:

(a) It is not easy to achieve continuous suppression in a significant proportion of them;
(b) It might interfere with their development of acquired protective immunity;
(c) It may accelerate the development of drug resistance;
(d) It uses scarce resources that may need to be used for better treatment.

Problems of Vector Control

(a) Resistance of DDT by vector;
(b) Technical problems to cover all the endemic areas;
(c) Expensive mosquito nets, replellants etc.

IMMUNITY AND VACCINE DEVELOPMENT

Immunity to malaria parasites can be natural or acquired.

Natural Immunity

Genetic Immunity is seen in:-

(a) Some black communities is due to some form of natural selection;

(b) Population with long exposure to P. Falciparum is probably due to natural selection.

However, there is no evidence of absolute natural immunity of man to human malarial parasites. There has been a degree of relative resistance to infection with P. Falciparum in patients with Glucose-6-phosphate dehydrogenase deficiency and in children with sickle cell trait (HBAS) or other hemoglobinopathies. Natural immunity can be reduced by splenectomy.

Acquired Immunity

Immunity is due to stimulation of combined humoral and cellular (phagocytic) protective mechanisms to previous erythrocytic infection. There is also transient acquired passive immunity from the mother to child mainly through the placenta and milk but does not go beyond six to nine months of age. The period between passive acquired and actively acquired immunity to malaria accounts for the child's most dangerous infection in endemic areas.

Malaria antibodies in the blood neutralize the toxin of the parasite or interfere with its multiplication. However, the immunity is strain specific. Acquired immunity of high degree is associated with high level of gamma - globulins in plasma, (IgG,IgM) premunition is due to presence of a small number of surviving plasmodium in blood.

Vaccines

The mechanisms for the protective role of malarial vaccine is poorly understood but there is evidence that humoral (1gG and 1gM), cel-mediated responses (T-cells) and non-specific responses (e.g killer cells) are involved.

Efforts to produce useful vaccines to the malaria parasites are still in progress and there are prospects that a broad spectrum vaccine (which is effective against all antigens) will be available before the end of this decade. However, how long it will take to reach the developing countries, where it is most needed is a multi-dollar question because of its high cost.

BIBLIOGRAPHY

1. Jelliffe D. B. and Stanfield J. P. (eds) Malaria in:
Diseases of Children in the Subtropics and Tropics 3rd ed. The English Language Book Society and Edward Arnold (Publishers) Limited 1982, 827 - 856;

2. Morley, D. (ed):
Malaria in Children. Paediatrics Priorities in Developing World. The English Language Book Society and Butterworths, London 1980: 248 - 256;

3. Tanzania Publish Health Association:
Challenges of Combating Malaria in Tanzania. Proceedings of the 4th Annual Scientific Conference on Malaria Control, Dar-es-Salaam, 1985;

4. Wilcokcs, C. and Manso-Bahr P. E. C. (eds):
Manson's Tropical Diseases. The English Language Book Society and Bailliere Tindali, London, 17th Edition, 1976: 39 - 86;

5. Parry E. H. O (ed):
Communicable Diseases. Principles of Medicine in Africa. Oxford University Press, Nairobi, Ibadan, 1976: 209 - 217.

CHAPTER 9

ESSENTIAL DRUGS AND RATIONAL USE OF ANTIBIOTICS

INTRODUCTION

Provision of essential drugs is a fundamental element of any comprehensive primary health care programme. Getting essential drugs to people under a well organized supply system, proper prescription by the health personnel and appropriate drug use by the consumer are all essential ingredients of the Essential Drug Programme. It is therefore important for a medical student to understand what are essential drugs, their pharmacology and how they should be practically prescribed.

OBJECTIVES

At the end of the chapter, you should be able to:-

1. Explain the concept of essential drugs;
2. Outline criteria for choosing essential drugs;
3. List essential drugs necessary for a defined community;
4. Discuss guidelines necessary for rational prescribing of antibiotics;
5. Describe the Bamako Initiative on essential drugs.

LEARNING ACTIVITIES

Visit two health centres of your own choice and:-

1. Correlate the essential drugs available in the health centre to the pattern of disease prevalent in the area;

2. Follow the steps of drugs procurement, storage, distribution and their use in that health centre;
3. Use the above findings to determine whether the essential drugs programme is being effectively implemented in the area;
4. Provide feed back on your findings to the health staff and write a report to the teacher.

CONCEPT OF ESSENTIAL DRUG PROGRAMME

DEFINITION OF ESSENTIAL DRUGS

What are essential drugs?

Essential drugs are cost effective drugs with proven efficacy for which adequate standards of quality have been established and which meet the health needs of the majority of the population.

DEVELOPMENT OF ESSENTIAL DRUGS CONCEPT

Continuous availability of drugs in any health care system cannot be overemphasized. Without drugs at health stations, patients shun the health services. Worldwide drug use and distribution is unequal, most drugs are produced and used in developed countries. Urban areas have more drugs than rural areas.

GEOGRAPHICAL DISTRIBUTION OF WORLD DRUGS, CONSUMPTION AND POPULATION, 1985.

WORLD PHARMACEUTICAL CONSUMPTION	WORLD POPULATION DISTRIBUTION
Developing countries 25%	Developing countries 75%
Developing countries 75%	Developing countries 25%

The problem of lack of essential drugs has been identified by WHO. In 1975 the WHO Director General prepared a paper on the issue and presented it to the 28th World Health Assembly. This marked the birth of the Essential Drug concept to solve the world's drug problems. The following proposals were subsequently made:- Many African countries have implemented the essential drugs programme.

CRITERIA FOR SELECTING ESSENTIAL DRUGS

The choice of essential drugs depends on:-

1. The pattern of disease prevalence in the community;
2. The available treatment facilities;
3. The training and experience of the available personnel;
4. The financial resources available;
5. The prevailing demographic and environmental factors.

The drugs selected should then satisfy the following criteria:-

(a) Availability of sound and adequate data on efficacy and safety obtained from clinical trials;

(b) Low cost. In cost comparison between drugs, the cost of total treatment and not only the unit cost must be considered;

(c) Established stability under the anticipated conditions of storage;

(d) Formulated as single compounds. Fixed-ratio combination provides advantages over single compounds;

(e) When two or more drugs are therapeutically equivalent preference should be given to:-

(i) the drug that has thoroughly been investigated;

(ii) the drug that improves compliance and minimizes risks to health;

(iii) the drug for which reliable local pharmaceutical manufacturing facilities exist.

LIST OF ESSENTIAL DRUGS

In 1984, WHO established a list of the three hundred (300) essential drugs. Countries were advised to choose those most appropriate to the local diseases.

The essential drug list designates drugs by their International Non-propriety Names (INM) or generic names, rather than their brand names.

Non proprietal, medical or generic name is the drug's official name regardless of who manufactures or markets it;

A proprietary, commercial of brand trade name is chosen by the manufacturer or distributor firm for marketing purpose;

The "INM" 'avoids confusion and difficulties of identifying drugs produced in different countries.

For different levels in the health care system of a country, there should be a uniform pattern of drug lists. In establishing a list of essential drugs WHO guidelines can be followed:-

(a) Six to fifteen drugs at a village health post;

(b) Fifteen to twenty drugs at a dispensary;

(c) Twenty to forty five drugs at a health centre;

(d) One hundred to one hundred and twenty drugs at a district hospital;

(e) Rarely more than two hundred and fifty drugs at a specialist hospital.

Village health posts and dispensaries should receive commonly used drugs. A health centre should first be given emergency drugs. When treating children, oral treatment using syrups and tablets is highly recommended. Injections should only be used when oral treatment is not available. Provision of drugs to traditional birth attendants or village health workers to administer basic drugs, remains controversial. However, trained village health workers can be given six basic drugs to treat common diseases prevalent to their areas. These drugs include:-

1. Chloroquine tablets;
2. Paracetamol tablets;
3. Chlorhexidine solution;
4. Acetylsalicylic acid tablets;

5. Oral rehydration salt sachets;
6. Tetracycline eye ointment or drops.

ADVANTAGES OF ESSENTIAL DRUGS

The following are some of the advantages of essential drugs:-

(a) Ensure constant availability of drugs which sustains patient confidence in the health services;

(b) Storage and distribution of drugs becomes easier to manage;

(c) A careful selection of drugs can be made on the basis of information available based on real needs;

(d) Correct dosage are easier to remember, thus the safety of drug usage is increased;

(e) There is less drug wastage;

(f) Avoid switching from one drug to another, therefore it is more cost-effective;

(g) Helps to obtain reliable data on drug consumption;

(h) The essential drug list influences favorably, practices of training centres in the field of therapeutics and general drug management.

STRATEGIES IN ESTABLISHING ESSENTIAL DRUG PROGRAMME

Before establishing essential drug programmes, there is a need for selecting essential drugs using WHO criteria.

The strategies for establishing essential drug programme can be summarized as follows:-

1. Formulation of health policies or identifying therapeutic needs;
2. Drug identification;
3. Drug procurement;
4. Supply, storage and distribution of drugs;
5. Training of personnel;

6. Information and education;
7. Quality control of drugs;
8. Supervision, monitoring and evaluation;
9. Co-operation and collaboration;
10. Financial support.

REASONS FOR ESTABLISHING ESSENTIAL DRUGS PROGRAMME:

(a) Unsatisfactory procurement procedures and erratic ordering of drugs frequently resulting in serious drug stock outs and expensive purchases;

(b) Unsupervised importation regulations for drug and raw materials for local production of drugs;

(c) Acute shortage of foreign currency to import drugs and raw materials for local production of drugs;

(d) Under utilization of the local drug production capacity;

(e) Poor drug storage and drug distribution practices;

(f) Rapid expansion of health services without a corresponding increase in drugs supply capacity;

(g) Unsatisfactory use of essential drugs both by the health workers and the general public.

ORGANIZATION OF ESSENTIAL DRUG PROGRAMMES

The essential drug programme is a comprehensive system of production, procurement, packaging, distribution and use of drugs in the community.

In order to execute essential drug programme effectively there is need for proper organization. There are four levels of organization:-

(a) **National Level:**

At the national level there is an essential drug unit department in the Ministry of Health. Its functions include:-

(i) Making plans of the programme;

(ii) Funding the programme;

(iii) Procuring and distribution of drugs in the entire country;

(iv) Training of personnel;

(v) Liaison officer seconded to the unit, facilitates cooperation between ministries.

(b) **Regional and District Level:**

Medical Officer and the entire administrative staff at each level are involved in:-

(i) Storage and distribution of drugs;

(ii) Training of all health workers in proper storage;

(iii) Distribution and record keeping techniques;

(iv) Prescription and dispensing of drugs;

(v) Facilitating full community participation.

(c) **Health Centre/Dispensary Levels:**

Health centres and dispensaries are the key stations implementing the programme effectively. Managing drugs in these health units is one of the most important functions of a health worker. Drug must be handled with skill, knowledge and accuracy. Drugs management at these stations involves ordering, receiving, storing and distribution of the drugs to the community. Health workers at this level are the actual educators of the community in drug use.

(d) **Community Level:**

Involvement of the community in the storage, distribution and use of their own drugs is an essential component of the programme. Community members have to understand, cooperate and work very hard to make the programme a success.

ACTIVITIES OF THE ESSENTIAL DRUG PROGRAMMES

The major activities in the implementation of the essential drug programme are:-

1. Producing and procurement of drugs;
2. Distribution of drugs;
3. Drug use.

These three activities are supported by the following:-

(a) Management and supervision;
(b) Local packaging;
(c) Warehouse and logistics;
(d) Training and retraining;
(e) Communication and advocacy;
(f) Monitoring and Evaluation.

IMPLEMENTATION OF THE ESSENTIAL DRUG PROGRAMME

Drug Procurement

This is the most important activity in implementing the essential drug programme. It involves estimation of drug quantities needed and ordering them. There are three different ways to estimate drug needs:-

1. Population-based estimation calculates the theoretical needs of a given population based on the community observed disease. This represents an ideal situation. However, it is not attainable in the short time especially if the health service do not cover the entire population of the community;
2. Service based estimation is based on health services statistics only and considers patients who come for care. It enables us establish objectives so as to avoid stock outs. This implies that health services have been in existence for sometime and past records of disease treated and drugs prescribed are available.
3. Consumption-based estimation: This is the most commonly used method. It requires a system that provides satisfactory information on monthly drug consumption and stock level in health-care units throughout the year. This method under-estimates true demands, because of lack of information on diseases treated.

DISTRIBUTION OF ESSENTIAL DRUGS

Once the drugs are procured, they are distributed in kits to various health units according to their requirements. They are distributed systematically throughout the year without interruptions. Regardless of the type of distribution, whenever an item is removed from the warehouse, the nature and amount of item taken should be recorded.

When essential drugs are received at the health unit it is important to ensure that:-

(a) The drug kits are sealed;
(b) The kits are not damaged;
(c) Each kit is opened carefully and the contents checked for signs of damage (leakage, broken glass, open tins, broken packets etc);
(d) The content of each kit is checked against the packaging slip;
(e) For each drug package, the expiration date, the manufacturer's batch number and identification of the manufacturer are noted and recorded;
(f) Any damage or shortages are reported to the person in charge with explanations;

(g) The drugs are then recorded into the stock record book and stored.

MONITORING

Monitoring drugs and the whole programme ensures proper implementation of the drug policy. Monitoring of drug stocks should be based on stock record cards. At the end of each month, stock inventory should be done. The results of the inventory are used to facilitate timely ordering of drugs and rescheduling of the drug kits.

RATIONAL USE OF ANTIBIOTICS

DEFINITION OF RATIONAL PRESCRIPTION

Rational prescription is one where the dosage of a drug is appropriate for the correct infection, disease condition or prophylaxis. The infection is either strongly suspected or proven bacteriologically.

Appropriate drug therapy requires that the prescribed drugs are:-

(a) Available at the right time and at a price people can afford;

(b) Dispensed correctly in the right dose, at the right intervals and for the right length of time;

(c) Effective and of acceptable quality and safety.

Possible reasons for emerging drug resistance include:-

(i) Ready availability for sale of antibiotics at counters without requiring prescription;

(ii) Poor prescribing practices;

(iii) Usage of antibiotics in animal feeds. Wide spread inclusion of antibiotics in animals and subsequent transfer to man;

(iv) Cross infection with resistant bacteria in hospitals.

MINIMIZING ANTIBIOTICS RESISTANCE:

To minimize the development of antibiotics resistance the prescription of antibiotics should satisfy the following:-

i. There should be clear indication for antibiotic use, advise for antibiotic use and management from bacteriologist should always be sought;
2. All bacteriological specimens, should be taken before start of therapy;
3. In general for all antibiotics, prescribe for at least five days initially;
4. Change of antibiotics should be done with guidance from the laboratory or if there is no clinical response;
5. It is safer to add than to subtract one antibiotic for another. This is done especially in an acutely ill patient where the nature of the infecting organism is not known.
6. Appropriate route of administration and dosage given in right intervals for the right length of time should be adhered to:
7. Appropriate investigations during therapy should be performed, i.e renal function, antibiotics serum essays etc, whenever indicated;
8. Clinical progress of the patient should be reviewed at regular intervals;
9. Topical use of antibiotics should be avoided except in specific defined clinical conditions e.g. eye preparations;
10. The prescriber should always take into consideration the possibilities of compatibility and interactions that might occur with other drugs which the patient may be receiving at the same time;
11. When choosing an antibiotic for treatment, the antibiotic should be bacteriocidal and have a narrow spectrum of low toxicity.

SELF EVALUATION

1. Study a set of slides of essential drugs produced by TALC P. O. Box 49, St. Albania,

Herts Al 14Ax, United Kingdom. Carefully note drug use, irrational prescribing habits and misuse;

2. Why should we have essential drugs? Discuss.
3. Describe how you are going to plan and implement essential drug programme in your district;
4. Discuss the management of essential drugs at health centre level;
5. Define rational prescription. Discuss its advantages and how it is implemented.

BIBLIOGRAPHY

1. WHO Essential Drug Technical Report 1983;
2. WHO, acting programme for essential drug 37th World Health Assembly, 17th May 1984;
3. WHO, essential drugs for all. World Health July 1984;
4. WHO, The use of essential drugs second report at a WHO Expert Committee Technical Report series no. 722, 1985;
5. WHO Emergency Health Kit. Standard drugs and clinic equipment for 10,000 persons for three months. WHO Geneva 1984;
6. Uganda Essential Drugs manual First Edition, 1988;
7. Proceeding of the workshop on the essential drugs concept and the role of medical school in the dissemination WHO 1986, DAP 87.6;
8. The World Drug situation. World Health Organization, Geneva, 1987;
9. The Rational use of drugs, WHO November 1987;
10. Essential Drugs. Contact No. 107 February 1989;
11. Children in the tropics 1988 - N 173, Drugs system.

CHAPTER 10

POISONING, ACCIDENTS AND CHILD ABUSE

INTRODUCTION

In the world over, poisoning, accidents and child abuse, are increasingly becoming important causes of childhood morbidity and mortality. Highest mortality is recorded in the one to five years age group. The burden of poisoning from agrochemicals is out of proportion to their use. The primary health care worker needs to be familiar with the common types of accidents and poisoning in his area in order to be able to plan interventions and curative services.

LEARNING OBJECTIVES

The learner by the end of this chapter should have achieved the following objectives:-

Poisoning

1. List six common agents of poisoning in children;
2. Give the specific toxic effects, first aid measures and comprehensive management for each specific poisoning;
3. List eight circumstances that pre-dispose children to poisoning and describe measures to prevent poisoning;
4. Describe the three forms of poisoning and indicate the commonest cause of each in your country and the relative importance as causes of morbidity and mortality.

Accidents

1. List at least six causes of accidents and indicate first aid measures and comprehensive management of each;

2. List at least six circumstances in which accidents occur and describe measures for their prevention.

Child Abuse

1. List at least 4 types of child abuse. Describe associated risk factors. Describe management and prevention.

LEARNING ACTIVITIES

Form small group discussions using the illustration below with one student presenting to his colleagues. The teacher should act as the facilitator.

Case Illustration

Kamau aged four years and Muthoni aged three years were well when their mother left them asleep in the afternoon. The mother did not have a nanny so she locked the children in the house. Two hours later when she came back she found her two children unconscious on the floor. Clutched in the hands and scattered on the floor were sugar coated aspirin tablets used by an older sibling with rheumatoid arthritis.

One hour later both children were breathing fast, running a fever and convulsing. Discuss the following:

1. the possible causes of coma in these children;
2. management of these children;
3. prevention of similar occurrence in this family and your community.

POISONING

EPIDEMIOLOGY AND ETIOLOGY

Vulnerable Age:

Accidental poisoning is commonest in children younger than five years with a peak incidence in the age one to two years.

Several theories have been proposed to explain why these children are more vulnerable namely:-

(a) they have a strong exploratory instinct without a social conscience;

(b) they have a strong desire for oral gratification;

(c) they have a strong desire to assert their own automony coupled with strong negative feelings that drive a child to do what is forbidden.

Older children often present with poisoning in groups, for example following food poisoning or Carbon Monoxide poisoning or individually following a suicide attempt, of following exposure at the work place. Pesticides and chloroquine are the most commonly used agents in suicidal attempts.

Sex Distribution

Boys are poisoned more frequently because they explore their environment more aggressively than girls.

Socioeconomic Factors

Children living in socioeconomically deprived environments of the urban and peri-urban slums are at greater risk of poisoning. High risk families are those exposed to mental stress, both parents are working and children are inadequately supervised.

Seasonal Variation

Most accidents in children occur within the home. Accessibility of the poisoning agent is the single most important environmental factor. Paraffin is the commonest poisoning agent and was 100% available in an East African Study. It was usually stored in beverage bottles for example a beer or coca-cola bottle and it was stored under the table or under the bed.

Seasonal Variation

Seasonal variations in poisoning occur. In Kenya it was noted that hospital admissions due to chronic heavy metal poisoning occurred more in the rainy months probably from increased use of agrochemicals, for farming purposes.

Carbon monoxide poisoning was commoner in Nairobi during the cold season. A lighted charcoal burner in a room without adequate ventilation is usually the cause.

Illiteracy

Individuals who are unable to read will be unable to follow safety precautions written on the labels of various drugs and chemicals.

Inadequate Labelling of Drugs and Chemicals

A chemical or drug should be clearly labelled by its pharmacological name or chemical name. There should be clear indications of its use, safety precautions relating to handling and storage. There should be some information on its toxicity and anti-dotes, whenever available. Drugs which are dispensed in hospitals should be clearly labelled, with strength of the preparation and frequency of administration indicated.

Incidence

The incidence of poisoning varies from region to region according to environmental factors stated above. The mortality varies with type and amount of poisoning and also the availability of emergency services. Mortality of patients admitted to intensive care units is very high.

Types of Poisoning

In East Africa, household agents followed by medicaments are the leading cause of poisoning. In developed countries medicaments are the leading cause of poisoning and over 80% of these agents are available in the child's home. The common types of poisoning agents are:

Household Agents

. Paraffin, Pesticides (malathion, diazinon).

Medicaments

. aspirin, anticonvulsant drugs (epanutin, phenobarbitone);

. major tranquilizers (phenothiazines);

. herbal therapies.

Plant Agents

. mushrooms, datura stramonium - the young leaves are confused with amaranthus leaves;

. aflatoxins - from grains that have been inadequately stored;

. herbal teas (crotolaria, heliotropium).

MANAGEMENT

First Aid at Home

The mother should give a lot of fluids for example milk and them induce vomiting by tickling the back of the throat with a finger. Saline solution should be avoided. Containers of medicines or poisons should be brought along to the hospital for testing.

Treatment in Hospital

The clinician should take a brief history, examine the child thoroughly and rapidly and then do the following:

1. Ensure a clear airway and support respiration;
2. Treat shock if present;
3. Remove poison from the body before it is absorbed, by inducing vomiting or doing a gastric lavage except when **KEROSENE OR A CORROSIVE HAS BEEN INGESTED.** Vomiting is best induced by syrup of Ipecac if available. In organophosphate poisoning remove the clothes and wash the skin with soap and water to prevent further absorption through the skin;
4. Reduce absorption by administering activated charcoal which absorbs many toxins and prevents subsequent absorption;
5. Forced diuresis is useful in those poisons that are excreted from the kidney but is contraindicated in individuals with impaired renal function and pulmonary oedema;
6. Dialysis may be considered in certain severe cases;
7. Antidotes should be used when applicable but only about 1% of poisons have antidotes;
8. General supportive measures are important to ensure adequate hydration, temperature control, fluid and electrolyte balance, nutrition intake and control of convulsions and cardiac arrhythmias.

ACCIDENTS

Accidents occur as the child interacts with his environment. In developed countries, accidents are leading cause of death in children over the age of one year. In adolescents, alcohol and drug abuse contributed to road traffic accidents.

Accidents can be broadly grouped into the following categories:-
Road traffic accidents, burns, blunt trauma, cuts, falls, drowning, poisoning

Road Traffic Accidents

Road traffic accidents are increasingly an important cause of death in East Africa. In Nairobi it is estimated that they are now the leading cause of death in children aged five to fifteen years. Children are involved in accidents as passengers or pedestrians. Occasionally adolescents driving their parents vehicles under the influence of alcohol have been involved in major accidents.

Management

The management of road traffic accident victims depends on the severity of the injuries. A quick history and examination should establish the severity of the injuries. The following steps should then be taken:-

1. Establish a clear airway and support respiration if necessary;
2. Control any bleeding. A simple pressure bandage may be very useful but bleeding arteries may require to be sutured to arrest bleeding;
3. Make a quick appraisal of the blood loss and treat shock if present. Look for internal haemorrhage remembering the possibility of ruptured viscera and massive bleeding into tissues;
4. Clean and debride wounds before stitching;

5. Immobilize fractures immediately and plan to set them when the patient is stabilized;
6. Carry out the necessary investigations such X-ray while continuing to closely monitor the patient;
7. Give tetanus toxoid;
8. Give analgesics to relieve pain.

Blunt-Trauma, Cuts and Falls

Blunt trauma cuts and falls are common accidents in children. Boys have been admitted to hospital with varying injuries such as being kicked by the animals they are herding. Falls are important forms of injuries. Small babies do fall from high surfaces where they have been left unattended. In a few occasions head injuries followed by mental retardation and epilepsy have occurred. In urban areas toddlers and even school aged children fall down the stairs and from apartment buildings with inadequate safety measures. School aged children may fall from trees. Older children have presented with hip injuries after jumping off moving vehicles. Thorn pricks are important in rural areas where children walk bare footed. The wound may become septic and may be a source of tetanus. Principle of management are as detailed above.

Drowning and Near Drowning Management.

Children run the risk of drowning when they play around water with inadequate supervision. High risk groups are teenage boys, all toddlers and patients with seizures. A toddler may drown in a bucket or basin with as little water as one inch in depth. Older children in rural areas drown in rivers, pit latrines and excavation sites filled with water.

Management

On the Scene Resuscitation

Initiate ventilation - clear the mouth of any debris then do mouth to mouth resuscitation.

Start external cardiac message if there is no palpable heart beat. Give oxygen at the earliest opportunity.

In Hospital

All candidates of near drowning should be admitted for at least twenty four hours observation, no matter how well they look. Continue with cardiopulmonary resuscitation. Correct the metabolic acidosis if present. In a tertiary care centre cardiac monitoring and blood gases, are important. Early death following drowning are usually due to ventricular fibrillation. Respiratory support with positive end-expiratory pressure (PEEP) may be necessary. Near drowning patients who require cardiopulmonary resuscitation in the emergency rooms have a high risk of permanent neurological sequelae. Special management especially Diuretics may be required in near drowning in salt water.

Burns

Burns cause 10% mortality of all hospital admissions. It is globally estimated that 20 people per million population die from burns with half of them dying before hospital admission.

Children account for 60% of all burns admissions in Kenyatta National Hospital in Nairobi, and this is a leading paediatric surgical emergency. Burns are responsible for 30% of acute paediatric surgical admissions and like other accidents and poisoning, the peak incidence is between one to three years of age.

Scalds are most important burns in childhood usually from hot tea, water, porridge. 90% of the burns occur at home. Always consider the possibility of child abuse.

Burns Wound Management

There are two methods of treating burns, the open method and the closed method. In both methods one aims to provide an aseptic environment so that the burn can heal rapidly. In second and third degree burns topical antibiotics may be indicated. The drug of choice is sulfadiazine although mafenide, silver nitrates, povidone-iodine and gentamicin ointments have been used.

Open Method

The burn is left open and a topical agent is applied twice daily. This method has an advantage in that bacterial growth is not enhanced. However, it has the disadvantage that the wound is more painful and there is increased fluid loss.

Closed Method

An occlusive dressing is applied after a topical agent is applied. There is an increase in the re-epithelialization of the wound but the method has the potential of increasing bacterial growth.

In major burns the following should be done:-

a. Monitor the urine output;
b. Monitor serum electrolytes;
c. Management of wounds:
i. Using sterile technique (gloves, mask, gown);
the closed or the open burn wound management, will be applied according to the surgeons preference.
d. Give tetanus toxoid;
e. Treat any infections;
f. Refer the patient to the tertiary centre for skin grafting.

How to Prevent Poisoning:-

1. Safe storage of drugs and household agents. They should be out of reach of children, and drugs should be kept under lock and key. Safe packaging in less attractive colours and taste should be used;
2. Health workers should give health education on safe use and storage of drugs dispensed to patients. Unused medication should be destroyed;
3. Containers of food and beverages should not be used to store drugs or noxious household agents;
4. There is an urgent need for education on safe handling of agro-chemicals. This should include use of protective clothing and storage of agro-chemicals. Empty containers should be buried. Manufacturers should be encouraged to pack agro-chemicals in small packages to meet the needs of the peasant farmer. The containers should be clearly labelled indicating contents, safety precautions and disposal, in the commonly used local language.

ROAD TRAFFIC ACCIDENTS PREVENTION

Children should be taught how to use roads properly and the rudiments of the Highway code should be taught in School and by parents.

BURNS PREVENTION

Make sure hot liquids, fires and match-boxes are not accessible to children, children should be adequately supervised and not left in houses alone.

ACCIDENTS AND POISONING PREVENTION AT THE NATIONAL LEVEL

1. Use of the mass media to educate people on safety;

2. Work with local administration such as the District Development Committee to educate the public;
3. Open pools of water such as old quarries and excavation sites should be filled;
4. Urban developers should be compelled to provide safe playground for children as part of their housing development.

CHILD ABUSE

Child abuse implies neglect, hostility, deliberately inflicted injuries and lack of reasonable protection and care by the parent, guardian, other adults and older children. Child abuse is classified in the following way:-

Physical abuse, sexual abuse, nutritional deprivation, emotional abuse and education neglect.

Risk Factors

The following situations put a child at risk of child abuse:-

(a) The parental emotional status, e.g. depression, violent, outbursts etc;
(b) The bond of love between the child and parent is weak;
(c) A child who is perceived to be different or abnormal;
(d) A child who is considerably indiciplined;
(e) Analysis in the family;
(f) A mother lacking social support;
(g) A parent who was abused as a child.

Special Groups of Abused Children

Sexual Abuse

There are three types:

a. Rape;

b. Molestation;

c. Incest.

The abusing adult may be a friend or a family member. In a Kenyan study it was found that school age children were sexually abused when they were sent to the shops after dark.

Diagnosis

A thorough physical examination is necessary and the mother must be present in order to emotionally support the child. In the younger child the physical trauma may be very severe and an adequate examination can only be carried out under general anaesthesia.

Signs of Acute Trauma	Chronic Trauma
- lacerations	- hymenal remnant
- contusion or hymenal tear	- healed laceration
- fissuring	- large introitus
- erythema	- discharge

Specimens to be Collected

a. Cervical, rectal and pharyngeal swab for Neisseria gonorrhoea preparations;

b. Pregnancy test;

c. VDRL, HIV Tests;

d. Vaginal secretions for semen and prostatic acid phosphatase;

e. Analysis of hair and clothing specimens. Young boys can be sexually abused or sodomized. You should be alert when a male toddler presents with urethritis and fissures, lacerations or with weak **ANAL SPHINCTER** muscles on rectal examination.

Learning Experience

Discuss how child prostitution and child marriages affect the health of the victims and its prevention

Physical Experience

This is the commonest type of child abuse presenting to the clinician. Listed below are the types of common physical injuries:-

- head injuries, internal injuries, burns, cutaneous injuries.

Head Injuries:

(a) Subdural Haematoma:-

This is commonest in children under two years of age with a peak at six months. Injury is inflicted by shaking of the child resulting in a whiplash injury. The infant becomes lethargic and may have bilateral retinal hemorrhages and subdural haematomas. These features are pathognomonic. Association with multiple fractures is common.

(b) Eye injuries:-

A black eye in a child should alert the clinician to look for basilar skull fracture. Chronic abuse may result in intraocular haemorrhage, cataract, retinal detachment and chorioretinal scarring.

Internal Injuries

There are second to head injuries as a cause of death in children. The history is usually not consistent with the injury. Injuries vary from visceral tear, ruptures and haematomas.

Burns

These may be scalds or flames injuries. They may resemble the instrument used e.g cigarettes, hot iron etc. Characteristically there is a delay in seeking treatment.

Cutaneous Injuries

The distribution is characteristic as indicated in the following table below. The injuries resemble the object used to inflict them and are in various stages of healing.

Localization of accidental and non accidental injuries

Non Accidental Injuries	Accidental Injuries
Upper arms	Hips
Trunk	Low arms
Sides of face	Prominences of the spine
Genitalia	Forehead
Buttocks	Underchin

Others

Drowning and poisoning are also possible forms of child abuse.

Diagnosis

The following findings should alert the physician to the possibility of abuse:-

1. Cutaneous lesions of varying age and may be burns, bites, etc;

2. Multiple fractures in varying stages of healing especially epiphyseal chip fractures;
3. An acute abdomen due to intra-abdominal haemorrhage;
4. Retinal and conjunctival haemorrhage;
5. Failure to thrive;
6. A neglected dirty child with jiggers;
7. A child exhibiting emotional deprivation and withdrawal;
8. Sudden infant death that is not consistent with cot death;
9. Injuries the child could not have inflicted on himself;
10. An inconsistent and changing history.

Investigations

- Admit any child that you suspect to be abused for complete evaluation. The following should be done:-

1. Rule out a bleeding disorder;
2. Radiological surveys. In the under fives do a skeletal survey while in the older child x-ray the affected joint only to establish whether there are:-

a. Epiphyseal and metaphyseal injuries;
b. Greenstick fractures;
c. Occult multiple repetitive fractures;
d. Fractures in varying stages of healing.

Management

A multidisciplinary approach to treatment using the primary care physician, the social worker, other social support systems in the community is mandatory. The police will be involved in cases of sexual abuse as a legal prerequisite. The following should be done:-

1. Remove the child from his environment;
2. Treat the child's physical and emotional injuries;

3. Inform the social worker or other agencies involved in child protection;
4. Family assessment followed by counselling.

In the long term, appropriate parenting skills should be taught in family life education programs and they may have a role in prevention. Legislation should be enacted and enforced to protect the rights of the child.

REFERENCES

1. Reece R. M.; Godin M. A. Paediatric Clinics of North America Feb. 1985. pages 42 - 60;
2. Jellife, D. B.; Stanfield P.: Disease of Children in the Tropics and Subtropics;
3. Kempe, Henry C.; Silver Henry K.; O'Brien Donough: Current Paediatric Diagnosis and Treatment. Lange Publication 1984;
4. Baures Peter: The management of the road traffic accident victim. Post Graduate Doctor. June 1984. Vol. 6 No. 6 p. 174;
5. Hendrickse R. G.; Aflatoxins and Kwashiorkor in children in Africa p. 348. Postgraduate doctor 1985 vol. 7 No. 11;
6. Medicus January 1989 vol. 7 No. 1;
7. Injuries and injury prevention. February 1985 paediatric clinics of North America;
8. Children in especially disadvantaged circumstances. Proceedings of the national pre-workshop on children in especially disadvantaged circumstances. Nairobi - Kenya April 10 - 11, 1985;
9. Child Labour and Health. Proceedings of the first National Workshop of Child Labour and Health. Nairobi - Kenya December 10 - 11, 1985;
10. Bwibo N. O.; Battered baby Syndrome; East Afr. Med. J. 49; 934, 1972 48; 56, 1971.

CHAPTER 11

AIDS IN CHILDREN

INTRODUCTION

The AIDS and HIV pandemic has reached unprecedented promotions. By 1992, close to 450,000 AIDS cases have been reported to WHO, but WHO estimates that close to 1.5 million AIDS cases may actually have occurred, taking into account under-diagnosis, under-reporting and delay in reporting. It is estimated by WHO that BY 1992 more than 500,000 paediatric AIDS cases resulting from perinatal transmission may have occurred, with 90% of this total in sub-Saharan Africa. WHO estimates the cumulative AIDS cases to total about 2 million by 1992, and the number of people infected by the HIV virus to be over 5 million with almost 50% of this number in Sub-Saharan Africa. (see figure I).

While effort to find a cure and an effective vaccine are continuing, Health Education is the only way to slow down the pandemic.

OBJECTIVES

At the end of this chapter you shall be able to:

1. Define the term AIDS;
2. Describe the structure and properties of HIV;
3. List the modes of transmission;
4. Describe the pathophysiology of HIV disease;
5. List the clinical manifestations of HIV disease;
6. List the clinical criteria for making a diagnosis in your country;
7. Treat complications of AIDS and offer supportive treatment;

8. Counsel the patient, spouse and family;
9. Plan, develop and evaluate health education programmes to prevent the rapid spread of HIV infection.

LEARNING ACTIVITIES

1. The student should read this chapter and other relevant materials on HIV infection;
2. Student will role pay a doctor giving a health education talk on AIDS to a group of students;
3. Students should attend a counselling session and observe the counselling techniques and take turns in role playing as counsellors.

AETIOLOGY AND EPIDEMIOLOGY

The term AIDS stand for Acquired Immune Deficiency Syndrome.

Acquired - not inherited
Immune - body's defence system
Deficiency - not working properly
Syndrome - a group of signs and symptoms

AIDS is caused by infection with the HIV virus and consequent damage to the immune system.

Structure of HIV

HIV is a member of the retrovirus family virus. Like all retroviruses, HIV contains RNA in its core, the virus itself is surrounded by a fat containing (lipid) envelop or coat. The core antigen are easily detected with the patients antibodies, but are less immunogenic than the surface antigens.

Properties of the HIV Virus

HIV, like other viruses, is easily destroyed by boiling and steaming (autoclaving). The lipid-containing envelope of the virus can be destroyed by various chemicals in standard disinfectants-hypochlorite, glutaraldehyde and formaldehyde, normally recommended for Hepatitis B virus as well as alcohols, acetone, phenol and several detergents.

Types of the Virus

Two types are known to cause disease in man, HIV-1 and HIV-2. HIV 2 was first isolated in December 1985. It has same receptor as HIV-1, the CD molecule. The HIV-1 and HIV-2 retroviruses share certain core antigens and differ predominantly in their envelope proteins. Thus there is serologic HIV-2 core protein antibodies.

Epidemiology

AIDS was first recognized as a clinical entity in 1981, and later recognized as the end-stage of infection with HIV. The AIDS epidemic has touched the entire world. The majority of HIV-infected persons are expected to develop symptomatic disease including AIDS sooner or later. In Africa the disease has affected predominantly young adults between the age of 20-40 years, but it can strike at any age.

Modes of Transmission

There are three documented modes of HIV transmission

a. Sexual intercourse, heterosexual or homosexual;

b. Contact with blood, blood products, or donated organs and semen. The vast majority of contacts with blood involve transfusion or the use of unsterilized syringes and needles by intravenous drug abusers;

c. Mother to child - mostly before and during or shortly after birth. For mothers who are infected but are essentially well, the risk of passing HIV infection to unborn child is around 25% - 30%. Where the mother has (ARC) the risk is increased.

Breastfeeding and HIV Infection

While HIV virus has been isolated from breast milk, there is still need for further epidemiological and laboratory research on the potential benefits of breast milk in situations where infants have been exposed to HIV or are already infected.

The immunologic, nutritional, psychosocial and child-spacing benefits of breastfeeding are well-recognised. Breast milk is also important in preventing recurring infections which accelerate progression of HIV-related diseases in already infected infants.

The importance of breast milk to young children, as well as for child-spacing and hence maternal health, should continue to be emphasized in all health and nutrition policies. Mothers who are known to be HIV positive and whose babies are HIV negative, should be advised not to breast feed. Mothers who do not know and don't want to know their HIV status should be encouraged to breast feed.

PATHOPHYSIOLOGY

To produce itself in human cells the virus first needs to select cells to attach itself to. These are cells with a special "receptor" known as the CD module. This receptor occurs on cells in the body's immune system, the helper/inducer, T-lymphocytes, the monocyte/macrophages:

- Lymph nodes : dendritic follicular cells
- Lungs : alveolar macrophages
- Epidermis : langerhans cells
- CNS : microglia

The monocyte/macrophage is an extremely vital site for viral replication and for transmission of infection to various body sites and to other cells.

Replications

When the virus has made contact with a CD4 antigen-carrying cell, it sheds its lipid coat and infects its RNA into the human cell. The single-stranded RNA then makes a copy of itself with the use of an enzyme called reverse transcriptase. The result is double-stranded DNA which then inserts itself into the human cell DNA. Because HIV becomes part of the human cell's genetic material, infection of the cell is irreversible. Although it may be possible to develop a drug that suppresses the activity of the virus (keeping an infected person relatively healthy) there is no prospect of cure in the sense of eliminating the integrated viral DNA.

The virus may remain dormant for months, or even years, but if the infected cells are activated by the body's immune system HIV will begin to reproduce itself, making copies that will go on to infect more human cells.

The viral DNA starts to instruct the human cell to produce viral components such as viral protein and RNA-the two components of HIV. The viral protein migrate to the surface of the infected cell, where they stick out through its outer membrane. Then, by a process known as budding, multitudes of new viruses detach themselves from the infected host cell, and are taken away in the blood stream to attach to other cells with CD4 receptors.

Infection with any other disease i.e. activation of the immune system, is therefore likely to lead to the virus replication, but there is some evidence that a few common viral infections such as herpes simplex virus and cytomegalovirus can specifically encourage replication of HIV.

Increased replication of the virus means that an infected person is more likely to develop full blown AIDS. This is because replication of the virus leads to progressive destruction of infected

cells, thus destroying the body's immune system and decreasing its ability to fight off infection with other diseases. Although the body's immune system does produce antibodies to the virus, they do not seem to inactivate the virus.

The three kinds of cells involved in keeping the immune system working are called helper T cells or T4 cells, suppressor T cells or TB cells and B cells. Each of these cells perform a specific task in protecting a person from disease. In a healthy immune system the helper T cells notify the B cells that a virus had invaded the body. The B cells will then produce antibodies which attack the invading virus. When the virus has been destroyed, suppressor T cells tell the B cell to stop producing antibodies.

When a person is infected with the AIDS virus, this process is disrupted because AIDS virus attacks and kills off the helper T cells, the actual cells that signal the rest of the immune system that an invading virus is present. As a result, there are more suppressor T cells, which adds to the effect of shutting down the immune system.

Marked hypergammaglobulinemia with elevation in IgG with or without elevations in IgA and IgM, is a very common finding present even in early phases of the infection. Depletion of T4 subset of T cells and reversal of T4/TB ratio as well as decreased T lymphoproliferative responses are abnormalities that usually become evident later in the course of infection.

CLINICAL MANIFESTATIONS

a. DEFINITION OF AIDS IN AFRICA (WHO WORKSHOP BANGUI)

Clinical case definition of paediatrics AIDS

. The presence of two major and two minor signs in the absence of other known causes of immunosuppression:

MAJOR
- Weight loss or abnormally slow growth;
- Chronic diarrhoea for more than one month;
- Prolonged or intermittent fever for more than one month.

MINOR
- Generalized lymph node enlargement;
- Oropharyngeal candidiasis (thrush in the mouth);
- Recurrent common infections;
- Generalized dementia (strange, disturbing behaviour, poor and worsening psychological development);
- **Persistent cough for more than one month;**
- Confirmed infection with HIV in the mother.

Other important signs include:
- Generalized dermatitis;
- recurrent otitis media;
- pulm. T.B.
- persistent parotitis

b. **Classification in Adults**

AIDS in an adult is defined by the existence of at least two of the major signs associated with at least one minor sign, in absence of severe malnutrition or other recognized aetiologies.

MAJOR
- Weight loss > 10% of body weight;
- Chronic diarrhoea > 1 month;
- Prolonged fever > 1 month (intermittent and constant.

MINOR
- Persistent cough for > 1 month;
- Generalized pruritic dermatitis;

- Recurrent herpes zoster;
- Oro-pharyngeal candidiasis;
- Chronic progressive and disseminated herpes simplex infection;
- Generalized lymphadenopathy.

The presence of generalized Kaposi Sarcoma or Cryptococcal Meningitis are sufficient by themselves for the diagnosis of AIDS.

Each country is developing its own criteria with reference to the Bangui Criteria.

AIDS IN CHILDREN

In older children the disease is similar to adult AIDS, apart from the first sign i.e. growth faltering. In babies and toddlers infected before, or just at birth, the disease may advance much more quickly than in adults, but may not become ill until after six months of age. A few show either no evidence of the infection or have symptoms that only emerge years later. The earliest sign are failure to thrive and recurrent diarrhoea.

AIDS IN ADULTS (CDC Classification) Atlanta Centre for Disease Control, in USA)

a. **Primary Infection**

This is the acute infection stage (transient signs contemporary with seroconversion). It may go totally unnoticed, as in viral diseases, the picture is that of sudden fever, peripheral multifocal lymphadenopathy and haemotological anomalies, with atypical circulating lymphocytes, closely resembling the classical picture of infectious mononucleosis. Diagnosis of this primary infection is therefore difficult.

b. **A Subclinical Carrier - State**

This is the asymptomatic disease state. It may follow a strict latent or clinically manifest primary infection. The state may last for many years in individuals who are not only seropositive but also viropositive. In other words, the person is not only infected but is also infecting, owing to the presence of the virus in the biological fluids, and especially the blood and genital secretions.

During this period general health is good, clinical examination is strictly negative, with the possible exemption of a few moderately enlarged lymph nodes, usually in the armpit.

c. **The Persistent or Chronic Generalized Lymphadenopathy State (PGL or CGL)**

This is quite similar to the previous one, but a greater number of peripheral lymph nodes are affected at least in two sites. They remain unchanged, or fluctuate in size for at least several months.

d. **Constitutional Sign**

- May include loss of 10% of body weight;
- Persistent or intermittent fever exceeding 38°C for several weeks;
- Continuous or intermittent diarrhoea for two months;
- The existence of one of two of these symptoms, combined with peripheral multifocal lymphadenopathy, define what was called ARC (AIDS related complex). The ARC concept is completed often in, the presence of so called minor opportunistic infections, the main ones being oropharyngeal candidiasis, herpes simplex and lingual leukoplakia, often attributed to EB virus infection. The term is slowly disappearing because the limits of this pathological entity are quite vague.

e. **Neurological Signs:**

There is a direct presence of the retrovirus in cerebral macrophages and brain cells-glial cells in particular as well as in the CSF. There may be peripheral damage of the polyneuritic type as in polyarteritis, chronic meningo-encephalitis with clear fluid an encephalitic picture with mood and behavioral disturbances predominating at the onset, or true psychiatric signs, mostly dementia.

f. **Hematological Signs**

Normally affects the 3 types of cells: erythrocytes, granulocytes and platelets. This cellular insufficiency may be combined with other clinical signs or remain isolated for many months.

g. **Respiratory Signs**

Directly linked with the virus, as a part of lymphoid interstitial pneumopathy, with a clinical and radiological picture of interstitial pulmonary disease. Alveolar lavage discloses major hypercellularity, composed almost exclusively of lymphocytes and especially of cytoxin T lymphocytes (TB). This is probably a local response to the presence of the HIV virus, which is infact found in the alveolar lavage fluid of some patients.

h. **Humoral Signs**

Mostly represented by rapidly aggressive kaposi Sarcoma. This affects not only the skin but also the mucosa of the mouth, entire digestive tract and respiratory tract. Some patients develop only a few, slowly evolving skin lesions, while others, on the contrary, experience a second phase with multiple cutaneous and mucosal sites. Patients with

isolated kaposi Sarcoma have a slightly longer average life expectancy than those with opportunist infections, since it ranges from 13 to 18 months, but unfortunately kaposis sarcoma frequently occurs in conjunction with opportunistic infection. Other Humoral signs such as lymphomas particularly affecting the brain, may be observed, as well as Burkitt or hogkins type lymphomas.

MANAGEMENT

Diagnosis

AIDS can take on the appearance of any ordinary, treatable disease, the converse is also true, many ordinary disease can mimic AIDS. There are a number of diagnostic dilemmas that a health practitioner, particularly in relation to paediatric AIDS. There is need to distinguish between AIDS in young children from the common syndrome of failure to thrive-due to gasto-enteritis, or food shortages. In many instances it is a sick child who is the first in a family to present with HIV infection.

Diagnosis by Serology

Ideally laboratory evidence should be obtained for HIV infection in every suspected case. In general HIV antibody testing by enzyme-linked immunosorbent assay (ELISA) and a supplement test are sufficient to establish the presence or absence of HIV infection. In children infected perinatally, the presence of HIV antibody after age 18 months establishes HIV infection.

In the paediatric population three situations exist when this testing is limited.

1. A major problem in paediatric HIV infection is the definite diagnosis of HIV infection in newborn offspring of HIV infected women. Maternal 1gG antibody to HIV crosses the placenta and there is no established accurate way of differentiating maternal antibody from that made by the infant. In rare situations maternal transferred antibody may persist for up to 18 months but is usually lost by 6 to 9 months.

TREATMENT

a. **Treatment of Primary Disease**

Since the discovery of the aetiological agents of AIDS and related conditions, many attempts have been made to develop specific antiviral treatment. However, there is yet no definite cure for AIDS.

DRUGS

Most of the drugs studied inhibit reserve transcriptase enzyme activity the key to HIV replication. Azidothymidine (AZT) seem to represent the first true therapeutic advance. Attempts have been made at treatment with interferons alpha and gamma and interleukin 2 but results are not yet satisfactory.

PREVENTION

a. **Health Education**

This may be given at a community level, hospital, clinic, schools and even at a patients's own home. Policies for handling blood, body fluids and instruments infected by hepatitis B virus should be followed.

Gowns, gloves and masks are only required for invasive procedures or for the protection of a severely immuno compromised patient. There is no need for wearing special garments at all times. Wearing of gloves is recommended however when handling blood and body fluids.

Cuts of scratches should be covered. Used needles should not be shared. They should be put in a container where they will all be incinerated. Clinical waste products should be well wrapped in a double bag and burned. Use of condoms along with Nomozyno 1-9 should be

Role as a Teacher

The doctor should be in the forefront on educating the community about the various aspects of HIV infection and AIDS, such as:

1. Inform people about the modes of transmission
2. Promote non-risk sexual behaviour
3. Assisting individuals change risk behaviour

Certain target groups such as schools, churches, political groups, women organizations, parents, health workers, traditional health workers, prostitutes, truck drivers and patients attending STD clinics could be aimed for. Seminars should be organized for these groups of people. In this manner the doctor can learn their views while mounting the following strategies:-

(a) Health education to these various groups of people can be arranged, and intensified;
(b) The media could be used extensively in the form of newspaper articles on AIDS, talk-shows on the radio and TV where questions can be answered directly;
(c) Theater, traditional drama and songs can be used in anti-AIDS campaign;
(d) The doctor should, with the help of relevant people be able to develop health learning materials such as posters and brochures.

Role as a Counsellor

The doctor is in the best position to be able to counsel the patient, the spouse and other relatives. After caring for the patient in the ward or at home, she would have better knowledge of the patient and his family around. This builds confidence in the counsellor to counsel the whole family and even touch on some sensitive issues, such as death. The doctor could also be a group leader of counsellors who visit patients in the homes. He/she should evaluate their conditions and if need be admit them for various problems such as anaemia or dehydration.

Role as a Co-ordinator

The doctor can be a very important link between the Government and non-governmental organizations in promoting health activities of the community level.

Role as a Leader in Continuing Education

(a) The doctor could hold in-service training for staff.
(b) She should attend relevant seminars to keep up to-date on the new information coming.
(c) She should get involved in research concerning AIDS.
(d) She should serve as a resource person in the school health education programme.

EVALUATION

John, a thirty five year old bank clerk has been unwell over the last six months. He was admitted in the University Teaching Hospital in Lusaka, six weeks ago when his conditions deteriorated. He has lost a lot of weight, has had diarrhoea on and off, he has also been having a dry cough and has been feeling dizzy whenever he attempts to stand up. After counselling, John agreed to have an HIV test done, and was informed that he tested positive.
John has shown some improvement over the last one week. The diarrhoea has lessened, he is able to sit up in bed when relatives come to visit him.

His stay in hospital has worn out his thirty years old wife whom you have come to know very well, because she has been at John's bedside all the time. She looks very tired but still maintains a smile on her face. While talking to you, she tells you that they have two children at home. Their first son is five years old and attends the neighborhood nursery school. Their daughter is two years old. She also confides in you that she is three months pregnant and she is very worried that she too could be HIV positive. She asks your permission to take John home, because she feels she can now cope with him at home.

Questions

1. What answer would you give John's wife?
2. Do you believe in AIDS patients staying at home among their loved ones?
3. What would you like to discuss with her as regards to the pregnancy, herself and the children?

BIBLIOGRAPHY

1. AIDS Action: December, 1986, issue 5. Diagnosis a clinical dilemma. Children, HIV infection and AIDS. Breast feeding, breast milk and HIV (statement form the consultation held in Geneva, 23 - 25 June 1987;
2. Colour Atlas of AIDS 1989, (University of Zambia) Ansary, Bailey, Chintu, Nyaywa et al.;
3. Living with AIDS in the Community, Uganda Ministry of Health Booklet, March 1991;
4. Global Strategy for AIDS prevention and control. AIDS Situation in the African Region WHO AFR/RC42/5 Rev. 1.

CHAPTER 12

HEALTH EDUCATION

INTRODUCTION

Health education is one of the core Primary Health Care strategies. It can produce radical and lasting improvement in the health of the people especially the mothers and their children who are the most vulnerable groups. It has been suggested that, given the same heredity, home environment and access to health services, one who has received effective health education is more likely to have better health. Health education is mainly concerned with helping people to take greater responsibility for the protection and promotion of their health. Health workers need to develop relevant knowledge, attitudes and skills of helping people to promote their own health.

OBJECTIVES

1. Define health;
2. Explain the determinants of health;
3. Define health education;
4. Explain the factors which determine an individual's behaviour;
5. Describe a doctor's leadership and teaching roles;
6. Describe effective communication process and effective teaching methods;
7. Identify health educational needs of the individual staff, patients and community through individual interviews and knowledge, attitudes and practice (KAP) surveys in the community;
8. Counsel individual patients on health practices;
9. Counsel groups on health practices;

10. Plan, organise, implement and evaluate a health education programme in a community.

LEARNING ACTIVITIES

1. Visit a child welfare clinic of your choice and determine the incidence of missed opportunities for health education;
2. Visit an antenatal clinic and compile a list of health education messages being given. Analyze them and comment on their adequacy;
3. List five major killer diseases and develop health education messages;
4. A seven month old infant from a defined village is brought to the hospital with a one day's history of diarrhoea. You manage him and in the process you learn that diarrhoea is a very common problem in the village. Explain how you would lead the community in preventing diarrhoea.

HEALTH, DETERMINANTS OF HEALTH AND HEALTH EDUCATION

To give health education properly, a health worker should have clear concepts of health, its determinants and health education.

DEFINITION OF HEALTH

Health is defined as a state of complete physical, mental, social and spiritual welfare and not merely absence of disease. These four elements of well-being influence each other. When the influence is positive the individual enjoys life. Conversely when the influence is negative the individual suffers ill health.

Well being is a personal experience of positive enjoyment of life. Objectively, it is revealed by appearance and behaviour (bright eyes, nice skin colour, strong health hair, a good posture, good appetite, normal physical activity and good intellectual performance and normal sleep).

The physical basis of well being are satisfactory growth, good nutrition and acquisition of skills.

Determinants of Health:

Man's behaviour, hereditary factors, environment and access to health services determine his health. To be healthy, man needs adequate nutrition, immunization, housing, clothes, sanitary environment and to choose healthy behaviours consistently.

Unhealthy human behaviour play a big role in the aetiology and epidemiology of many of the diseases of the greatest importance in society. Virtually all the killer childhood diseases, in the developing countries (diarrhoeal diseases, malnutrition, pneumonia, malaria, whooping cough, measles, tuberculosis anaemia, and acquired immune deficiency syndrome) are preventable by adopting such healthy behaviours as adequate feeding, using the immunization services, personal hygiene, proper disposal of faeces, control of environment and self control.

Modern Concept of Health Education

Education is derived from the Latin word educate meaning to lead forth. It is the process of facilitating change in behaviour or way of thinking of the learner.

Health education is thus the process of helping to change people's behaviour (observable action) in a way that will make their health, that of their families and the community better. This modern concept of health education differs from the older one which emphasized only the transfer of information. Attitude molds behaviour more effectively than information alone. The third and final step in health education is change in practices for health benefits. Only then has the goal of health education been achieved. Often these three steps are not achieved in one interview. Old habits, which were all learnt in childhood, are very strong and take time to die. This necessitates patient and repeated efforts in various settings for inducing a healthy behaviour.

PLACE OF HEALTH EDUCATION IN HEALTH CARE

Health services in a District Hospital are often organized into three broad categories:-

(a) Curative services;

(b) Maternal and child health;

(c) Health promotion, prevention and control of diseases

These categories are complementary:

(1) Promotive role as in improved nutrition and better housing;

(ii) Curative role when it helps in restoring health before complications or disability have developed or when a mother continues to feed a sick baby;

(iii) and rehabilitative role when it helps a disabled person adjust to his disability.

Health education is therefore such an important component of health care that all health personnel from the doctor down to the watchman, should enthusiastically accept the responsibility of providing it meticulously and have a definite plan for health education activities.

UNDERSTANDING BEHAVIOUR

It is important for the health worker to understand the complex nature of the human behaviour. The Health worker should, therefore, always study the various factors determining the individual's health related bahaviour prior to attempting to change that behaviour. The main determinants of people's behaviour are: knowledge, beliefs, attitude, values, social factors, culture and resources.

Knowledge acquired from experience helps us to behave in a certain way. If a child touches fire, he learns about heat and pain. This knowledge prevents that child from doing the same again.

Beliefs: are sincerely and strongly held ideas we get from our parents, grandparents and other people we respect. The beliefs on burial, waste disposal, feeding babies etc, are accepted as such without being subjected to any test.

Attitudes are individual tendencies to react consistently in a certain way to an object, ideas, thoughts and situations. They derive from many sources: family, school, youth associations playmates, friends, family relationship, watching reading movies, television and listening to the radio etc.

Values are the worth we attach to objects, ideas, thoughts and situations. These exercise considerable influence on behaviour because they are often shared by the community. These values lead to the individual's tendency to show preference in his actions for one kind of object or objective. Examples of values are welfare of children and community stability. Disregard for values leads to sexually transmitted diseases, alcoholism, illegitimacy and crime.

Social factors which may determine health related behaviour include: opportunities for formal education and influence of people who are important to us. The influence makes us likely to do what others may say and try to do what they do. Among these important people are the parents, grandparents, close friends, workmates, health workers, peers etc. School teachers have much influence on their pupils. Peers can be very powerful, a boy whose close friend is a smoker may end up smoking. Usually individuals will also not change behaviour unless it is acceptable to those whose approval is desired. A mother may not do the right thing for the baby unless the grandmother or husband approves of it.

Culture means the habits, expectations, ritual, values and beliefs that human groups develop over time, through the family, school, church organizations, other associations, reading, radio, television etc. It determines people's feelings and beliefs about how to live, about health, causes of illnesses, feeding a baby, how to cure the sick, about death and loss. People hold those beliefs as strongly as we do, and feel secure in doing the things they have always done.

Resources which include money, time, facilities, labour, skills services and materials, determine the behavior depending on their availability.

To be able to understand the determinants of behaviours in a given community, the health worker needs to study the relevant health knowledge, attitudes and skills in a community. The beliefs are then classified into those which are helpful, neutral, and harmful to health maintenance. In health education, helpful beliefs are used as sources of energy and are reinforced. The neutral ones are left alone while the harmful ones are tactfully discouraged and changed. A sound understanding of behaviour is helpful in tackling most of the resistance to health education. This resistance is related to the various determinants of behaviour.

Attempts to change long, sincerely and strongly held beliefs, attitudes and values with which people feel secure for new ones create a sense of insecurity in the people.

We find the resistance irrational only because we weigh it against scientific knowledge. People need much courage to adopt new ideas. To be effective in his work, a health worker builds on beliefs and practices that people already have and often appeals to their sense of values and emotions without causing too much anxiety.

Most people's lack of interest in health may be a cause of resistance to health education. Disinterested people tend to see health education as a persuasion to adopt ideas imposed from outside. Health workers can minimize such resistance by stimulating interest through introducing ideas and experiences which provoke a discussion, through frequently emphasizing the enormous value of health and the measures people must take to maintain it and through showing the people that their health contributes a great deal to their attaining their life goals.

Lack of resources such as physical facilities, money and time may also be the causes of resistance to health education. Health workers should therefore ensure that they promote actions

that are realistic and feasible within the economic means of the people and not too time consuming.

DOCTOR'S LEADERSHIP ROLE:

The doctor should play a leadership role in promoting community health development. To play this role the doctor needs to develop skills in identifying the health needs and resources of the community, planning and organizing the satisfaction of those needs using the available resources and generating others from the community. Learning these skills, as discussed in the chapter on health management, is an essential part of the training of the doctors.

The doctor fulfills the leadership role in promoting community development through encouraging community involvement, promoting intersectoral collaboration and promoting health education. As a leader, the doctor should participate in community activities directed to the improvement of the lives of the people. Utilizing all possible opportunities he should endeavor to make health education a part of all community activities and discussions.

THE DOCTOR'S TEACHING ROLE

The doctor has a responsibility for educating himself, other health workers and his patients. Given the continuous developments in medical sciences, the importance of doctor's continuing self education cannot be overemphasized.

In hospital setting, the doctor's main role as an educator is not so much the patient education as much as the regular training of other health workers for the better curative, preventive, promotive and rehabilitative work as well as ensuring that all members of the health team give health education constantly and properly. As other health workers acquire skills, the doctor can delegate to them much of the routine work. To fulfill the educator's role effectively, the doctor requires effective communication and educational skills with which he is usually not equipped.

To facilitate acquisition of these skills a few of the most important principles in communication and education will be mentioned and the student is referred to more exhaustive resources for further study.

COMMUNICATION SKILLS

Communication is the process of transferring messages and skills from the sender to the receiver and from the receiver back to the sender. The receiver may be a person or a group. If there is no response there is no communication.

Effective communication is one in which the sender and receiver establish commonness, being tuned together. The receiver sees and feels as the sender. The commonness is revealed by a second message which is arising from the first message and relating to the first message. A repeated exchange of messages results in dialogue. Establishment of the dialogue is the main characteristic of effective communication.

Conditions which favour effective communications are:

1. A clear and concise message;
2. A message which is relevant to the needs and concerns of the receiver;
3. A message related to the experience and knowledge of the receiver.

The receiver is ready to learn when:

(a) He is interested in what is being said;

(b) He is alert;

(c) He is not occupied with some urgent and worrying matter of a different kind

How can the sender facilitate effective communication?

By establishing a warm relationship. A warm relationship is established by welcoming the learner, offering him a seat, introducing oneself in a friendly manner and making him feel at ease and respected, showing him that we truly want to help and that we are people he can trust.

Which communication skills are important to the health worker?

These are:

1. Effective speaking;
2. Explaining things to others;
3. Persuading others;
4. Listening to others;
5. Asking questions

Ability to concentrate your attention on the client when he is speaking is not only an active participation in the communication process but also essential in education. The attention must be continuous.

EFFECTIVE EDUCATION METHODS

To be an effective educator, the doctor should have clear concepts of educational objectives, learning and education besides acquiring the skills to apply the various educational methods.

An educational objective is a clear statement of what the learner should be able to think, feel and do (behaviour, observable activity) at the end of learning period. The objectives are obtained from the various tasks for solving the community health problems.

They facilitate selection of educational content and measurement of the extent to which learning has occurred (evaluation or assessment). They also guide the learner to know where he is going. One educationist has said that if you do not know where you are going, you may well end somewhere else and not even know it.

Learning is the process that results in relatively permanent change in behaviour of the individual learner. Learning is controlled by the learner, is affected by the total state of the learner, is unique, individual and is the result of experience or repetition. The durability of cognitive and

behavioural change is proportional to the degree of active rather than passive participation of the learner. Here it is worth recalling the Chinese proverb "What I hear, I forget; what I see, I recall; and what I do I know".

In facilitating learning, the educator utilizes the various visual aids effectively, proceeds from the known to the unknown, from the particular to the general, from the simple to the more complex and from easy to more difficult. He also avoids all those things which may interfere with learning (tiredness, worry, heat, hunger, poor light and noise). A good educator therefore always finds out the learner's knowledge and experience on which to build.

In selecting the education methods, the educator gives preference to the methods which place the student in an active situation for learning. The methods of teaching include:

. lecture, small group discussion, demonstration, practicals, role play and simulation.

LECTURE

To facilitate learning a lecture should not exceed 25 minutes. This is because very little learning occurs after this period. To be effective the lecture must be very well organized and carefully presented.

A good lecture has the following features:

(a) An introduction explaining the importance to the students;
(b) A statement of the objectives;
(c) Evaluation of what students already know;
(d) Learning activity such as answering questions;
(e) Presentation in a logical sequence;
(f) Repetition of the main points;
(g) Evaluation at the end and a summary.

A SMALL GROUP DISCUSSION

This is a good method, for the students are actively involved. A group of 7 - 8 is ideal and 20 is the absolute maximum.

Demonstration

This is a method used for teaching a skill. The skill is first described and then demonstrated. The demonstration must be correct, visible and with explanation of every step.

Practice

Practice is the most effective methods of helping acquire skills. The more the opportunities offered, the more the health workers can improve their skills. All the students should practice and should be given feedback of how they are performing the skill.

Role Playing

This is an effective method of teaching attitudes and communication skills. In this method the student acts different parts as if they are in a play, but they are only given the outline and left to think out the rest.

Simulation

This is a method of providing the student with some experience and practice on an imitated thing before working with the patients. For instance the students may use orange skin to practice injections. Here the orange simulates the skin of a person.

Counselling an Individual:

Counselling an individual is the process of helping him to think clearly about his problems, discover their causes and thus develop understanding of the causes. In this process we first establish a warm relationship and then encourage him to talk to us sincerely and trustingly about

his problems, to find out the possible solutions, select the best solution and take action to solve the problem himself.

This form of counselling is called non-directive. The decision arrived at is of the individual and not that of the counsellor. Providing feedback to the mother and praising her when she has learnt something and when her baby is growing well improves learning. If the baby is not growing, she is advised accordingly and sympathetically helped to reach a decision as to what she herself can do to help the child maintain normal growth. Successful counselling depends on the counsellor's ability to establish a good rapport with the person being counselled.

Group Counselling:

This is a method of helping a group of 10 - 15 people through discussing among themselves to discover or define their health problems, to discover the most effective solutions and to take action. In the discussion, the group members do offer each other support for the appropriate behavior. The discussion is usually enjoyable with exchange of experiences, enrichment of the individual with ideas, and participation in decision-making with the other people.

The health worker first establishes rapport with creation of a relaxed friendly atmosphere. He then introduces the discussion with a question, a film, a newspaper cutting, a tape, a role play or a multiple choice question relevant to the issue. He also summarizes from time to time and thinks of new directions the discussion should take.

During the discussion people are enabled to show their different values and attitudes, to clarify their ideas and to make plans for a new course of action with the support of the group. People in this way realize aspects of the motives behind their action. Some members of the group may have solved their problems and this would be helpful to those still with a problem. New action by the individual is more likely if the individual has the understanding, sympathy and support of the group or if a members can find endorsement for his new attitude within the group.

The size of the group is to be restricted to 10-15 people to facilitate the sharing and the problem solving.

The leader needs to be sympathetic in approach to the group and topic, avoid unnecessary interventions, have genuine interest in guiding and listening to the opinions of others rather than his own, encourage the reserved tactfully, tolerate the verbose and turn questions posed to him back to the group.

Impersonal Health Education Methods:

Impersonal health education methods include leaflets, posters, pamphlets, newspapers, magazines, books, radio, television and songs. For spreading messages, the impersonal methods have great penetrative power.

These impersonal methods have the following advantages:

1. Reaching a large number of people;
2. Repetition of the message;
3. Serving as a reminder and reinforcement;
4. Assuming more authority than personal contact.

The disadvantage of the impersonal methods are:

(a) Lack of opportunity for questions or discussion

(b) Difficulties experienced by individuals in relating the message to their circumstances

(c) Risk of being misunderstood

Combination of personal and impersonal health education methods:- This occurs when the mass media messages reinforce individual counselling, when individual counselling clarifies the mass media messages and when small group discussions use radio messages, television programmes and newspapers as the focus or starter.

Planning begins with identification of the formal and informal community leaders, carefully, explaining to them the health education programme. Deliberate effort is made to establish good relationship with these leaders. Since they command respect and are listened to, the leaders can influence people's thinking and attitudes.

In order to determine the prevailing health problems as perceived by the community members, community analysis is carried out. The community members are encouraged to identify their health problems, prioritize the problems, work out the preventive measures and define the objectives in measurable terms. It is expected that those who have taken a true part in making decisions will not see those decisions lightly set aside. It is also expected that the more serious the people think a problem is the more likely they are to do something about it. The target are all members of the community but especially the mothers.

The organization consists in allocation of human and material resources for the implementation of the programme. The community is encouraged to form a village health committee and to identify volunteers to be trained as village health workers. The main task of village health workers would be to help the community to organize itself in order to undertake appropriate health promoting activities. The community's traditional channels of communication, for example, songs, drama, art and story telling are identified, adapted as necessary and used for providing community health education.

Administratively, the village health workers are under the village health committees but they are trained and supervised by the health workers headed by a health educator when they are available, with support of the doctor. Frequent meeting between village health workers and health team are very necessary.

While the village health workers are being trained, health education messages relevant to the needs of the community are designed with the help of a communication experts or health educator whenever possible. To foster sociocultural acceptability, the design takes cognizance of beliefs and customs and pretests the messages, making the necessary changes.

In the implementation of the programme, the village health workers deliver the health message by individual counselling and group discussion. Only a few carefully selected message are delivered at anyone specified period. The selection of messages is based on their potential for improving health, feasibility, acceptability and affordability by the community members.

It is important to be in touch with informal leaders and people to facilitate early recognition of divisions, rival groups and rumours which can damage a successful programme. The rumours should be dealt with very fast by the staff talking to all the community members they know, repeating the facts and explaining the misunderstanding. Trust and confidence with the community members will also facilitate counteracting the rumour.

For purposes of evaluation, all health workers, including the village health workers, should keep a careful record of health education activities in carefully designed data collection forms. The data recorded includes knowledge of the message being offered, attitudes towards the message, observation of the behavior being promoted and attitudes towards health workers.

The formative evaluation is usually done through monthly analysis of the records and finding out the extent to which the objectives have been achieved. The summative evaluation is performed at the end of the programme period and consists of finding out the extent to which

the objectives have been achieved. In the long run success of community health education programme is indicated by decrease in morbidity, mortality and health attendances with increased utilization, antenatal clinics, etc. Providing the feedback to the community enables it to see the results of its action and so spurs it to do more.

Health Education Research:

Doctors should undertake operational research for finding better methods of health education and why some mothers in the same environment are successful in raising healthy children.

SELF EVALUATION QUESTIONS

1. How can data to evaluate the achievements of a health education be obtained?
2. Explain what is counselling and list six qualities of a good counsellor;
3. Describe the reasons why some individuals do not immediately accept the health education message;
4. Explain the best way of developing the content of a clinical officer continuing education programme;
5. Explain the role of informal leaders in health education.

HEALTH EDUCATION IN SCHOOLS

A very important component of the community are the schools. Through health education, teachers and school children can serve as agents of cultural change by changing the content of instruction in line with changing knowledge, social needs and values. Health education in schools has the major goal of promoting health as a value, and the known means of caring for it by healthy behaviour, including choice and use of health products and services. In schools health education is given, as in the rest of the community, formally in the classes, and informally.

Informal health education in schools is given during the contacts of the students and the health workers. The contacts represent some teachable moments to be exploited.

CHAPTER 13

MANAGEMENT AND HEALTH ECONOMICS

INTRODUCTION

A sound understanding of the basic principles on management of health economics by all health workers, particularly doctors working in developing countries, is an essential pre-requisite, to successful development and implementation, of a sound and optimal PHC programme.

Management of health economics is an essential aspect of health care in any country since the available resources will never be enough. The alma Ata Conference in 1978 has given a global objective of achieving health for all by the year 2000. This ideal must be translated into strategies and plans of action in order that the objective be met. The process of transforming ideals into action require managerial skills to redirect the health system, so that the PHC programme may be efficiently delivered. The delivery process itself needs to be monitored and evaluated so that inadequacies may be redressed.

The success of the PHC programme depends upon cooperation of various sectors in the nation and requires a reorganization of various agents of change.

In this chapter the expected professional roles and responsibilities of a doctor in management of PHC services are discussed.

OBJECTIVES

At the end of this chapter you should be able to:-

1. Define the concept of management and describe two basic principles;

2. Describe major management functions;
3. Conduct situation analysis;
4. Write up a primary health care project;
5. Coordinate and supervise PHC activities;
6. Communicate decisions to relevant people on PHC activities;
7. Evaluate/monitor/appraise health care activities.

FOR EXAMPLE:

After completing medical school training and internship, you are appointed District Medical Officer of a newly designated "Masai District". The local people are very pleased to have a doctor. The district officer in his briefing tells you that the people are very worried about the high death rate of under fives which they attribute to infections such as measles, neonatal tetanus and diarrhoea. They are equally worried about the high rate of maternal deaths during delivery. You should be able to apply the management skills acquired from this chapter to design and to manage activities directed at lowering the high childhood and maternal mortality rates.

LEARNING EXPERIENCE

Visit the Director of Maternal and Child Health services in your country and obtain the document of his programme. Read the document and answer the following questions:

1. List reasons that led to the establishment of this programme;
2. Discuss the objectives of this programme;
3. List the steps followed in planning this programme;
4. State the operational targets of this programme;
5. List indicators of effectiveness of this programme as specified in the plan;
6. Use above information to work out relevant strategies for Masai District MCH problems in the example above .

THE CONCEPT AND PRINCIPLES OF MANAGEMENT.

For the purpose of this text, management will be defined as, "Getting things done through other people". This definition is based on two principles.

i. Commitment to achievement. This means commitment to purposeful action, as opposed to action for its own sake. Effective management requires that first, objectives are specified and then; that these objectives are achieved;

ii. The importance of people. This means that, people are the most important resource of getting things done. Through a planning process management specifies objectives to be achieved before committing the resource available. To ensure that the resource have been used in the required manner, management must assess and monitor its actions at specified intervals, management, therefore revolves around planning, implementation and evaluation.

MANAGEMENT FUNCTIONS.

A function is a broad area of responsibility which is composed of many activities aimed at achieving a predetermined objective. The following are some of the functions:-

(a) Planning (P);
(b) Implementation (I);
(c) Evaluating (E);
(d) Communicating;
(e) Decision making.

In carrying out his duty of "getting things done" the Health Team Manager will perform three broad essential functions of management i.e. Planning, Implementation and Evaluation in addition to these sequential functions there are two more which are continuous. These are communication and decision making. Management if effective ought to be a continuous cycle of planning, implementation and evaluation.

PLANNING FUNCTION

The planning of management spells out the objective to be achieved. It involves choosing among alternative courses of action in order to use the scarce resources available effectively and efficiently to gain the goal. Planning not only CONCEPTUALIZES the course of action to be followed in order to solve the problem, but also includes indicators as to whether or not the problem should be tackled in the first place. It charts alternative strategies so as to simplify adoption of those that work best in a given circumstance.

Depending on when the objective is to be achieved a plan can be long term (normally five years and more), medium term and short term (usually less than one year).
Figure one illustrates five steps to be followed when developing a health plan.

5: Write up plan

4: Review obstacles and : limitations

3: Set priorities

2: Identify problem

1: Analyze situation

IMPLEMENTATION FUNCTION

Implementation function of a plan involves its translation into practice. In doing this the management will carry out several subfunctions:-

1. **Organizing**
   (i) Assessing resources (human, material, financial,time etc);
   (ii) Allocating these resources.
2. **Staffing**
   (i) Selecting and recruiting staff;
   (ii) Training and developing staff.
3. **Directing**
   (i) Delegating;
   (ii) Supervising;
   (iii) **Motivating;**
   (iv) Coordinating team effort.

While all the functions of implementation are important, motivation and delegation deserve special mention because they are frequently ill understood.

Motivation:- means creating a force of impulse which will move people towards a desired behaviour for example.

A hungry person will behave in such a way that he can eat. Similarly a person who needs to be respected and held in high esteem will behave in such a way that he gets recognition from others. Accordingly, motivation means helping people to satisfy their needs. Incentives and reinforcement like money given for carrying out some work are some of the motivating factors. For people to get things done they must be motivated.

Delegation means getting things done through people and implies the managerial technique of delegation. Delegating, means the conferring of certain specified responsibility by a higher level. In delegating the manager must:-

(a) Be clear of what is to be delegated;
(b) Select the delegatee and make sure he accepts the responsibility;
(c) Make sure the delegatee understands what is being delegated;

(d) Give corresponding authority;

(e) Announce the delegation to all interested parties;

(f) Be prepared that the delegatee may make mistakes;

(g) Do not interfere while things appear to be going on well;

(h) Exercise control, check to see that the results you have obtained are the ones wanted

EVALUATION FUNCTION

Evaluation is concerned with assessing the achievements of results and the economic use of health resources. Evaluation is the managerial function that keeps a health programme functioning as planned. Management decisions are concerned with programme functioning as planned thus:-

(a) Effectiveness of achievement of results;

(b) Efficiency in the performance of the plan;

(c) Economic use of the resource.

The evaluation should answer two questions:-

(i) Are the results as expected?

(ii) Are the results of value?

When the answers to both questions are yes, the decisions would be carried on as planned. If negative, the objectives and/or the activity may require revision. Deviations from the original plan, are bound to occur. The purpose of interim evaluation is to ensure that the deviations do not fall outside the allowable limits otherwise corrective action should be taken.

The following steps are taken in evaluating activities:-

1. Selecting evaluating indicators which will allow the manager to compare what actually takes place with what was expected;
2. Collecting information on how the programme is actually performing;
3. Comparing the actual performance against indicators;

4. Identifying the causes of excessive deviation;
5. Taking corrective decision where excessive deviations occur.

COMMUNICATION FUNCTIONS

In management one is concerned with "effective communications". This means that, in addition to receiving the message the receiver should be influenced by it and behave in conformity with it.

DECISION-MAKING FUNCTION

A decision is a choice among options which is made to solve problems and to initiate action which hopefully will result in their resolutions.

A five step process is suggested for decision=making:

1. fact gathering;
2. consulting people;
3. making the decision;
4. communicating the decisions;
5. following up to see if decisions are carried out correctly and with commitment.

MANAGEMENT OF PRIMARY HEALTH CARE SERVICES

A health worker is responsible for a population in a defined geographical area. This area may be as small as a village or as large as a region. Whether large or small there is always satisfaction in overcoming these problems.

The health care team must work closely with the community in planning and implementing the health programmes. It is therefore important to know:-

(a) How to manage PHC services in the community;

(b) How to increase health coverage by developing community self-help programmes.

PLANNING OF PRIMARY HEALTH CARE SERVICES/ACTIVITIES

Planning a health programme can take place at any level in the health system. Usually the general policies and guidelines are laid down by the ministries of health. The five steps of planning mentioned in this chapter, will now be described in the context of their use for the planning of primary health care services.

Step One Planning, Conducting A Situation Analysis

The following information is required:-

1. Demographic data e.g. population growth rate, death rates, age groups etc.,
2. Health, diseases and illness;
3. The housing facilities, schools, etc;
4. Community leaders;
5. The organization of the health services;
6. The local health personnel available.

Management information must be adequate and relevant to the purpose.

Methods of gathering information:-

(a) Listening and observing in the community;

(b) Discussing with community leaders;

(c) Talking with other development workers, teachers, religious leaders, agricultural workers, head of women groups etc;

(d) Reading records of clinical and health centres;

(e) Studying maps, census figures, special reports;

(f) Survey data, national health policy documents;

(g) Annual reports, programme reports etc.

Collecting base-line information. Whenever health services are to be provided for the first time in a community, baseline information is required to enable the management team:

(a) Decide what kind of health activities are needed;

(b) Determine the number of people who should receive the different kinds of health services (target groups or at risk groups) and;

(c) Measure progress of activities at intervals after the service has started.

Baseline information includes:-

1. Demographic data, population including number of births, number of deaths, age at deaths, probable cause of death;
2. Occupations;
3. Most common communicable diseases in the area;
4. What people do when they fall sick;
5. Geography of the area;
6. Excreta disposal practices;
7. Foods available, especially for mothers and children;
8. Methods of food storage and food preparation, etc.

Information about resources:-

A resource is anything that can be used to carry out activities to achieve an objective. When choosing a course of action all types of resources must be reviewed systematically. Such information will include:-

(a) Available manpower to implement health care services;

(b) Building dispensaries, health centres, hospitals, etc;

(c) Equipment - materials, transport, etc;

(d) Information - health learning materials, such as books, manuals, records, reports, community studies, films, etc;

(e) Public opinion, government support, climate and technical resources such as electricity etc;

(f) Money needed to obtain other resources, such as equipment, drugs, transport, etc;

(g) Time - required to carry out programmes.

Analysis of the information.

All of the information collected should be assessed and the useful components are arranged in such a way that it can be compared with information already recorded, and be stored in such a way to be assessed again when needed and communicated as required.

The following questions should be asked:-

1. What is the problem to be solved?
2. Why is it important to select this problem(s)?
3. What criteria should be used in defining the problems?

A problem is an obstacle seen to exist between a present situation and a desired future objective. In other words a problem is perceived as a gap between what is now and what should be. Different people perceive problems differently, therefore, it is important to define the problem clearly. Having done so, all possible causes and solutions should be sought. When defining problems it is useful to group them under three heading:-

(a) Diseases of health problems, e.g. malaria, malnutrition, diarrhoea etc;

(b) Health services problems e.g insufficient drugs, qualified personnel etc;

(c) Community problems, e.g. inadequate or unsafe water supply, lack of food, education etc;

One way of determining priorities is to set criteria. Criteria are principles or standards against which measurements or judgements can be compared. For example, does this problem?

1. Effect a large number of people (as in a malaria, TB, etc);
2. Cause high infant mortality (as in malnutrition, measles etc);
3. Cause chronic conditions and handicap (as in blindness from trachoma or vitamin A deficiency or paralysis from polio);
4. Affect children and young people (as in TB and HIV etc);
5. Involve rural development (as in sleeping sickness);
6. Causes worry to the community etc.

Step three of planning - setting objectives

An objective is the intended result of a programme. A clear objective is essential to a definite plan, because it will enable the results to be evaluated. In order to be useful an objective must meet four criteria. It must be - relevant, feasible, observable and measurable.

Step four of Planning - Reviewing obstacles and limitations

Limitations of activity may simply be due to lack of resource which may be discovered during the review of general resources. For example:-

(a) People - may not be interested due to other commitments or lack of training;
(b) Equipment - may not be available or cannot be purchased because of lack of funds;
(c) Information - may be difficult to obtain because of lack of records;
(d) Money - may be in short supply;
(e) Finally, lack of the time to initiate and/or supervise activities may be the limiting factor.

Other obstacles can be technical, social, or environmental, such as geographical or related to climate. Obstacles and limitations should be analyzed and categorized into groups:-

1. Those that can be removed;

2. Those that can be modified and reduced;
3. Those that cannot be removed.

After review and classification of obstacles and limitations, the objectives can be changed as appropriate. The modified objectives will then become the final objectives to be achieved.

Step Five of Planning - Making the Plan

This is the last step in planning for health activities. To make the plan it is necessary to:-

(a) Consider alternative strategies;
(b) Balance resources and needs;
(c) Choose best strategy;
(d) Write out-line of the plan.

The health team and the community together must be decided on the best strategies to achieve the objectives and targets. They may be several strategies to choose from and the optimal plan will use available resources in a way that will give the best results. In balancing resources, it is helpful to draw up a time-table indicating what is needed and what is available. A plan must be drawn within available resources, even if some activities will have to be modified. Priorities should be examined and the optimal use of resources should be examined.

The final step is to write the plan. This can be done by answering seven questions: why, what, how, who, which, where, and when.

EXAMPLE OF AN OUTLINE PLAN

Planning

Step 1 - information - Why are we doing this?

Step 2 - problems - Explain the background of the problem to be solved and the reasons for the plan;

Step 3 - Objectives - What is to be done? what is to be achieved, including the main objective and smaller targets;

Step 4 - choose strategies - How will it be done?

Step 5 - the activities - Explain the strategy chosen how it will overcome any obstacles and list activities.

(a) <u>Implementation</u>

(i) Resources needed to perform the activities;
(ii) Explain how many people will be needed;
(iii) What skills they should possess;
(iv) Which other resources are needed;
(v) List the equipments that are available and those to be ordered;
(vi) Money (budget) or funds available, how will it be allocated? Will more funds be necessary?

(b) <u>Organization</u>

(i) Where will the work be done?
(ii) In which area/village/building will the plan be managed or carried out?
(iii) When will it be completed?
(iv) There should be a schedule of activities from beginning to the end.

(c) Controlling

Decide on information to be collected in order to monitor the progress. How will this information be used.

IMPLEMENTATION OF PRIMARY HEALTH CARE ACTIVITIES

After planning is complete, methods of implementation must be considered. The planning process is actually designed to help implementation. The health worker, in this management planning function, has first to review the plan. The times when each activity will begin and end should be stated.

1. Assign responsibilities to health care workers;
2. Discuss proposals with representatives of the community, health staff and workers in other sectors where applicable. The community members will decide how they can participate;
3. Check these actions against the seven works mentioned above as guidelines. It is important to coordinate the work of members of the team and, communicate decisions among them.

Coordination of Team Members

A clear organizational chart which describes the inter-relationship among members is required, as well as detailed job descriptions. The chart should indicate reporting relationships so that each member will know to whom reports should be made. Each member must have an individual, written job description.

Coordination of the Activities

The programme should be reviewed in order to decide what activities are required, how, by whom and the expected cost. A list of activities required should then be put into a time table, stating the time for beginning, completing each activity and indicating which team member is responsible for each.

Communication of Decision

No matter how well the planned activities are scheduled and the organizational chart and job descriptions prepared, coordination will only succeed if requirements are communicated and understood by all members of the team. It is a good idea to display the organizational chart in a conspicuous place where the team members can study and discuss the contents.

In order to coordinate work effectively, the health worker in charge must manage the team members well so that they work together harmoniously. In that case an activity schedule should be drawn up and communicated to all concerned with the programme activities.

Monitoring and Re-directing the Programme

(1) **Monitoring the Programme**

Several health activities will be taking place concurrently. The supervisor can not be everywhere at once and will therefore need tools to monitor progress. The purpose of this management activity is to maintain work standards.

It is helpful to design a check list in a form of a record of what should be happening to assist in supervising. The supervisor will need this check-list to observe the performance of each health worker and identify deficiencies. The cause of any deficiencies should be ascertained.

These may be:-

(a) Technical;

(b) Administrative;

(c) Organizational, etc.

Targets should be assessed at regular intervals so that defects can be corrected and problems solved before progress is seriously compromised.

It is also important to monitor resources continuously, checking supplies against inventories and stock list, examining records and discussing the state of resources with staff members and the community.

(ii) Re-directing activities

The information obtained from monitoring will guide the health activities. If work deficiencies are found or targets are not met, the cause must be sought and appropriate changes made in the programme. Making such change is referred to as re-directing. Sometimes even goals must be modified.

(iii) Conducting a Supervisory visit

Routine supervisory activities in an area should be in accordance with the supervisory schedule and consist of:-

(a) Reviewing records for completeness, accuracy and agreement with monthly report information;

(b) Observing how the health worker carried out the activities listed in the job description;

(c) Talking with village leaders and others in the community to see if they understand and agree with the programme and if they need help. The supervisory visit

should end with discussions with the health worker about findings during the visits. Good and weak points should be brought out clearly.

Supervision of Action

There may be one or several health workers assigned to an area. A yearly supervisory plan should be drawn up stating when visits are to be made. Their frequency will depend on the local situation, the stage of the programme and the availability of transport and personnel.

EVALUATION OF PRIMARY HEALTH CARE SERVICES

Planning and implementing programmes must be monitored and evaluated so that shortcomings may be rectified. Evaluation refers to judging the value of the results achieved by the health team. This information will then be used to improve the services with regard to their quantity, quality, accessibility, costs etc.

(a) Evaluation Of Achievements

In evaluating achievement two questions should be asked:-

(i) Are the results those that are expected?

(ii) Are the results of value?

The general process of evaluation consists of five steps:-

1. Decide on what is to be evaluated and select indicators of effectiveness;
2. Collect the information needed for evaluation;
3. Compare the results with your targets;
4. Judge the extend to which the targets have been met;
5. On the basis of the evaluation, decide whether the programme is to continue as it is, be changed or altogether stopped.

(b) **Appraising Staff Performance**

The main purpose of evaluation is to learn from experience. The specific purpose of staff performance appraisal is to measure the actual contribution in work output of each member of the health team against the standard set by the team. This will enable decisions to be made about the future learning needs of the staff. There are five steps to follow in appraising staff performance.

(i) Decide what is to be appraised and select indicators of performance;
(ii) Collect information for measuring performance;
(iii) Compare observations with norms and standards;
(iv) Judge the degree to which staff performance meets the standards;
(v) Decide on further actions needed concerning performance.

(c) **Evaluation of Resources Use**

Management activities are reviewed using the management audit which is a check-list of questions related to management, comparing summary oral operational control processes. The results of each management audit are compared to those of the previous ones so that the results of any recommendation for action made at each audit can also be assessed.

Self Evaluation Exercise

1. Discuss the relationship between planning, implementation and evaluation functions of management;
2. List the sub-functions of implementation and explain what you understand by the motivating functions;
3. Discuss the evaluation function of management and list the five steps taken in evaluation health activities;

4. The Ministry of Health has set national programme objectives to reduce the incidence of neonatal tetanus to zero. The authorities at the local level must decide their contribution to the national programme. One proposal has been to vaccinate all pregnant women with tetanus toxoid. An operational target has been set.

(a) . From your own experience list some possible obstacles which might interfere with the achievement of the national objective to reduce the incidence of neonatal tetanus to zero.

(b) . Suggest two other complimentary actions which may be necessary to solve the problem of neonatal tetanus in the community.

BIBLIOGRAPHY

1. Festo, P. Kavishe. Principle of Managing Health Care Programmes, Tanzania Food and Nutrition Centre. Report No. 070, 1980;
2. Rosemary MCMahom, Elizabeth Barton and Murice Plot. On being incharge. A guide for middle-level management in Primary Health Care. WHO Geneva, 1980;
3. Alfred Mutema and Peter Ngatia. Management Theory and Practice Kenya HLM Series, Ministry of Health, 1st edition 1988;
4. Schluster, Health Management in East Africa. International Hospital Federation Year Book 1986.

MED
RA 395
.D44
.P74 Copy 3
(1990)