

MODULE

Maternal Nutrition

Diploma Program
For the Ethiopian Health Center Team



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Abbreviations

ABCD	= Anthropometry, biochemical, clinical and dietary methods
AIDS	= Acquired Immuno Deficiency Syndrome
BMI	= Body Mass Index
B.M.I.	= Body Mass Index
EDTA	= Ethylenediamine Tetra Acetic acid
EHO	= Environmental Health Officer
ENA	= Essential Nutrition Actions
HCT	= Hematocrit
HFA	= Height For Age
HIV	= Human Immune Deficiency Virus
IDD	= Iodine Deficiency Disorder
ICSM	= International council for standardization hematology
IQ	= Intelligence Quotient
IUGR	= Intra Uterine Growth Retardation
IU	= International Unit
LBW	= Low Birth Weight
PCV	= Packed Cell Volume
PEM	= Protein Energy Malnutrition
PEM	= Protein Energy Malnutrition
RBCs	= Red Blood Cells
SGA	= Small Gestational Age
SD	= Standard Deviation
TB	= Tuberculosis
TT	= Tetanus Toxoid
U.S.	= United States
WFH	= Weight for Height

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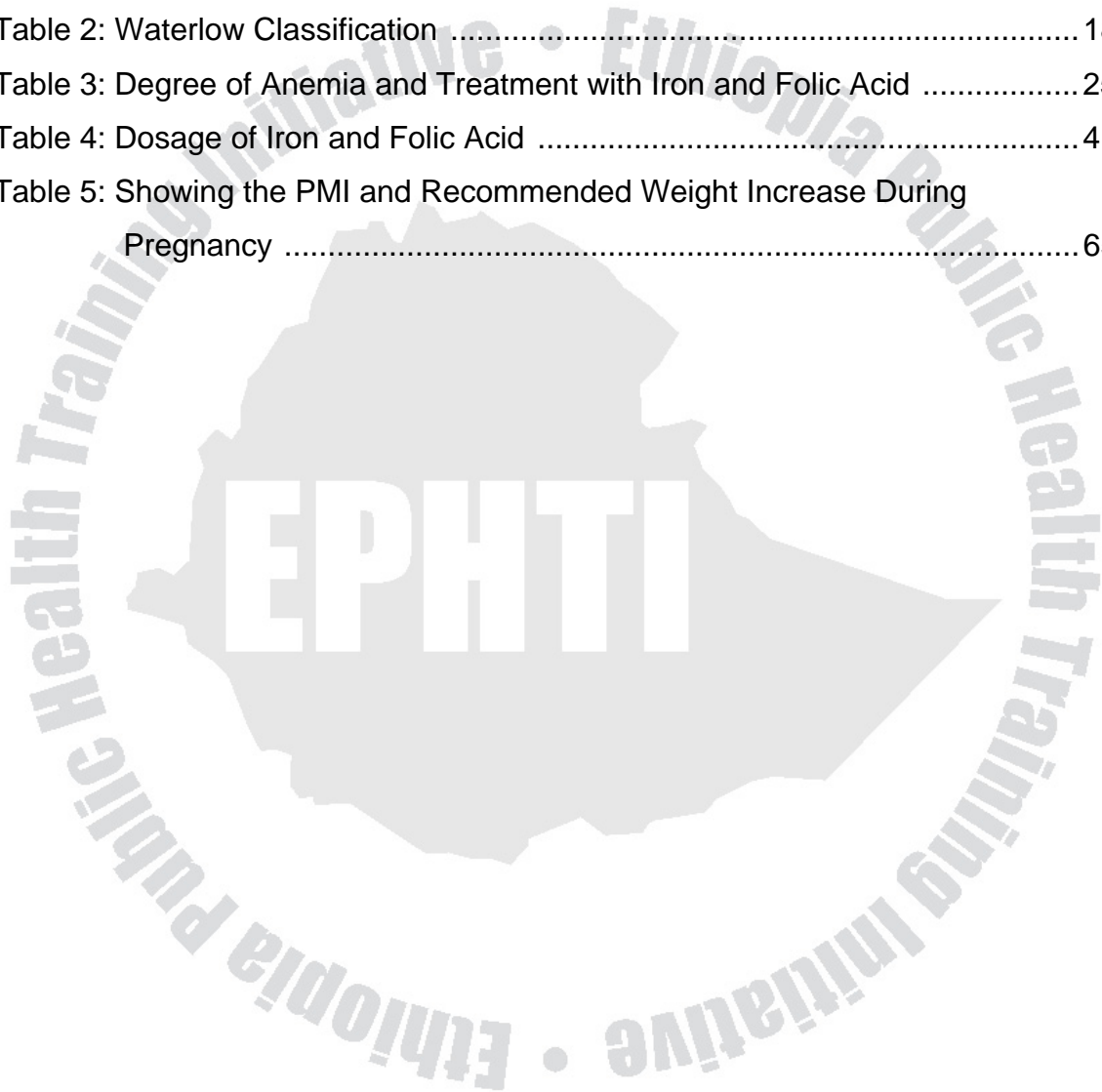
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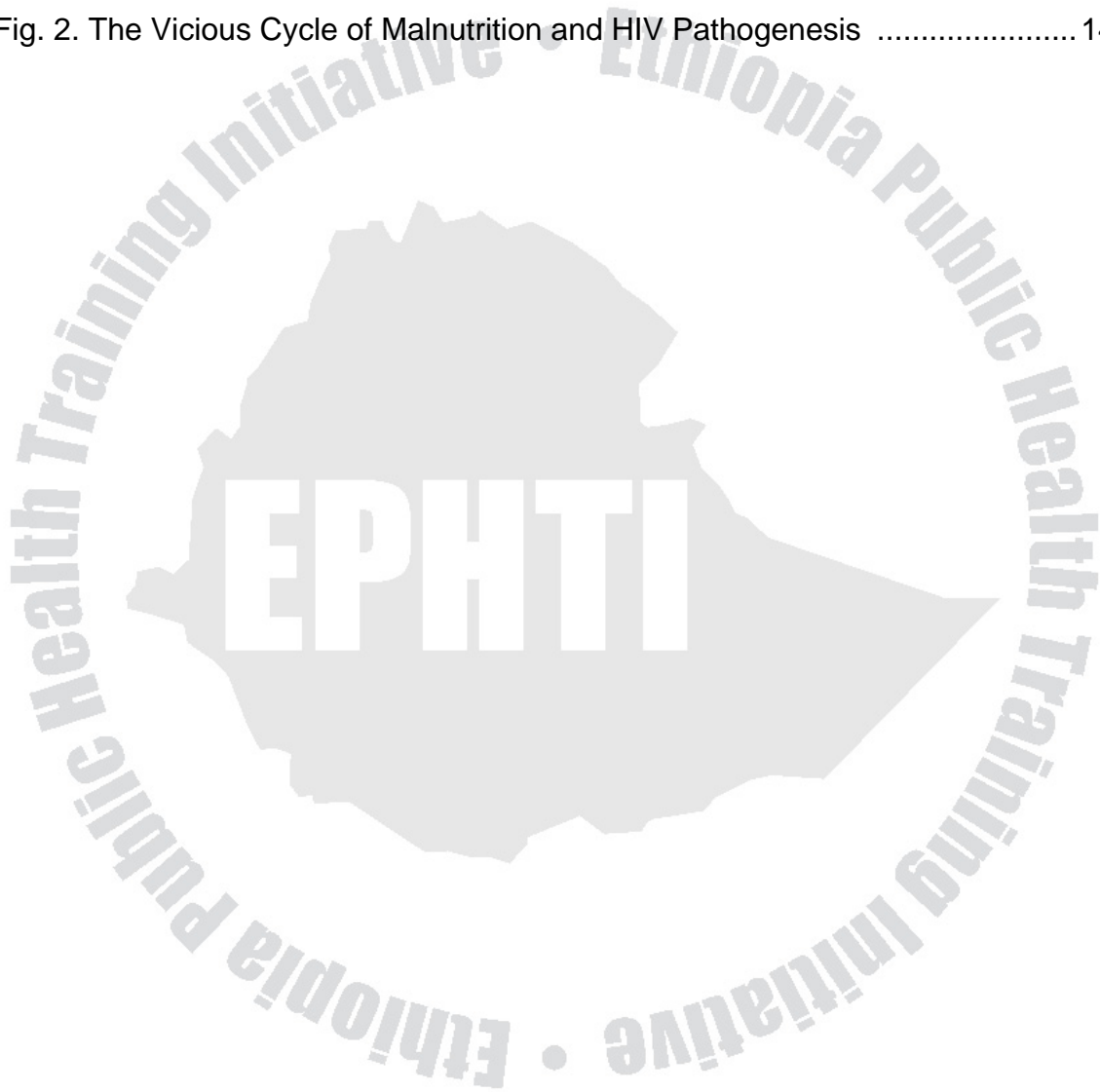
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UNIT ONE

INTRODUCTION

1. INTRODUCTION

1.1. Purposes and uses of the module

For many years it has been known that the height of the mother is closely related to birth weight and pregnancy outcome, such as perinatal mortality and stunting due to chronic malnutrition during childhood. Mothers who enter pregnancy with sound reproductive physiology, and who have not suffered ill health or nutritional deprivation in childhood will have larger and healthier infants than mothers who do not have such advantages. Several studies provide evidence for the relationship between adult size reproductive efficiency and socio economic status. In general, the baby of a short woman is lighter and has less vitality and has lower survival than that of a tall woman.

Mothers are often the key care taking persons of the children in the household, community and country. They themselves have to be healthy and need the time, the knowledge and the right environment to carry out their duties.

Studies in the U.S. conducted by the national institute of Health, have shown that mothers who weigh more than 68 kg at conception or who gain more than 12.5 kg in weight during pregnancy tend to have larger and healthier babies with a lower prenatal mortality as compared to mothers who weigh less than or gain less than weight than above.

The major micro nutrient deficiencies of public health importance in Ethiopia are iodine deficiency disorder, vitamin A deficiency and iron deficiency anemia. Other deficiencies, mainly related to thiamine, vitamin C and fluoride are also observed sporadically in some parts of the country. There is however, little or no information related to the sporadic deficiency disease.

Iodine deficiency and mental development, is directly related. The presence of goiter reflects a significant iodine deficiency in a population. Iodine deficiency has long been recognized as a problem of public health importance in Ethiopia. Therefore, health science students, instructors and graduate health professionals attempting to improve the nutrition of mothers, especially during pregnancy and lactation, can use this module.

1. 2. Direction

- Attempt all the pre test questions.
- Go through the core module and ensure that you have understood the epidemiology, causes, preventive and management aspects of maternal nutrition.
- Each category of students should:
 - Read their respective satellite module
 - Study and discuss their own specific learning objectives and activities.
- Answer all posttest questions
- Compare your answers of the pretest and posttest by checking against the key given.

UNIT TWO

CORE MODULE

2. 1. Pre-test

1. The maternal nutrition is affected by:
 - a) Income
 - b) Culture
 - c) Heavy physical activities
 - d) All of the above
 - e) Non of the above
2. One of the following does not affect maternal nutrition
 - a) Race
 - b) Pregnancy
 - c) Lactation
 - d) Digestion
3. The pregnant woman should get increased calories more than the non pregnant ladies by:
 - a) 150 kcal/day
 - b) 350 kcal/day
 - c) 800 kcal/day
 - d) A and B
 - e) All of the above
4. The important causes of malnutrition in women include the following **except**
 - a) Ignorance
 - b) An even distribution
 - c) Infectious disease
 - d) Insufficient supply
 - e) All of the above
5. Insufficient food supply is due to:
 - a) Lack of food production
 - b) The families are not capable to purchase the available food on the market
 - c) Poor communication
 - d) Change of weather condition
 - e) All of the above
 - f) All except C

6. One of the following are underline causes for retarded fetal growth **except**
- a. Poor maternal nutrition
 - b. Anemia
 - c. Acute and chronic illness
 - d. None of the above
7. Which method of nutrition intervention is least practiced in Ethiopia?
- a. Food fortification
 - b. Price policy
 - c. Supplementation
 - d. Nutrition education
8. One of the following **is not** anthropometric measurement:
- a. Weight
 - b. Height
 - c. Skin fold thickness
 - d. Biochemical tests
9. One of the following helps to detect chronic malnutrition (stunting):
- a. Weight for height
 - b. Height for age
 - c. Weight for age
 - d. All of the above
10. Adding a needed nutrient or nutrients to foods which are centrally produced and commonly eaten within a particular society for the purpose of preventing deficiency is:
- a. Fortification
 - b. Supplementation
 - c. Complementation
 - d. All of the above
11. Iodine deficiency disorder can be prevented at a national level by:
- a. Iodine capsule supplementation
 - b. Universal salt Iodization
 - c. Iodine injection
 - d. All of the above
12. One of the following is not consequence of maternal malnutrition
- a) Infection
 - b) Lower productivity
 - c) Decrease immune function
 - d) None of the above
13. The causes for anemia includes
- a. Iron deficiency
 - b. Hookworm
 - c. Malaria
 - d. All of the above

14. Which of the following statement is/are true about well nourished HIV infected woman
- a. Delay HIV progression to AIDS
 - b. Maintain body weight and strength
 - c. Enhance response for antiretroviral drugs
 - d. All of the above
15. Which statement is true about maternal nutrition?
- a. Carbohydrate is the only calorie for lactating mother
 - b. The nutritional requirement of lactating women is more than pregnant women.
 - c. Vitamin A should be given routinely to all pregnant women.
 - d. None of the above
16. The normal average weight gain in pregnancy is
- a. 3.5kg
 - b. 8.5kg
 - c. 10kg
 - d. 12.5kg

2. 2. Causes of maternal malnutrition

- Insufficient supply of the necessary food due to lack of food production or unavailability of food on the market or lack of money to purchase the available food on the market.
- Uneven distribution of the available food with in the household and the community.
- Lack of knowledge about food, nutrition, safe and sanitary way of preparation, and health from individual and community level.
- Infectious disease

2. 3. Factors affecting maternal nutrition

Culture and beliefs

Culture plays a significant role in the types of food eaten and feeling about diet and nutrition.

- During period of fasting, important foods are not consumed, such as animal products.

- Pork is forbidden for religious and cultural reasons.
- The belief that eating heavy meals during pregnancy would cause big baby resulting delay in labor.
- Fear of evil eye and not exposing infants to sunlight
- Considering vegetables (mainly kale) as a poor man's diet
- Discrimination in feeding among family members, adult males (head of the household) before females and feeding of children with left over food.

Economic Resources

An adequate diet may be related to a person's finances. The lower a person's economic level, the less likely it is that his or her diet is nutritionally adequate. In Ethiopia, mothers are a lower priority due to the cultural influence. They are also economically dependent.

Gender

Nutritional requirements vary between men and women. To prevent anemia, women need more dietary iron to offset menstrual blood loss.

2. 4. Maternal Health and Pregnancy Outcome

The state of the mother's physiology, especially reproductive physiology, at the time when pregnancy commences has considerable influence on the growth of the fetus. Several studies provide evidence for the relationship between adult size reproductive efficiency and socio economic status. In general, the baby of a short woman is lighter and has less vitality and lower survival than that of a tall woman. Stunting in the mother cannot be overcome by a good diet in pregnancy and the same applies to reproductive efficiency.

The growth of the fetus can be regarded as a result of the interaction between its genetic potential and the intrauterine environment. Mothers who enter pregnancy with sound reproductive physiology, and who have not suffered ill

health or nutritional deprivation in childhood, will have larger and healthier infants than mothers who do not have such advantages.

There are many short mothers in the lower socio economic groups, which means that inadequate nutrition and illnesses prevent many girls in the social group from achieving optimal physique.

2. 5. What mothers should do during pregnancy

- Help clients to understand the importance of adequate weight gain during pregnancy. Strongly discourage clients who are obese from attempting to lose weight during pregnancy. Weight gain during pregnancy is recommended.
- Encourage clients to plan meals carefully so that all of the nutrients needed during pregnancy can be included without excess calories using a food guide for pregnancy is helpful. Strongly discourage the pregnant woman from using alcohol.
- Caffeine intake should be limited, instruct client to take only vitamins and minerals prescribed. Excess amount can be harmful.
- Advise clients that skipping meal is a poor practice, especially for the pregnant woman. The fetus needs a steady supply of nutrients.
- Encourage the pregnant mother to use high fiber foods and plenty of fluids to avoid constipation.
- Give priority to helping pregnant teenagers improve their eating habits. Additionally, teenagers need snacks that are nutritious and at the same time acceptable to the teenagers.
- Take advantage of the client's high motivation during pregnancy to provide nutrition education for the family as well as for the pregnant woman.

Alcohol consumption such as liquor, Wine, Beer, Tella, Teje, and Areki should be avoided during pregnancy.

Many factors cause variation in weight at birth, but in developing countries the mother's health and nutritional status and her diet during pregnancy are most important.

One of the reasons for low birth weight is retarded fetal growth and this occurs due to poor maternal nutrition. Moreover, the following factors should be known as causes for low birth or improving birth weight:

- Anemia
- Acute or chronic infection such as TB
- Effort to increase the amount of food available to pregnant and lactating mothers can be the most effective way of improving their health and that of their infants.
- To support lactation and maintain sufficient maternal reserves, most mothers in developing countries will need to eat about 650 additional kilo – calories (the equivalent of one extra meal) everyday.
- Mothers should eat a balanced diet (including fruits and vegetables, animal products, and fortified foods, when possible) by consuming a Variety of foods.
- Community and household members should be informed of the importance of making additional food available to women during pregnancy and lactation, as well as helping them to reduce their workload and obtain adequate rest.

2.6. Maternal Nutritional Problems:

1. Types of malnutrition

- a) Protein – Energy malnutrition
- b) Micronutrient malnutrition
- c) Obesity

2. The integral cycle of malnutrition

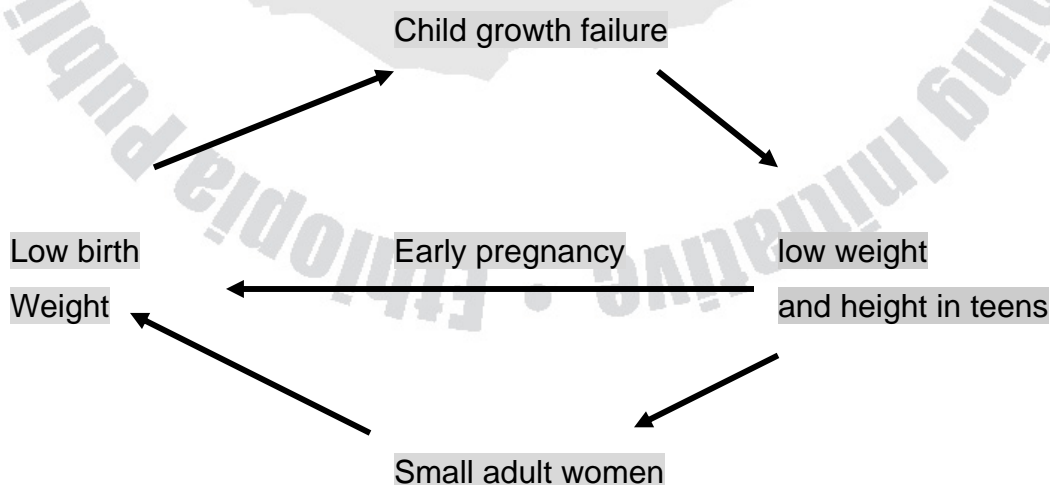


Figure 1: Cycle of Malnutrition

3. Maternal malnutrition: a life cycle issue

⇒ Infancy and early childhood (birth -24 month)

- Sub optimal breast-feeding practice
- Inadequate complementary feeding
- Infrequent feeding
- Frequent infections

⇒ Child hood (2-9yrs)

- Poor Diet
- Poor health care
- Poor education

⇒ Adolescence (10-19 years)

- Increased nutritional demands
- Greater iron needs
- Early pregnancy

⇒ Pregnancy and lactation

- High nutritional requirements
- Increased micronutrient intake
- Closely-spaced reproductive cycles

⇒ Throughout life

- Food insecurity
- Inadequate diets
- Recurrent parasitic infection
- Poor health care
- Heavy work loads
- Gender inequities

4. Consequences of maternal malnutrition

⇒ Maternal

- High Maternal Mortality
- Increased infection
- Anemia
- Decreased immune functions

- Fatigue and weakness
- Low productivity
- Obstructed labor

⇒ Infant health

- Increased fetal and neonatal death
- Intrauterine growth retardation
- Low birth weight
- Pre term delivery
- Decreased immune function
- Birth defects
- Cretinism and decreased IQ

⇒ To the family and community

- Increased expenditure
- Affect the socio economic condition.

5. The common maternal nutritional problems

- Protein energy malnutrition
- Iron and folic acid deficiency.
- Vitamin A deficiency
- Iodine deficiency
- Folic acid deficiency
- Zinc deficiency
- Vit. B₆ and B₁₂ deficiency

⇒ *Protein energy malnutrition*

It is due to deficiency of proteins, fat and carbohydrate

Consequences

- Low resistance to Infection
- Obstructed labor
- High Maternal Mortality
- Low birth weight and IUGR
- High Neonatal and infant mortality

⇒ *Iron deficiency*

- It is the most common cause of anemia
- Anemia is defined in first and third trimesters hemoglobin concentration less than 11gm/100ml or Hematocrit less than 33% and in second trimesters hemoglobin less than 10.5gm/100ml or Hematocrit less than 32%
- Causes of dietary iron deficiency
 - Low dietary iron intake
 - Low iron bioavailability
 - Consumption of iron absorption prohibitors
- Other causes of anemia parasitic infections and malaria. Parasitic infections like Hookworm
 - Causes blood loss
 - Increase iron loss
- Malaria
 - Destroys red blood cells
 - Leads to severe anemia
 - Increases risk in pregnancy
- Consequences of maternal anemia
 - Maternal death
 - Reduced transfer of iron to the fetus
 - Low birth weight
 - Neonatal mortality
 - Reduced physical activity and productivity
 - Impaired cognition

⇒ *Vitamin A deficiency*

- Causes
 - Inadequate intake
 - Recurrent infection
 - Reproductive cycle
- Consequences
 - Night blindness

- Maternal mortality
- Miscarriage
- Still birth
- Low birth weight
- Reduced transfer of vitamin A to fetus
- HIV vertical transmission
- Low vitamin A concentration in breast milk

⇒ *Iodine deficiency*

➤ Causes

- Living in the mountainous area where plant foods have inadequate iodine
- Taking cassava tuber as a food with out detoxifying it and other chelating substances
- Not taking sea foods
- Not consuming Iodide Diet

➤ Consequences

- Impaired cognition
- Poor school performance
- Endemic cretinism

⇒ *Folic acid deficiency*

➤ Cause

- Nutritional deficiency
- Drugs that affects bio availability

➤ Consequences

- Maternal anemia
- Neural tube defect
- Low birth weight

2.7. Common problems related to maternal nutrition in pregnancy

Health workers are likely to encounter a number of nutritional problems in day-to-day prenatal care.

1. Nausea vomiting and hyper emesis gravidarum

- Usually in first trimester
- Cause discomfort anxiety as well as weight loss, ketosis and dehydration in more severe cases.

2. Pica

- The craving and eating of non-foods such as laundry starch and clay.
- It is common in some ethnic group
- The etiology is unknown but cultural belief and iron deficiency anemia could be attributed to be contributing factors.
- Pica replaces ingested nutritious food and may bind dietary iron, leading to anemia. There is a possibility that the ingested substance to be toxic

3. Constipation

Can be treated by increasing dietary fibers, fluid intake and exercise

4. Vegetarianism

The strict Vegan lacks essential amino acids from animal proteins

Problems high weight increment (gain)

5. Food restriction

- Dieting and fasting on a chronic basis can result in sub optimal fetal growth.
- Bulimia and anorexia nervosa reflects extreme form of food restriction and malnutrition

6. Ingestion of caffeine

Caffeine is contained in foodstuffs like coffee chocolate and coca beverages.

Problems – withdrawal symptoms including nausea, lethargy, malaise and headache, insomnia acid indigestion, reflex and urinary frequency.

2.8. HIV/AIDS and maternal nutrition

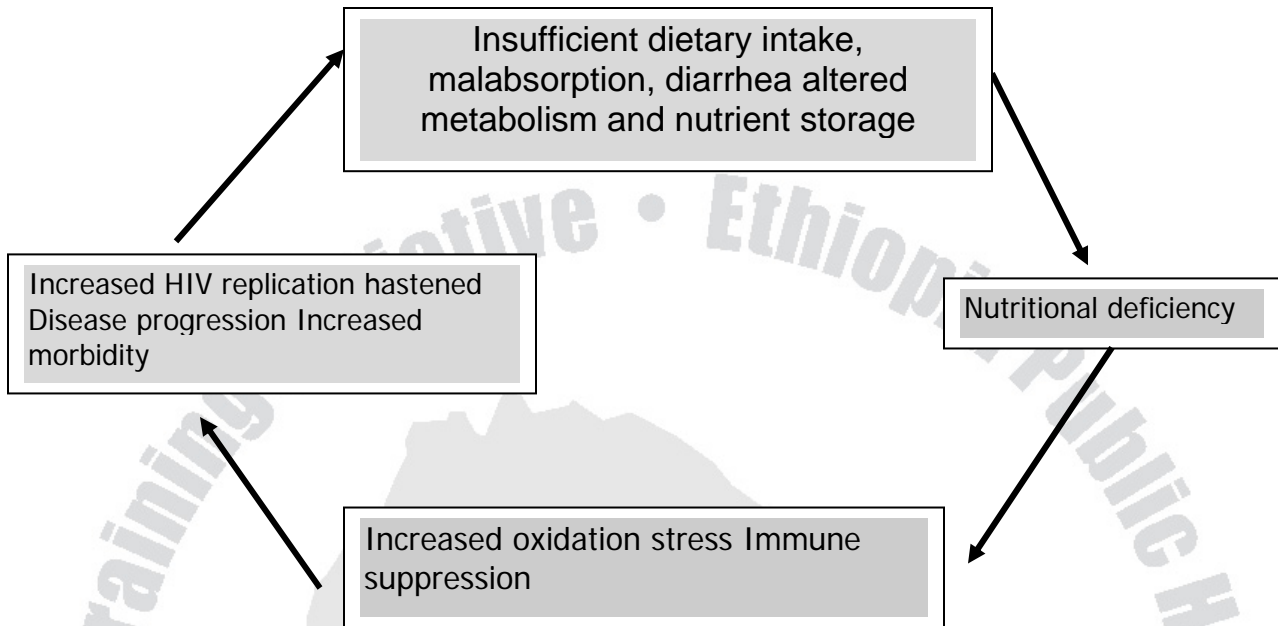


Figure 2: The Vicious Cycle of Malnutrition and HIV pathogenesis

- Good nutrition delay HIV progression in to AIDS, maintain body weight and strength, enhance responses to therapy
- Antiretroviral drugs and (ARV) food/nutrient can interact.

2.9. Maternal Nutritional Requirements

Table. 1: Recommended Daily Dietary Allowances for Women Before and During Pregnancy and Lactation.

Nutrients	Non-pregnant	Pregnant	Lactating	Food
Energy (kcal)	2200	2500	2600	Protein, carbohydrate and fat
Protein (gm)	50.55	60	65	Meat, fish poultry, dairy, and legumes
Vitamin A (μ g)	800	800	1300	Fruits, vegetable and liver
Folate (μ g)	180	400	280	Leafy vegetable and liver.
Iron (mg)	15	30	15	Seafood, meat and grains
Iodine (μ g)	150	175	200	Iodinated salt and seafood

1. Diet during pregnancy and lactation

Make sure the type of food used to prepare her meals and snacks gives her enough to achieve daily energy requirement in non-pregnant woman (2200kcal), pregnant women (2500kcal) and lactating woman (2600kcal)

2. Weight gain during pregnancy

The recommended weight gain in pregnancy is 11.5 to 16kg; on average is 12.5kg for women with normal pregnancy body mass index (BMI).

- Low weight gain associated with SGA, LBW and pre term delivery
- Excess weight gain cause macrosomia and increased cesarean delivery
- Components of weight gain during pregnancy
 - Fetus, placenta, amniotic fluid = 4750 gm
 - Uterus and breast = 1300 gm
 - Blood 1250 gm
 - Water 1200 gm
 - Fat 4000 gm
 - Total 12500 gm**

Assessment of maternal nutritional status

Nutritional assessment is the process of estimating the nutritional position of an individual or group, at a given point in time, by using proxy measurement of nutritional adequacy. It provides an indication of the adequacy of the balance between dietary intake and metabolic requirement.

Uses of Nutritional Assessment

It should aim at discovering facts to guide actions intended to improve nutrition and health.

- a) Diagnostic tool; (individual and group)
 - Does a problem exist – identify
 - Type of problems
 - Magnitude of the problem
 - Who are affected by the problem

- b) Monitoring tool (individuals and group)
 - Requires repeated assessment over time
 - Has the situation changed?
 - Direction and magnitude of change
- c) Evaluation tool (individual or group). To what extent has the intervention, treatment, or programme had the intended effect (impact)

2.10. Assessment Methods

Assessment of maternal nutritional status

Maternal nutritional status can be assessed using the ABCD (Anthropometry, Biochemical, clinical and dietary methods).

a. Anthropometric assessment

Measurement of the variation of physical dimensions and the gross composition of the human body at different age levels and degrees of nutrition.

Two types:

- Growth measurement
- Body composition (body fat, and fat-free mass)

Indices can be derived directly from a single raw measurement;

- Height for age
- Weight for height
- Weight for age

Anthropometrics assessment of growth

Common measurements include;

1. Stature (height)
2. Body weight
3. Skin fold

Indices derived from growth measurements;

1. Weight-for-height: (used for under 5 children)
 - Sensitive index of current nutritional status
 - Valuable as index of wasting

Limitations:

- Oedema and obesity may complicate

2. Height-for-age:

- Estimates the past or chronic nutritional status
- Valuable as an index of stunting

Stunting:

- Slowing of skeletal growth and stature
- End result of a reduced rate of linear growth
- Results from extended period of inadequate food intake and high morbidity
- Depends on genetic/ethnic factors
- Accurate measurement technique is essential because of narrow distribution of height measurement at a given age

3. Weight for age

- Used for under 5 children for growth monitoring by health institutions
- Less sensitive index because of inaccurate age estimation
- Valuable as an index of underweight

4. Weight changes:

A reflection of changes in protein, water, mineral and/or body fat content.

5. Weight/height ratio:

Frequently used for adults

Measures body weight corrected for height

Two types:

Relative weight

Power type indices

Relative weight expresses the weight of a given subject as percentage of the average weight of persons of the same height.

Power-type indices express weight relative to some power function of height or height relative to some power function of weight.

$$\text{BMI} = \text{Wt}/(\text{Ht})^2$$

Anthropometrics techniques can indirectly assess these two body compartments, and variations in their amount and proportion can be used as indices of nutritional status.

The WATERLOW Classification

The nutritional status of the children is a reflection of the nutrition status of the household. Waterlow pointed out two different types of deficit: a deficit in *WEIGHT-FOR-HEIGHT* (wasting) and a deficit in *HEIGHT-FOR-AGE* (stunting). Waterlow recommends that individuals should be classified according to the degree of wasting and the degree of stunting. He provides a two-way table and suggests how the cut-off points should be chosen.

Classification of all degree of PEM

1. Waterlow has suggested classification based on wasting (current malnutrition) or stunting (chronic malnutrition)

WFH = 80% of the Reference standard or
– 2 SD below the median

HFA = 90% or – 2 SD below the median

Table 2: Waterlow classification

		Weight	
		Above > -2SD	Below < -2SD
Height	Above > -2SD	Normal	Acute malnutrition
	Below < -2SD	Nutritional Dwarfism	Chronic Malnutrition

Clinical method

Changes in the superficial tissues or in organs near the surface of the body, which are readily seen or felt upon examination. These include changes in:

- Eyes
- Skin
- Hair

- Thyroid gland

Common indicators

- Edema
- Dyspigmentation of the hair
- Angular Stomatits
- Corneal lesions
- Swelling (enlargement) of glands
- Xerosis, etc.

Advantage of this method, it does not require elaborate equipment or laboratory; several can be done by minimally trained personnel.

Limitation:

- (a) Specificity is low; many of the signs are associated with a number of nutritional disorders as well as non-nutritional disorders.
- (b) Sensitivity is low; sign may appear in the recovery as well as the deficiency state

Assessing PEM in women

- Height less than 1.45m
- Weight less than 45kg
- BMI less than 18.5 (thinness)
- Pregnant – weight gain less than 1.5kg/month in the second and third trimesters (or less than 10.5kg gained over full course of pregnancy)

Methods of nutrition intervention

- Food fortification
- Food for work
- Price subsidization
- Supplementation
- Dietary diversification and modification
- Family planning
- Integration of nutrition with health
- Price policy

- PHC (immunization, Control Diarrhea Diseases, Malaria Control, dewarming, watering Sarah)

2.11. Mechanisms of Nutrition Interventions

There are five principal mechanisms through which all interventions work.

1. Availability of food at local or regional level. Making the required foods more available with respect to place and time.
2. Accessibility to food and availability of foodstuff at the household level.
Making the required foods more accessible and available to the households.
3. Food utilization at household level. Making better use of available foods.
Food processing like fermentation, germination preparing weaning food. This includes:
 - Nutrition education (face to face, mass media), rehabilitation
 - Breast feeding
 - Food formulation
4. Distribution within the household.
 - Intra household distribution of food
 - Supplementation
 - Education
5. Physiological utilization
 - Health service activities and environmental sanitation
 - Primary health care
 - Environmental health

Key interventions to improve Maternal Nutrition

Improving Maternal Nutrition

- Ensure access to and consumption of salt fortified with iodine in every household
- Distribute a high dose of vitamin A within six weeks after delivery
- Distribute iron supplements during the last six months of pregnancy
- Delay first pregnancy especially for teen age girls
- Increase birth intervals

- Increase food intake during pregnancy and lactation
- Access to labor saving devices

Rationale for supplements or fortified food products for mothers

- Certain nutrients in breast milk can be affected by maternal diet (vitamin A, Thiamin, Riboflavin, Vitamin B6, Vitamin B12, Iodine, Selenium)
- First choice is improvement of mothers diet, but cost constraints limit options
- Adequate micronutrient intake during lactation can benefit both mother and infant

2. 12. Essential Nutrition Actions (ENA) Approach:

An action oriented approach to nutrition...

If we use the ENA approach to nutrition, estimated decrease of child mortality is 25%. The seven essential actions and the six contact points should be included in the curricula of all health science students.

Action areas:

1. Women's nutrition:

Key messages:

During pregnancy and lactation

- Increase feeding
- Iron/Folic Acid Supplementations
- Treatment and prevention of malaria
- De-worming during pregnancy
- Vitamin A Capsule after delivery

2. Control of Vitamin A Deficiency:

Key messages:

- Vitamin A rich foods
- Maternal supplementation
- Food fortification

3. Control of Anemia:

Key messages:

- Supplementation of women and children (IMCI)
- De-worming for pregnant women and children (Twice/year)
- Malaria control
- Iron rich foods
- Fortifications
- Vitamin C rich foods

4. Control of Iodine Deficiency Disorders:

Key messages

Access and consumption by all families of iodized salt

How the Essential Nutrition Actions expands coverage of nutrition support in the health sector:

Critical contact points in the lifecycle

1. During Antenatal Care

- Pregnancy: TT
- Antenatal visit, Iron/Folic Acid
- De-worming
- Maternal diet
- Exclusive Breast Feeding
- Risk signs, Family Planning, Sexually Transmitted Infection prevention
- Safe delivery, iodized salt

2. Delivery

- Safe delivery,
- Exclusive Breast Feeding
- Vitamin A, Iron/Folic Acid
- Diet, Family Planning and Sexually Transmitted Infection, Referral

3. Postnatal and Family Planning:

- Exclusive Breast Feeding, Diet, Iron/Folic Acid

- Vitamin A, Iron/Folic Acid
- Vitamin A, Iron/Folic Acid
- Family Planning, Sexually Transmitted Infection prevention
- Child's vaccination

4. Immunizations:

- Vaccination, Vitamin A
- De-worming
- Assess and treat infant's anemia
- Family Planning, Sexually Transmitted Infection prevention.

Recommendations for Maternal Nutrition

- During Pregnancy Increase food and vitamin A intake
- Postpartum In areas where vitamin A deficiency common, take a single high-dose (200,000IU) vitamin A capsule as soon as possible, but not later than eight weeks postpartum
- During Lactation Increase food and vitamin A intake
Plan for recuperative period between lactation and the next pregnancy
- All times diversify the diet to improve vitamin A and other micronutrient intake

Priority Nutrition Activities in District Health Services

District Level

- Monitor nutrition problems, identify sub-populations at risk of nutrition problems, and direct additional resources to high risk areas
- Provide resources and tools to implement nutrition activities at health facilities and in communities
- Implement communications strategies to reinforce priority nutrition messages
- Implement special actions to supplement routine services, e.g., campaigns to distribute micronutrient
- Provide facilities for management of severe malnutrition and anemia

- Form partnerships with private providers in the district

Health Facility Level

- Carry out essential nutrition actions at these contacts with women: during pregnancy, at delivery and postpartum, and in the weeks following delivery
- Detect, treat/ refer severe anemia
- Build community partnership in the catchments area
- Train and supply community workers; encourage private providers to follow appropriate guidelines
- Implement special actions to achieve coverage targets, e.g., local micronutrient distribution days
- Record and monitor the coverage of essential actions; conduct surveillance of nutrition problems

Community Level

- Identify and support a system to follow all pregnant women at least through delivery and in the first few weeks postpartum
- Train and support birth attendants, women's groups, and other workers to give key nutrition services
- Support family planning choices
- Make community leaders and families aware of priority nutrition problems and needed actions
- Record and monitor key nutrition indicators

Vitamin A

In areas where vitamin A deficiency is common, post partum women should be given a single high dose (200,000 IU), vitamin A capsule as soon after delivery as possible, but not later than eight weeks of postpartum. High dose vitamin A supplements should not be taken during pregnancy as it may harm the developing fetus. Since the risk of pregnancy for lactating women is very low during the 45 days postpartum, this is the only time they should be given the high-dose capsule.

Target Group	Dosage (IU)	Frequency
Post partum women	200, 000	within 45 days after delivery

Iodine capsule

As a short-term strategy in highly endemic areas, Lipiodol (iodized oil capsule), should be distributed on a one-time basis to individuals. This will cover the recipients for one to two years until salt iodization processes are in place.

Dosages are: One capsule for pregnant women
 Two capsules for women in the reproductive age

Iron and folic acid

Supplementation for pregnant and lactating women

Pregnant women require a much higher amount of iron than is met by most diets and therefore, it is important that they receive iron supplements. In places where anemia prevalence is high, supplementation should continue in to the postpartum period to enable them acquire adequate stores of iron.

Iron and folic acid doses for universal supplementation for pregnant and lactating women.

Table: 3 - Degree of anemia and treatment with iron and folic acid

Prevalence of anemia in pregnant women in the area	Doses	Duration
<40 %	Iron: 60 mg /day+ Folic acid; 400mg/day	Six months during pregnancy (or if started late, extend to post natal period for a total duration of six months)
> 40%	Iron: 60 mg /day + Folic acid; 400mg/day	Six months during pregnancy plus continuing to three months post-partum (or a total duration of nine months)

Food Fortification

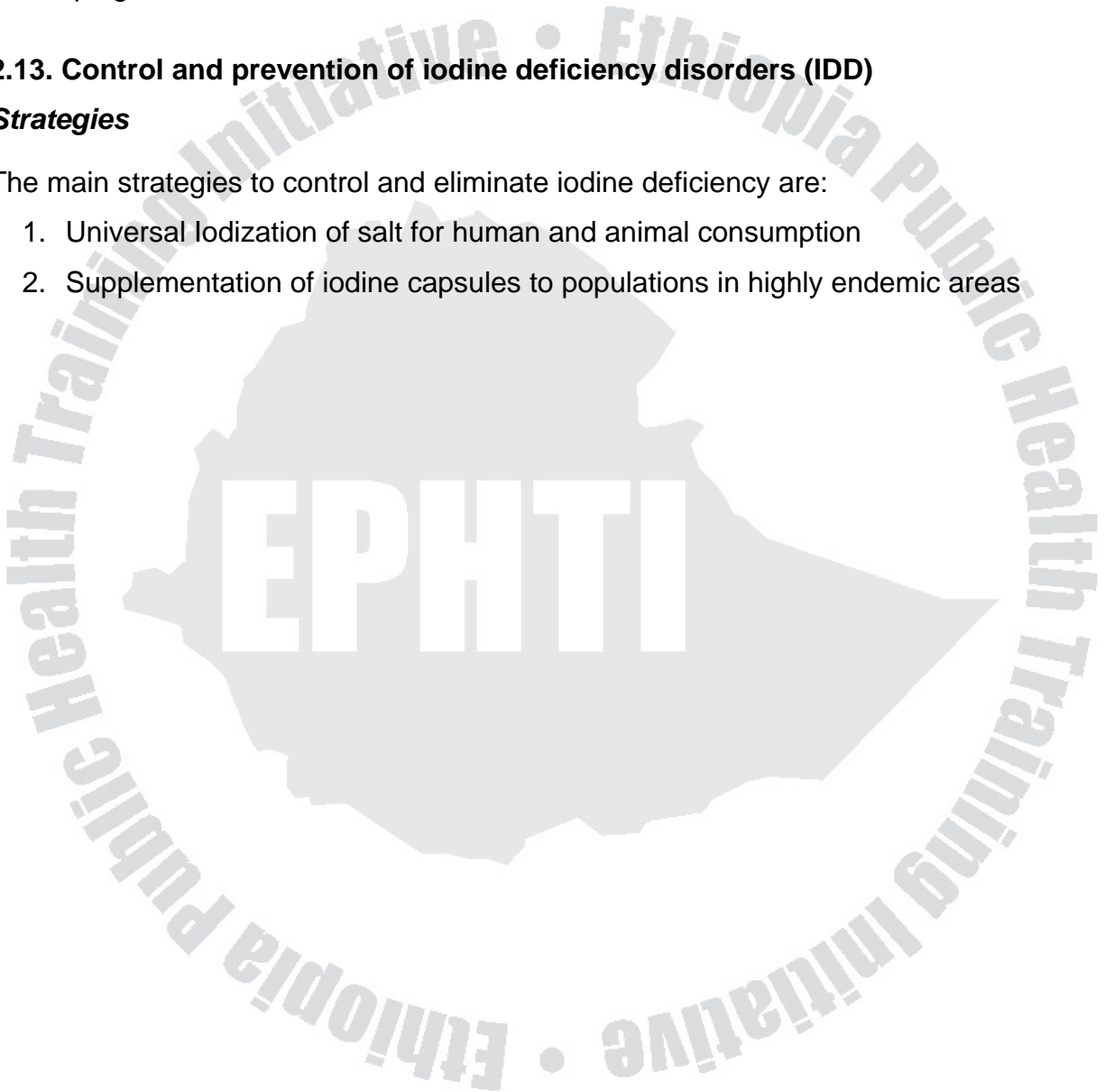
Food fortification means adding a needed nutrient or nutrients to foods, which are centrally produced and commonly eaten within a particular society. Food fortification is a major intervention in the effort to reduce iron, vitamin A and iodine deficiency in both developing and industrialized countries.

2.13. Control and prevention of iodine deficiency disorders (IDD)

Strategies

The main strategies to control and eliminate iodine deficiency are:

1. Universal Iodization of salt for human and animal consumption
2. Supplementation of iodine capsules to populations in highly endemic areas



UNIT THREE

SATELLITE MODULE

3.1. SATELLITE MODULE FOR HEALTH OFFICER STUDENTS ON MATERNAL NUTRITION

3.1.1. Introduction

Under the normal conditions the mother's weight increases by 20% during pregnancy. In well-nourished mothers from industrial countries this corresponds to the average weight gain of 12.5 Kgs.

In developing countries, studies among poor mothers show that many of them gain only about 5 to 7 Kgs during pregnancy. Low weight gain during pregnancy of poor mothers may be due to mother's health and nutritional status when they enter pregnancy and their diet during pregnancy.

Maternal Health: Health workers are in a strong position to design and implement nutrition programs. They are also powerful motivators who can help change family practices and community beliefs about the care and feeding of women. The health workers will design programs to:

- Carry out essential nutrition actions at these contacts with women, during pregnancy, at delivery, and postpartum, and in the weeks following delivery.
- Detect severe anemia and refer the women if a blood transfusion is needed.
- Identify and support a system to follow all pregnant women at least through delivery and in the first few weeks postpartum.
- Train and support birth attendants, women's groups, and other workers to give nutrition services.
- Support family planning choice.
- Make community leaders and families aware of priority nutrition problems and needed actions.

- Record and monitor key nutrition indicators of maternal nutrition.

3.1.2. Learning objectives:

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

- Discuss the role of nutrition in the promotion of maternal health.
- Discuss some of the important causes of maternal malnutrition
- Explain common maternal nutritional problems
- Identify the available intervention methods

3.1.3. What are the common maternal nutritional problems?

See Core Module.

3.1.4. Treatment and prevention of vitamin A deficiency:

Vitamin A deficiency is a major health problem in Ethiopia. Bitot's Spot was reported to be 0.8% nationwide in Ethiopia. WHO identifies the area as having a problem of public health significance if Bitot's Spot is greater than 0.5%.

Vitamin A deficiency occurs when vitamin A intake (or liver stores) fails to meet daily metabolic requirements. The most common cause is inadequate consumption of vitamin A rich foods. Deficiency also occurs when there is problem of absorption, conversion or utilization of vitamin A or when there are repeated infections of diseases such as measles or diarrhea. In the absence of foods containing oils or fats in the diet, vitamin A is not well absorbed and utilized.

Vitamin A deficiency has long been associated with blindness. Recent research reveals that vitamin A deficiency is associated with increased morbidity and mortality. In countries like Ethiopia, where diarrhea, acute respiratory infection, and measles are among major causes of child mortality, Vitamin A deficiency is of specific concern.

Rationale for action:

Improving vitamin A status:

- Prevents night blindness, xerophthalmia, corneal destruction, and blindness
- May reduce birth defects
- Prevents epithelial and perhaps other types of cancer

Strategies

The main strategies, which have been adopted globally to control and eliminate vitamin A deficiency, are:

1. Supplementation
2. Dietary diversification and modification
3. Food fortification

In areas where vitamin A deficiency is common, post-partum women should be given a single high-dose (200,000 IU) Vitamin A capsule as soon after delivery as possible. This will help to build up vitamin A stores, improve the vitamin A content of breast milk, and reduce the risk of infection in mothers and infant.

High dose vitamin A supplements should not be taken during pregnancy as it may harm the developing fetus. Since the risk of pregnancy for lactating women is very low during the first 45 days postpartum, this is the only time that they should be given the high-dose capsule.

The dosage for vitamin A treatment to post-partum women within 45 days after delivery is 200,000 IU.

Health workers at health facilities and outreach posts can administer vitamin A capsules to women. Properly trained and adequately supervised volunteers, community health worker or health extension agents can administer vitamin A during campaigns.

Food Diversification for vitamin A

Food diversification is an important long-term, sustainable strategy for prevention of vitamin A deficiency. Communities should be encouraged to grow and consume vitamin A rich food like tomato, green pepper, yellow fruits and green vegetables throughout the country at all times.

Animal sources of vitamin A

The best food sources of pre-formed active retinol, which is most effectively used by the body, are animal foods. These include egg yolks, organ meats such as liver, whole milk, and milk products, small fish with liver intact, fish, cod-liver oil, butter, and ghee.

Plant sources of Vitamin A

Plants contain beta-carotene that needs to be converted into retinol by the body. The best plant sources of vitamin A are dark orange or dark yellow fruits and vegetables such as papayas, mangoes, pumpkins, carrots, and yellow or orange sweet potatoes and dark green vegetables such as spinach, kale and Swiss chard. Gommen is an example of a traditional plant, which is rich in vitamin A and commonly included in the Ethiopian diet.

Food fortification with vitamin A

This involves adding one or more vitamins to commonly consumed foods.

This strategy is beneficial for the whole population if many types of foods for human consumption were to be processed and fortified at the factory level. Unfortunately food fortification is not well known in Ethiopia. Some efforts are under way to fortify sugar and oils that are being produced in some of the larger factories.

Deficiency of Iron

Causes of anemia are multiple and the main causes are nutritional deficiencies, which represent more than half of all cases. Other causes of anemia include blood loss through hemorrhage, destruction of red blood cells by infections, and genetic defects of red blood cells.

Causes of iron deficiency

- Insufficient iron in the diet
- Blood loss during menstruation
- Heavy load of intestinal parasites such as schistosomiasis, tricuriasis and, ascariasis

Consequences: Anemia leads to reduced work capacity, decreased mental performance and intolerance to infections. When the level of hemoglobin concentration falls below 4g/dl it may cause death from anemic heart failure. Iron deficiency anemia can also cause increased maternal mortality due to adverse immune reaction, and maternal anemia can cause prenatal infant loss, low birth weight and prematurity.

3.1.5. Prevention and treatment of iron deficiency

The main strategies are:

- Supplementation of iron tablets with folates preferably with vitamin B₁₂ and vitamin C.
- Dietary improvement of iron rich foods
- Changing of dietary habits and food preparation practices through nutrition education.
- Fortification of foods with iron
- Control of malaria infection
- De-worming of intestinal infection
- Control of febrile and chronic diseases
- Prenatal iron supplementation

Pregnant women require much higher amount of iron than is met by most diets. Therefore, it is important that pregnant women routinely receive iron supplements. In areas where anemia prevalence is high, supplementation should continue into the postpartum period, to ensure adequate stores of iron.

3.1.6. Assessment of maternal malnutrition:

See core module

3.1.7. Nutrition Intervention

When there is a serious nutritional problem in a community, we will try to intervene. For intervention we need many things, such as manpower, logistics and resources. When we secure the necessary things for the intervention, we will choose methods that are the most appropriate and design strategies for the intervention program.

Protein Energy Malnutrition (PEM)

PEM is today the most serious nutritional problem in Africa and other developing countries. Its two clinical forms are kwashiorkor and marasmus.

These diseases occur most often in children between one and three years of age, after they have been taken off the breast. There are two principle theories regarding the etiology of kwashiorkor that have both opposing and overlapping aspects, the old classical view of protein deficiency and the new theory of different noxae (e.g. infections, toxins, medications, trauma etc.) leading to free radical damage by an impaired state of the body's anti-oxidant defense mechanism (lack of vitamin A, E, C, protein, zinc, copper, selenium and manganese).

Although there is no final clarity about the etiology of kwashiorkor in biomedical terms, it is nevertheless, clear that it is related to nutritional deficiencies. Therefore, all factors that could possibly contribute to malnutrition in general should be avoided. These include seasonal food shortage, unfavorable family condition, inadequate water supply and sanitary facilities, certain traditional attitudes during pregnancy, prenatal period, breast-feeding and weaning periods, and all infectious diseases, which generally reduce immunity. Other diseases may sometime play an important role in precipitating the onset of kwashiorkor in already malnourished mothers and children, Example:

- Gastrointestinal tract infection
- Diarrhea
- Intestinal worms (these share the diet and cause ill- health and poor appetite)
- Constipation
- Childhood diseases such as measles and whooping cough

Proteins assist in regulating the fluid balance of the cells. Plasma protein molecules are so large that they cannot pass through the capillary membrane thus they remain in the blood vessels. The presence of these large molecules in the blood vessels create the pressure needed to draw fluid back out of the cell so that it does not accumulate in the tissues. In protein deficiency, the number of plasma proteins in the blood is reduced,

and consequently, the pressure they exert also is reduced. When there is insufficient pressure to remove fluid from the tissues, edema results.

Nutrition Education should focus on:

- Cultural malpractices and beliefs in feeding pregnant and lactating women.
- Intra household mal-distribution of food (age bias, sex bias,)
- Effects of emotional deprivation and neglect
- Breast feeding and its benefits (policy issues posed by HIV)
- Hygiene (sanitation of food cooking and storage utensils, personal hygiene, food hygiene etc)

3.1.8. NUTRITION IN MOTHERS

Goals:

- Help women understand the importance of adequate weight gain during pregnancy. Strongly discourage women who are obese from attempting to lose weight during pregnancy. Weight gain during pregnancy is essential
- Encourage clients to plan meals carefully so that all of the nutrients needed during pregnancy can be included without excessive calories, using a food guide for pregnancy is helpful. Strongly discourage the pregnant woman from drinking alcohol.
- Caffeine intake should be limited.
- Instruct client to take only vitamins and minerals prescribed, excessive amounts can be harmful.
- Advise clients that skipping meals is a poor practice, especially for the pregnant woman. The fetus needs a steady supply of nutrients.
- Encourage the use of high fiber foods and plenty of fluids to avoid constipation.
- Give priority to helping pregnant teenagers improve their eating habits. Together with teenagers, plan meals and snacks that are nutritious and at the same time acceptable to the teenagers.
- Take advantage of the client's high motivation during pregnancy to provide nutrition education for the family as well as for the pregnant woman.

Table 5. Food Guide for the Reproductive years need number of daily serving

Food group of category	Food	Major nutrients provided
Protein sources	Meat Fish Cheese Eggs Beans, legumes Nuts, seeds Nut butters	Protein, iron, riboflavin, niacin, phosphorus, zinc, iodine, vitamin B ₆ and B ₁₂ Emphasize those low in fat protein, iron, thiamin, phosphorus, magnesium, zinc, vitamin B ₆ , vitamin B ₁₂ , E, and folic acid
Calcium – rich foods	Milk Fortified soy milk Yogurt Cheese Dry milk	Calcium, phosphorus, riboflavin, vitamins D, A, E, B ₆ , B ₁₂ , magnesium, zinc, protein (not all of the foods listed provide all of these nutrients)
Grain products	Whole –grain bread cereal, dry Wheat germ Pasta or rice	Thiamin, niacin, riboflavin, iron, phosphorus, zinc, fiber
Vitamin C sources (fruits and vegetables)	Orange Grapefruit Strawberries Tomatoes Greens Peppers Cabbage	Ascorbic acid, folate
Leafy green vegetables	Cabbage Green pepper	Folate, vitamins A, E, B ₆ , riboflavin, iron, magnesium
Other fruits and vegetables		Vitamins A, B complex, and E, magnesium, zinc, phosphorus

ALCOHOL CONSUMPTION SUCH AS:

- Liquor -Tella
- Wine -Teje
- Beer -Areki

Alcohol mentioned above should be avoided during pregnancy. Use of alcohol is associated with the risk of birth defects, as alcohol enters both the maternal and the fetal bloodstream. Babies born to alcoholic mothers may develop fetal alcohol syndrome. This disorder is characterized by low birth weight, and slow growth and development. In some cases there may be permanent mental retardation.

3.1.9. Supplementation

This refers to an administration of a nutrient in the form of a tablet, a capsule or an injection. For example some of the nutrients that are considered in the supplementation programmes in Ethiopia are: -

- Vitamin A for children under five year old and lactating mothers
- Iron for pregnant mothers and any anemic person
- Folic acid for pregnant mothers and any person with macrocytic (megaloblastic) anemia
- Iodine for everybody in the goiter endemic area in the form of iodized salt
- Vitamin K (Menadione) for pre-term newborns and other people with vitamin K dependent clotting factor deficiency.

STRATEGIES

The main strategies are:

1. Supplementation of iron and folic acid
2. Treatment of severe anemia
3. Dietary diversification (increased production and Consumption of locally available iron rich food)
4. Fortification of food with iron and vitamin A
5. Control of malaria (prophylaxis and treatment), Helminthiasis and schistosomiasis.

Fortification

For fortification to be opted as a strategy to address special nutrient problems the following concerns need to be addressed:

- The staple food should be centrally produced by firms
- Consumption of the staple food should not vary from day to day
- The target nutrient must be bioavailable from the vehicle food
- The vehicle be culturally accepted
- The fortification nutrient should not alter the color, taste, shelf life, or cost of the vehicle
- There should be a law to enforce the implementation of consumption of the fortified product
- There should be a quality control mechanism as to the quality of the fortified product in terms of its nutrient content.

3.10. Case Study (learning activity)

A 30-year-old woman came to the health center with complaints of weakness, swelling of the lower extremities, and sometimes of the face. She has four children and her husband is not living with her. She is a daily laborer and is responsible for taking care of her children. Their daily diet consists mainly of cereals.

1. Based on the above information, what is your diagnosis?
2. What are the possible causes of her complaint?
3. What diagnostic work would be appropriate?
4. Describe your treatment.

Treatment of malnourished mothers:

- Efforts to increase the amount of food available to pregnant and lactating mothers can be the most effective way of improving their health and that of their infants.
- To support lactation and maintain sufficient maternal reserves, most mothers in developing countries should eat about 650 additional kilocalories per day.
- Mothers should eat a balanced diet including fruits, vegetables, animal products, and fortified foods when possible.

- Community and household members should be informed of the importance of making additional food available to women during pregnancy and lactation, as well as helping them reduce their workload and obtain adequate rest.
- During pregnancy and lactation increase caloric intake, iron/folic acid supplementations, and de-worming.
- Vitamin A capsule after delivery.



3.2. Satellite Module for Nursing Students on Maternal Nutrition

3.2.1. Introduction

Nutrition plays an important role in maintaining health, preventing disease, promoting normal growth and development and supports daily activity. For this reason everybody is expected to get adequate nutrition, especially woman's of child bearing age.

The nutritional status of the mother is important to her own as well as to her infant's well-being.

1. Purpose and use of the module

This satellite module is prepared for nursing students to equip them with the knowledge and practice needed for identification and management of maternal nutritional problems using the nursing process and providing appropriate nursing care.

2. Directions for using this satellite module

For better understanding of the module, students are advised to follow the following directions

- After completion of the core module go through the satellite module
- Do pre and post test questions
- Do the learning activity – case study and critical thinking exercise

3.2.2. Learning Objectives

After you have read this satellite module, you are expected to:

- Manage nutritional problems during pregnancy
- Use the nursing process to identify and take action on maternal nutritional problems
- Provide preventive service for the major maternal nutritional problems.

Pre Test Questions

1. What are the doses of Iron/Folic Acid supplementation recommends for the pregnant women to prevent anemia?
 - a. Iron 200mg/day and Folic Acid 200mg/day

- b. Iron 40mg/day and Folic Acid 300mg/day
 - c. Iron 60mg/day and Folic Acid 400mg/day
 - d. Iron 120mg/day and Folic Acid 800mg/day
2. Which of the following **is not** a cause for anemia?
- a. Hookworm infestation
 - b. High zinc in the body
 - c. Malaria
 - d. Iron deficiency
3. A lady came to you with intractable vomiting at gestational age of 8 weeks. Which one is true about this patient?
- a. She should eat small and frequent meals
 - b. She doesn't need psychological support
 - c. Hyperemesis gravidarum can be diagnosed in this patient
 - d. A and C
4. One **is not** true about the advice that will be given for a mother with constipation
- a. Decrease the amount of food taken
 - b. Increase fiber intake
 - c. Increase fluid intake
 - d. None
5. Which micronutrient deficiency causes goiter?
- a. Iron
 - b. Iodine
 - c. Folic acid
 - d. Zinc

3.2.3. Learning Activity

Case study 1

W/ro Alemitu Belay is a gravida X para IX mother living in Dembia, which is a low land area in North Gondar Zone. She came to the clinic with a complaint of weakness. The nurse assessed her at the clinic and found that the lady was amenorrheic for the last 5 months. She told the nurse that she didn't eat enough food because she is poor; she has 2 meals of Gommen, sometimes kick wot. She never gets meat. She has the craving to eat soil and has had repeated attacks of malaria. The nurse noted that her

conjunctiva was pale and confirmed pregnancy in the patient. The nurse also assessed the nutritional status of the woman, which revealed BMI of 16 Kg/m². By the end of her pregnancy, she has gained 7 kilograms.

Questions

1. What are the problems of this woman?
2. What are the contributing factors for nutritional problems that this lady could have?
3. Discuss with your group the possible causes of w/o Alemitu's problems.
4. Discuss with your group the possible consequences of the problem on her and her child if w/o Alemitu is not treated.
5. What advice/ interventions are recommended?

Case study 2

Demekech is a 17 year old young lady living in Gondar town. She is unmarried but has a sexual partner. She became pregnant accidentally. When she presented herself to the health worker at the Gondar health center, she was in the second month of her pregnancy. She had repeated vomiting with nausea. She was given advice on her diet but she failed to comply with the recommendations. She is also worried about body image, not wanting to become obese. For this reason, through out her pregnancy, she was not eating foods as advised by the health worker. At the end of 9 months she delivered a female neonate weighing 1500g.

Questions

1. What problems are observed with Demekech?
2. What are the contributing factors for her nutritional problems?
3. What complications do you anticipate in this situation?

3.2.4. Major maternal nutritional problems of public health significance in Ethiopia

Refer to the core module

3.2.5. Factors that affect maternal nutritional status

Refer to the core module

3.2.6. Assessment of maternal nutritional status

Refer to the core module

3.2.7. Intervention against maternal nutritional problems

Refer to the core module

3.2.8. Management of Maternal Nutritional Problems

1. Objectives for protein energy malnutrition management

- Achieve rapid regeneration of tissues and institute cure of malnutrition
- Treat complications and reduce case fatality
- Achieve rehabilitation on a well balanced diet
- Prevent relapse & future deterioration, through education
- Achieve long-term follow up with the view of helping individual family members and community.

2. Management of micronutrient deficiencies

I. Iron deficiency anemia

- a) Iron/Folic acid supplements for the pregnant women to prevent anemia

Table. 4: Dosage of iron and folic acid

Doses of Iron/Folic acid	Duration
Iron 60mg/day Folic acid 400 mg/day	<ul style="list-style-type: none">▪ Six months during pregnancy where anemia prevalence is < 40%▪ Six months during pregnancy and 3 months postpartum where anemia prevalence is \geq 40%

- b) Treatment of severe anemia in women

Definition of severe Anemia

1. Definition of severe anemia

- Hemoglobin <7gm/dl or Hematocrit <20%

- Associated with extreme pallor of conjunctiva, oral mucosa, palm or nail beds or breathlessness at rest

2. Decide whether to treat or refer cases of severe anemia

Criteria for referral to a hospital

- Gestational age >36wks
- Any women with signs of respiratory distress or cardiac abnormality (labored breathing and edema)
- If their conditions show no improvement on follow up.
 - c) Cases that are not referred should be treated as follows
- 120mg iron + 800mg folic acid daily for 3 months in one dose or divided doses?
- d) Follow up of cases treated for Anemia
- One and four weeks after iron supplementation is initiated
- e) Nursing intervention for iron deficiency anemia:

Advise the client that:

- Liver and red meats are the best sources of iron
- Iron absorption from plant sources can be maximized by eating them with a rich source of vitamin C or with red meat
- Iron absorption from plant sources is impaired when food is consumed with coffee and tea
- Take iron supplements as prescribed
- f) Presumptive treatment for parasites in pregnant and lactating women is recommended to prevent anemia.

1. **Hook worm**

1.1.

1.2.

1.3. In endemic areas with 20-30% prevalence or greater, give antihelmenthic treatment in the second trimester

1.4. In highly endemics areas with >50% prevalence, repeat antihelmenthic treatment in the third trimester

1.5. Types of antihelmenthic treatment after first trimester:

- a) Albendazole 400mg single dose

- b) Mebendazole 500mg single dose
- c) Levamisole 2.5mg/kg single dose, best if second and third dose repeated on next two consecutive days
- d) Pyrantel 10mg/kg single dose, best if dose repeated on next two consecutive days

2. Malaria

In endemic area where transmission is high; give anti malaria prophylaxis to the woman according to the local recommendation

II. Vitamin A deficiency

a) Prevention

Immediately after delivery give one oral dose of 200,000 IU vitamin A to all mothers.

b) Treatment for night blindness or bitot's spot in reproductive age, pregnant or not

- 5,000-10,000 IU vitamin A/day po for at least four weeks
- Daily dose should never exceed 10,000 IU and weekly dose not exceeding 25,000 IU

c) Treatment for corneal xerophthalmia in reproductive age, pregnancy or lactation with doses of oral vitamin A 200,000IU each, one dose on the day of diagnosis, one dose the next day and one dose two weeks later.

III. Iodine deficiency

- Daily consumption of iodinated salt
- Supplementation with iodine capsules in endemic areas.
One capsule for pregnant women in early pregnancy and children under five.
Two capsules for women of reproductive age and children 5 to14 years of age

3.2.9. Management of nutritional problems in pregnancy

1. Adolescent pregnancy

- Assess nutritional status, physical and emotional maturity, dietary habits, educational status
- Provide on-going nutritional counseling

- Substitute additional energy food, protein and calcium to meet growth needs as well as to provide increased calories and nutrients for the growing fetus

2. Nausea and vomiting

- Symptomatic reassurance
- Eat small and frequent meal consisting of dry, starchy foods and avoidance of spicy food.
- Vitamin B6 25mg three times per day
- In severe cases (Hyperemesis gravidarum)
 - Hospitalization
 - Rehydration
 - Glucose
 - Antihelmenthic
 - Follow up
- Psychological counseling
 - Avoid drinking liquids with meals
 - Avoid coffee, tea, and spicy foods
 - Avoid high fat foods because they delay gastric emptying time

3. Pica

- Detection of practice
- Determine what is being ingested.
- Screen for and treat iron deficiency anemia
- Counseling to discourage or at least minimize the ingestion of non-food substances
- Show economical ways to obtain an adequate diet
- Encourage a high-fiber, high-fluid diet if the client experiences constipation
- Observe for diarrhea and vomiting which may indicate parasitic infection or lead poisoning

4. Heartburn and Acid indigestion

Eat small, frequent, dry meals separate from fluid intake, avoid greasy foods, wearing loose-fitting clothing can produce some relief

- Antacids can be taken for symptomatic relief but they may bind iron in gastrointestinal tract and excess use should be discouraged
- Eat small frequent meals and avoid liquids immediately before and after meals to avoid gastric distention
- Avoid coffee, high fat foods, and spices
- Advise not to lie down or bend over for tow hours after eating
- Avoid gas-forming foods.

5. Constipation

- Treat by increasing dietary fibers, fluid intake and exercise
E.g. whole grains, legumes and fresh fruits and vegetables
- Drink 6-8 glasses of liquid daily
- Encourage the client to try hot water with lemon or fruit juice on waking to stimulate peristalsis

6. The role of nurses in the management of maternal malnutrition

The nursing process

It is a systematic, client-centered and goal oriented method of caring that provides a framework for nursing practice. Nurses should always use the nursing process to identify and solve a client's problem.

1. Assessment

a. Subjective data

- Asses 24-hour intake according to the daily food guide
- Gastrointestinal side effects of pregnancy
- Dietary changes made in response to pregnancy or diet-related complications of pregnancy
- The frequency of eating; assess for periods of fasting
- Cultural, familial, religious, and ethnic influences on eating habits
- The use of vitamin and/or mineral supplements
- The client's nutritional knowledge and ability and/or willingness to implement dietary changes

- The client's knowledge and plan regarding breast-feeding
- The client's use of alcohol, tobacco, caffeine, drugs, and artificial sweeteners
- Economic status

b. Objective Data

- Height
- Weight
- Calculate BMI
- Blood pressure
- Hemoglobin and Hematocrit
- Edema, pallor, etc.

2. Diagnosis

- Poor health seeking behaviors, as evidenced by a lack of knowledge of appropriate diet before pregnancy, during pregnancy and during lactation and a desire to learn
- Altered nutrition: Less than body requirements, related to poor bioavailability
- Altered oral mucus membrane

3. Planning

After the diagnosis and related factors are identified, client goals and interventions are planned.

Client Goals

- Explain the importance of diet for her health and for fetal growth and development
- Consume an adequate, varied, and balanced diet based on the daily food guide for pregnancy
- Consume three meals per day plus two to three nutritious snacks
- Gain weight within the recommended range and rate, as determined by her assessment data
- Have an absence of nutrition related problems or complications of pregnancy

4. Intervention

Diet Management

- Set a mutually agreeable weight gain goal (range), based on the client's baseline pre pregnancy weight for height
- Promote the intake of a varied, nutrient dense diet based on the dietary food guide

- Modify the diet as needed to avoid or alleviate nutrition related problems or complications of pregnancy

Client Teaching

Instruct the client and family

- About the importance of adequate nutrition and weight gain for the betterment of maternal and infant health
- About how to achieve nutritional adequacy by using the daily food guide for pregnancy
- To take supplements only as prescribed by the physician because megadoses of some vitamins and minerals may cause fetal malformations
- That cravings during pregnancy do not always have a physiologic basis; rather, they are likely to be influenced by culture, geography, social traditions, the availability of foods, and previous experience
- About how to modify her diet to alleviate or avoid nutrition related problems and complications of pregnancy

5. Evaluation and Monitoring Progress

Evaluation is ongoing and monitors the patient for the following;

- Pregnant – weight gain less than 1.5kg/month in the second and third trimesters (or less than 10.5kg gained over full course of pregnancy)
- Food intolerances, especially lactose intolerance, and the overall impact on diet adequacy
- Ongoing compliance and tolerance of diet; evaluate adequacy and the need for further diet counseling

3.2.10. Prevention of Maternal Nutritional Problems

Refer satellite module for Environmental Health technician.

3.2.11. Post test questions

Refer pretest questions

3.3. Satellite Module for Environmental Health Students on Maternal Nutrition

3.3.1. Introduction

Prevention of maternal malnutrition: it is dietary practices and interventions directed toward the reduction of disease risk and/or improvement in health outcomes. It is a critical component of preventive medicine approach that seeks to prevent disease rather than treat the condition after it manifests clinically.

Examples of preventive maternal malnutrition are. The inclusion of iron in foods for the prevention of anemia for the pregnant mother and the inclusion of certain vitamin B Complex, Vitamin A and iodized salt and calcium in staple foods. Such as grain products, milk, and cereals, for the prevention of essential nutrition –related deficiencies. These maternal nutrition strategies have been underway as part of public health policy for more than a generation and have been shown to be extremely effective especially in developed countries.

Purpose and use of the satellite module

The purpose of this satellite module is to help the sanitarians to be involved in the prevention of maternal malnutrition with other team members.

Directions for using the module

For better understanding of the module, the sanitarians are advised to follow the directions given below.

- Do the pretest first and then read the whole core module. After that do the posttest and make sure that you have understand the core module.
- Do the pretest in the satellite module then go through thoroughly the satellite module including the learning activity.
- Finally evaluate your self by doing the post test

3.3.2. Pretest

1. Which one of the following microbial food poisoning shows the following signs and symptoms: fatigue, dizziness, double vision and muscle paralysis and cause death with short period of time?
 - a. Staphylococcus aureus
 - b. Clostridium botulinum
 - c. Salmonella
 - d. Environmental toxins
2. Which of the following is environmental toxin?
 - a. Zinc
 - b. Copper
 - c. Lead
 - d. All of the above
3. Sanitarians have paramount role in the prevention of maternal malnutrition, State some of the maternal malnutrition prevention measures.
4. Explain clearly the different pre questions to be taken while processing foods starting from cultivation until consumption.
5. Describe the right procedure to be followed during dish washing with the appropriate temperature and detergents.

Learning Activity:

Case study

W/ro wubalech Damtew was born and raised in Belesa District of North Gondar zone. She is 31 years of age and came to Arbaya health center with complaints of dizziness, fatigue and headache. She had a history of repeated delivery, poor diet. She usually walks with bare foot and there is no latrine facility in the village. The health officer in the health center suspected anemia and requested blood and stool examination. Her History, physical examination and laboratory findings confirm anemia as her main problem.

Answer the following question based on the above case study

1. What are the probable causes for anemia in this particular patient?
2. What measures should you take to prevent anemia?

3.3.3. Learning objectives

At the end of reading this module the environmental health technician should be able to:

- Implement environmental friendly methods to unproven maternal nutrition using the different intervention strategies.
- Actively participate in the prevention of maternal nutrition.

3.3.4. The Role of Environmental Health Technician in the Prevention of Maternal Malnutrition

I. Food poisoning and food infection control

A. Food poisoning: - contamination of any food or drink by toxins from microorganisms, environmental toxins or naturally occurring toxins in the food it self.

1. Microbial toxins

The commonest microorganisms' in causing food poisoning are:

- Clostridium botulism/common in canned food/
- Clostridium perfringens
- Staphylococcus aureus

2. Naturally occurring toxins

These groups of toxins are naturally found embedded in the edible portion of the food. E.g. mushroom,

3. Environmental toxins

These get access to our food or drink from the containers we are using or leaching agro-chemicals into the water bodies and contaminating the food or drink e.g. Heavy metals like copper, zinc, mercury and lead.

- Copper and zinc dissolve into drinks or canned watery foods from damaged containers.
- Mercury found in fish originates from chemicals used in agriculture.
- Lead occurs in paints, dust and gets incorporated into food.

B. Food infection: - the entry and development or multiplication of an infectious agent in the body of human or animal.

E.g. salmonellosis/ salmonella infection the Environmental Health technician can prevent or control it by protecting storage of food, thoroughly cook food, eliminate rodents, pets, and carriers, poultry, water and meat sanitation and advise not to eat raw beef.

II. Educating the mother

➤ *Personal hygiene of food handler:-*

- To keep hazardous foods at the right temperature.
- Adequate cooking of products to assure destruction of pathogenic organisms
- Thorough washing and storage of fruits and vegetables.
- Proper washing of equipment and utensils as follows:

<u>Wash</u>	<u>Rinse</u>	<u>Sanitize</u>	<u>Drying</u>
- T ° 110-120°F Hot water	- immerse in hot water	- T° - 170°F for 2min - 212°F for 30 sec	- air drying - discourage
- Use detergent as		- use chlorine solution	/needed/chlorine, 50 PPM for 2min.

- *Dietary diversification, supplementation* of different nutrients should be advised to the mother by working with the agricultural office in the specific woreda
- *Environmental sanitation:* - pregnant women may have the following problems. PEM, Vit. A deficiency, Fe-deficiency, iodine deficiency. This can be due to physiologic condition or associated with malaria and parasitic infection. Therefore to prevent these problems the following are major interventions that has to be conducted by the environmental Health Officer together with the health center team and the community.

A. Prevention of Anemia

- a) **Hookworm** – In communities where hookworm is endemic,
- Construction of latrines and their proper use
 - Wearing of shoes.
 - Anthelmintic drugs/Deworming/ should be given to all anemic persons to eliminate the intestinal worms.

- b) **Malaria** In areas where *P.falciparum* and *P.Vivax* are endemic the different physical methods such as filling in ditches, draining stagnant water, clearing bushes, drying marshy areas, using bed net, etc. should be demonstrated and the different chemical control methods such as, Abate, DDT, etc should be recommended as a part of presenter

The pregnant mother should be advised to take iron rich foods to prevent iron deficiency anemia through the following mechanisms:

Iron-deficiency Anemia

1. Dietary diversification – promotion of a diet with a wider variety of iron containing foods especially meat and/or fish, Teffe etc.
Generally it can be addressed specially to the Ethiopian population by economic approach (promotion of agriculture) i.e. improving the incomes of the target community as a solution to their nutritional problems.
(Refer to the core module)
2. Fortification
 - Fortification of staple food such as wheat or other grains is likely to increase iron intake ***(Refer to the core module)***
3. Supplementation ***(Refer to the core module)***

B. PEM prevention

Nutrition education on:

- Traditional mal practice and beliefs in feeding pregnant and lactating mothers
- Intra household maldistribution of food.
- Personal hygiene of the cook, cleanliness of utensils and the living environment at large.
- Cultivation of leafy green vegetables that contain iron.
(Refer to core module)

C. Iodine deficiency prevention

- Educating to take iodized salt in their food.
- Undergoing chemical analysis of water to check the concentration of iodine so those possible preventive steps will be taken.
- Educating people to take iodized salt in their food.

D. Vitamin A deficiency prevention

- Since it is a one of a major disorders that affect the eye which leads to blindness the EHO/sanitarian should be actively involved in education of people, especially mothers in recognizing vitamin A deficiency as early as possible.
Horticultural development (Green yellow vegetables and fruits) that contains vitamin A should be cultivated & consumed.

Finally the environmental health officer is supposed to educate people about preservation of perishable foods as follows, depending on the availability of technology and resource.

- Fruits - canning, bottling, drying, crystallizing refrigeration etc.
- Vegetables – drying, canning, bottling, refrigeration
- Eggs – refrigeration at less than 1°C
- Milk – refrigeration, pasteurization, condensing etc.
- Fish – salting, pickling, canning, freezing, chilling, and drying.
- Meat- salting, pickling, canning, freezing, chilling, drying

3. 3. 5. Post test

(Referee to pretest)

3.4. Satellite Module For Medical Laboratory Technician Students on Maternal Nutrition

3.4.1. Introduction

Purpose of the module

This module helps laboratory technology students to know their specific tasks and roles in the diagnosis and management of maternal nutrition. The module is prepared with consideration of the tasks, roles and responsibilities of laboratory technicians with diploma. Moreover, all types of laboratory workers may find the module helpful.

Direction for using the satellite module

For a better understanding of this module the laboratory technology students are advised to follow the following directions.

- Do the pretest
- Read the core module thoroughly
- Understand the contents of the satellite module
- Evaluate yourself by completing the posttest

3.4.2. Pretest

1. Which one of the following is not an anticoagulant?
 - a. Ethylenediamine Tetra acetic acid (EDTA)
 - b. Tri sodium citrate
 - c. Double oxalates
 - d. Heparin
 - e. None of the above
2. Identify the wrong statement
 - a. Folate deficiency is characterized by a Macrocytic/ megaloblastic anemia
 - b. Proteins are biochemical compounds with higher molecular weight
 - c. Glycogen synthesis adds glucose to the peripheral blood
 - d. None of the above

3. Normal matured red blood cells are:
 - a. Discocytes
 - b. Macrocytes
 - c. Megalocytes
 - d. Microcytes
 - e. All of the above
4. List three biochemical compounds that can be tested in urine to evaluate maternal nutrition.
5. List two dominant malaria parasites that are more prevalent than the others in Ethiopia.

3.4.3. Learning objectives

After completion of this module students will be able to:

- Describe how to collect, handle and label blood, stool and urine specimens.
- Describe the concept of laboratory diagnosis associated with maternal nutrition.
- List the biochemical tests used in the diagnosis of anemia.
- Describe and demonstrate the red blood cell morphology.
- Classify anemia based on red blood cell morphology.
- Describe the laboratory diagnosis of blood parasites, intestinal parasites and common urinalysis tests used to evaluate maternal nutrition.

3.4.4. Learning activities: case study

Almaz Tesema is a 22-year –old pregnant woman who lives in Kolla Duba, a rural town, south west of Gondar town. She had a history of multiple emergency room visits for acute febrile illness and she had previously been found to have a positive blood smear test for plasmodium vivax. She had been told that she was slightly anemic and had been treated with iron periodically. Today the woman came to Kolla Duba Health center because she was feeling weak, sweating, shivering and vomiting. Based on the above information answer the following questions.

1. What are the possible reasons for her frequent emergency room visits?
2. List the important laboratory investigations to diagnose this patient.

3.4.5. Laboratory Investigations Associated with Maternal Malnutrition.

Depending upon the level of the laboratory various types of hematological, biochemical and parasitological investigations can be performed in the laboratory to evaluate maternal nutrition.

The most important laboratory tests used to investigate maternal nutrition are:

1. Hemoglobin determination
2. Packed cell volume determination
3. Red blood cell morphology
4. Serum protein determination
5. Serum glucose determination
6. Investigation for blood and intestinal parasites.
7. Urinalysis

Blood collection

- The proper collection and reliable processing of blood specimens is a vital part of the laboratory diagnostic process.
- Blood is used:
 - To assess the morphology of red blood cells
 - To measure the hemoglobin content
 - To measure the Hematocrit value (PCV)
 - To evaluate protein and glucose
 - To Investigate hemoparasites
- Blood can be collected from capillary/ peripheral blood-micro blood samples and from venous.

Hemoglobin determination

- The hemoglobin content of blood may be estimated by several methods:
 - By measurement of its color
 - By measurement of its power to combine with oxygen or carbon monoxide
 - By its iron content

Note: Students are advised to refer to common hematology textbooks for detailed understanding of each method and procedures in all cases of this satellite module.

Moreover, referral of specimens to the respective institutions for advanced tests is indispensable.

Determination of packed cell volume (PCV) or hematocrit (HCT)

The PCV, also commonly called hematocrit, is a measure of the ratio of the volume occupied by red blood cells to the volume of whole blood in a sample of capillary or venous blood. The ratio is measured after appropriate centrifugation and is expressed by a decimal fraction or as percentage.

There are two methods, micro hematocrit method and macro hematocrit methods. Although the macro Hematocrit method is recommended by the international council for standardization in hematology (ICSH) as an alternative method, it is no longer in routine use because of technical problems.

Serum protein determination

- Proteins are biochemical compounds with high molecular weight. They are present in the cytoplasm and cell membrane of all cells
- In disease conditions, both the total serum protein and the ratio of individual protein fraction may be changed independent of one another.
- Common methods for the determination of total proteins present in serum includes:
 - Kjeldahel's method
 - Kingsley's Biuret method
 - Dye-binding method
 - Electrophoresis

Serum glucose determination

Blood glucose concentration can be measured by:

- Alkaline ferric cyanide method
- Copper reduction method
- O-Toluidine method
- Glucostixs

3.4.6. Investigation for blood and intestinal parasites.

- The laboratory diagnosis of malaria parasites include:
 - Detecting and identifying malaria parasites microscopically in blood films
 - Concentrating parasites in venous blood by centrifugation when they can not be found in blood films
- Using a rapid malaria antigen or enzyme test.
- The laboratory diagnosis of intestinal parasite infection can be performed by either direct microscopic examination of feces or concentration techniques.

Examination of red blood cells morphology

- Examination of stained thin blood films helps for morphologic classification of RBCs.
- Normal mature cells (discocytes) have diameters within 6.0 to 8.0 μm (normocytic – normochromic RBCs).
- Red blood cells from anemic patient can be:
 - Normocytic – hypochromic
 - Microcytic – hypochromic
 - Macrocytic – hypochromic
 - Etc.
- Red blood cells may show variation in size (Anisocytosis) such as :
 - Macrocytes
 - Megalocytes
 - Microcytes

Urinalysis

- Common laboratory tests on urine specimens to evaluate maternal nutrition include:
 - Protein (albumin)
 - Glucose
 - Ketones

3.4.7. Posttest

Refer to the pretest

3.5. Satellite Module For Health Extension Workers on Maternal Nutrition

3.5.1. Introduction

The Health Extension Package is a newly designed program designed to deliver health services to the community. Health extension package students are expected to take courses that are important to the prevention of prevalent disease and problems in the country.

3.5.2. Purpose and use of the module

This module is prepared for health extension package students to equip them with the knowledge and practice on identification and prevention of common maternal nutritional problems.

3.5.3. Direction for using this module

For better understanding of the module, students are advised to follow these directions:

- Do the pretest
- Read the module thoroughly
- Understand the contents of the module
- Evaluate yourselves by doing the posttest.

3.5.4. Pretest for health extension package students.

1. During assessment of maternal nutritional status we mostly focus on all of the following points **except**.
 - a) Weight
 - b) Height
 - c) Hemoglobin
 - d) Race
2. Which micronutrient deficiency causes night blindness?
 - a) Iron
 - b) Iodine
 - c) Vitamin A
 - d) Zinc

3. Which of the following is not a method to prevent iron deficiency anemia?
 - a) Giving antihelmenthic
 - b) Proper waste disposal
 - c) Increase iron intake from diet
 - d) None
4. The following are causes of maternal malnutrition **except**:
 - a) Cultural malpractice
 - b) Infection
 - c. Lack of knowledge
 - d. None of the above
5. Which of the following is/ are cause/s for anemia?
 - c) Hook worm
 - d) Malaria
 - c. Iron deficiency in diet
 - d. All of the above
4. A woman in her pregnancy should gain on average:
 - a) 10.5 kg
 - b) 7.5 kg
 - c) 12.5 kg
 - d) 5 kg

3.5.5. Learning objectives

After completion of this module, students will be able to:

- Discuss the major maternal nutritional problems of public health significance in Ethiopia.
- Develop skills for assessment and prevention of maternal nutritional problems.
- Identify causes of maternal malnutrition

3.5.6. Learning activity: case study

Desta Meshesha is a 35 year old pregnant woman who lives in Gendmethya, a rural village 12 km north of Gondar town. The woman always walks barefoot and she gets her income by working as daily laborer on the farmland and in the homes of other people. She states that she often eats two times per day but may not get this every day. She has a history of repeated attacks of malaria and has been previously treated with anti-malaria drugs. On examination, the woman's palms and conjunctiva are pale and she is underweight. Based on the above information answer the following questions.

1. What major health problems could you identify for this patient?
2. What do you understand from the pallor of the palm and conjunctiva of the woman?
How do you help prevent such problems as health extension package students?
3. List two important intestinal parasites that can be prevented by wearing shoes.

3.5.7. Causes of maternal malnutrition

- Lack of knowledge
- Infection
- Cultural malpractices
- Poverty
- Manmade and natural calamities
- Social unrest (war)
- Poor food production
- Uncontrolled population growth
- Poor marketing, storage and distribution

3.5.8. Factors affecting Maternal Nutrition

1. Culture and beliefs

- During period of fasting important nutrients are not consumed, such as animal products.
- Discrimination in food distribution among family members; adult males before females and feeding of children with leftover food.

2. Pregnancy and Lactation

The pregnant woman's diet should include a substantial increase in calories, protein, calcium, folic acid, and iron.

Pregnant women at particular risk of nutritional deficiencies are adolescents, underweight women, obese women, women with chronic nutritional problems, women who smoke or ingest alcohol or drugs, low income women and women with chronic illnesses such as diabetes or anemia.

3. Gender:

In the family and community, females are given lower priority and hence they are served with low quality and low quantity foods.

4. Economics:

The type and amount of foods consumed during pregnant and lactation depends up on the income of the family.

3.5.9. The Role of Maternal Nutrition in the Promotion of Maternal Health

The growth of the fetus can be regarded as a result of the interaction between its genetic potential and the intrauterine environment. Mothers who enter pregnancy with sound reproductive physiology, and who have not suffered ill health or nutritional deprivation in childhood, will have larger and healthier infants than mothers who do not have such advantages.

There are many short mothers in the lower socio economic groups, which may mean that inadequate nutrition and different illness prevent many girls in the social group from achieving optimal physique.

3.5.10. What mothers do during pregnancy

- Help clients understand the importance of adequate weight gain during pregnancy. Strongly discourage clients who are obese from attempting to lose weight during pregnancy. Weight gain during pregnant is recommended.
- Using a food guide for pregnancy, encourage clients to plan meals carefully so that all of the nutrients needed during pregnancy can be included without excess calories. Strongly discourage the pregnancy woman from using alcohol.
- Caffeine intake should be limited. Instruct client to take only vitamins and minerals prescribed, excessive amounts can be harmful.
- Advise clients that skipping meals is a poor practice, especially for the pregnant woman. The fetus needs a steady supply of nutrients.
- Encourage the pregnant mother take in high fiber foods and plenty of fluids to avoid constipation.
- Give priority in helping pregnant teenagers improve their eating habits. Additionally, teenagers need snacks that are nutritious and at the same time acceptable to them.

- Take advantage of the client's high motivation during pregnancy to provide nutrition education for the family as well as for the pregnant woman.

3.5.11. Common Maternal Nutritional Problems

- Protein energy malnutrition
- Iron deficiency
- Vitamin A deficiency
- Iodine deficiency

5.1. Protein energy malnutrition

It is due to deficiency of proteins, fat and carbohydrate

Consequences - Infection

- Obstructed labor- how?
- Maternal mortality
- Low birth weight and IUGR
- Neonatal and infant mortality

5.2. Iron deficiency

- Anemia is defined in first and third trimesters as a hemoglobin concentration less than 11gm/100ml or hematocrit less than 33% and in second trimester, hemoglobin less than 10.5gm/100ml or hematocrit less than 32%.
- It is the most common form of malnutrition
- It is the most common cause of anemia
- Other causes of anemia are parasitic infections and malaria
- Causes of dietary iron deficiency
 - Low dietary iron intake
 - Low iron bioavailability.
- Parasitic infections like Hookworm
 - Causes blood loss
 - Increase iron loss
- Malaria
 - Destroys red blood cells

- Leads to severe anemia
- Increases risk in pregnancy
- Consequences of maternal anemia
 - Maternal death
 - Reduced transfer of iron to the fetus
 - Low birth weight
 - Neonatal mortality
 - Reduced physical activity and productivity
 - Impaired cognition

5.3. Vitamin A deficiency

- Causes
 - Inadequate intake
 - Recurrent infection
 - Reproductive cycle
- Consequences
 - Night blindness
 - Maternal mortality
 - Miscarriage
 - Still birth
 - Low birth weight
 - Reduced transfer of vitamin A to fetus
 - HIV vertical transmission
 - Low vitamin A concentration in breast milk

5.4. Iodine deficiency

- Causes include:
 - Living in the mountainous area where plant foods have inadequate iodine
 - Taking cassava tuber as a food with out detoxifying it and other Oxposure to chelating substances
 - Not eating (or “having access”) to sea foods

- Consequences include:
 - Impaired cognition
 - Poor school performance
 - Endemic cretinism

3.5.12. Assessment of maternal nutritional status

Power-type indices express weight relative to some power function of height or height relative to some power function of weight.

Assessing PEM in women

- Height less than 1.45m
- Weight less than 45kg
- BMI less than 18.5 (thinness)
- Pregnant – weight gain less than 1.5kg/month in the second and third trimesters (or less than 10.5kg gained over full course of pregnancy)

$$\text{Body Mass index} = \text{Wt}/(\text{Ht})^2$$

Table: 5. The BMI and recommended weight increase during pregnancy

Pre pregnancy BMI	Recommended total gain (kg)
Low (BMI < 19.8)	12.5 – 18
Normal (BMI 19.8 – 26)	11.5 – 16
High (BMI > 26 - 29)	7 – 11.5
Obese (BMI >29)	< 7

Common indicators

- Edema
- Dyspigmentation of the hair
- Angular Stomatits
- Corneal lesions
- Swelling (enlargement) of glands
- Xerosis, etc.

Key interventions to improve Maternal Nutrition

Improving Maternal Nutrition

- Ensure access and consumption of salt fortified with iodine in every household
- Distribute a high dose of vitamin A within six weeks after delivery
- Distribute iron supplements during the last six months of pregnancy
- Delay first pregnancy
- Increase birth intervals
- Increase food intake during pregnancy and lactation
- Access to labor saving devices

3.5.13. Essential Nutrition Actions Approach:

An action oriented approach to nutrition...

If we use ENA approach to nutrition, estimated decrease of child mortality is 25%.

Action areas:

1. Women's nutrition:

Key messages:

During pregnancy and lactation

- Increase feeding
- Iron/Folic Acid Supplementations
- Treatment and prevention of malaria
- De-worming during pregnancy
- Vitamin A Capsule after delivery

2. Control of Vitamin A Deficiency:

Key messages:

- Vitamin A rich foods
- Maternal supplementation
- Food fortification

Vitamin A

Target Group	Dosage IU	Frequency
Post partum women	200, 000	within 45 days after delivery

3. Control of Anemia:

Key messages:

- Supplementation of women and children with iron and folate.

Group	Iron-folic acid doses	Duration
Pregnant and Lactating women	Iron: 60 mg /day Folic acid; 400mg/day	six months during Pregnancy
Adolescents	Iron: 60 mg /day Folic acid; 400mg/day	

- Advise on iron rich foods
 - De-worming for pregnant women and children (Twice/year)
- Take a single dose of albendazole (400mg) or a single dose of mebendazole (500mg) in the second trimester of pregnancy as a treatment of hookworm. If hookworms are highly endemic (>50 percent prevalence), take an additional dose in the third trimester of pregnancy.
- Malaria control
- Prescribe and make accessible anti-malarial curative and/or prophylactic drugs for pregnant women (according to local recommendations)

4. Control of Iodine Deficiency Disorders:

Key messages

Access and consumption by all families of iodized salt

Iodine capsule

Dosages are: One Capsule for pregnant women
 Two Capsules for women in the reproductive age

Universal Iodization

IDD can be eliminated by daily consumption of iodized salt. Salt is used universally by all age, socio-economic, cultural, and religious groups throughout the year. Iodized salt is both a preventive and curative measure for iodine deficiency and is the most effective, low cost, long-term solution to a major health problem.

Supplementation of Iodine capsules

Iodized salt should be used on a daily basis in an iodine deficient environment and the daily requirement for adults is 150 micrograms.

How the Essential Nutrition Actions expands coverage of nutrition support in the health sector:

Critical contact points in the lifecycle

1. During Antenatal Care

- Pregnancy: Tetanus toxoid
- Antenatal visit, Iron/Folic Acid
- De-worming
- Maternal diet
- Exclusive breast feeding
- Risk signs, family planning, sexually transmitted infection prevention
- Safe delivery
- Iodized salt

2. Delivery, Safe delivery,

- Exclusive Breast Feeding
- Vitamin A, Iron/Folic Acid
- Diet, Family Planning and Sexually Transmitted Infection, Referral

3. Postnatal and Family Planning:

- Exclusive Breast Feeding, Diet, Iron/Folic Acid
- Family Planning, Sexually Transmitted Infection prevention
- Child's vaccination

4. Immunizations:

- Vaccination, Vitamin A
- De-worming
- Assess and treat infant's anemia
- Family Planning, Sexually Transmitted Infection prevention, Referral

UNIT FOUR

BIBLIOGRAPHY

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