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Nutrition in Maternal and Child Health: Implication for Nursing Practice

Agharandu, Augusta Eleazar
Department of Nursing Science, Faculty of Basic Medical Sciences
College of Medicine, Rivers State University
Port Harcourt, Rivers State, Nigeria
agharandua@gmail.com

Nwokogba Joseph Onyedikachukwu
Faculty of Basic Medical Sciences, College of Medicine
Rivers State University, Port Harcourt, Rivers State, Nigeria
valentinojoseph@ymail.com

&

Des-Wosu Vivian Chioma
Health Services Department, Rivers State University
Port Harcourt, Rivers State, Nigeria
ohakavivian@gmail.com

ABSTRACT

Improved nutrition during pregnancy, lactation, and early childhood are important ways to maintain the health and wellbeing of mothers and children. Good maternal nutrition during pregnancy improves the birth outcomes of children and reduces the risk of pregnancy-related health complications. This paper explored nutrition in maternal and child health: Implication for nursing practice. It examined the concept of maternal and child nutrition, key nutritional practices that are ideal and crucial to maintaining maternal and child health outcomes, current trends in maternal and child nutrition, the relationship between maternal nutrition and child health, nutritional counselling in pregnant women, integration of nutritional interventions into maternal and child health programmes, maternal dietary diversity, maternal micronutrient and macronutrient intake, exclusive breastfeeding practices among mothers, maternal and child nutrition advocacy and sensitization as well as the implication of current maternal and child nutrition trends for care. It was shown that nutrition plays key roles in determining maternal and child health outcomes. The need for nurses, dietitians and related healthcare professionals to provide mothers and parents with nutritional focused interpersonal counselling with emphasis on child health was recommended.

Keywords: Child, Health, Mothers, Nutrition, Nursing Practice.

Introduction

Nutrition is a critical part of health and development of a population. It is the biochemical and physiological process by which an organism uses food to support its life. Nutrients in form of essential amino acids, carbohydrates, essential fatty acids, and an array of vitamins and minerals to sustain life and health. However, nutritional needs vary from one life stage to another. Optimal nutrition is the foundation of for maintaining maternal, neonatal and child health. The 1000 days spanning from conception to 2 years of life are a critical period of time when nutritional needs must be ensured can lead to adverse impacts on short-term survival as well as long-term health and development. One thousand days refers to the period from pregnancy through a child's second birthday, when optimal nutrition is critical for brain development, healthy growth, and setting children on a trajectory for lifelong health. Unfortunately, only a third of women gain the appropriate amount of weight during pregnancy and about 16% of pregnant women have iron deficiency. Almost 1 in 5 babies are never breastfed (Centre for Disease Prevention and Control, 2019). Among 1 year olds, fewer than half have eaten a vegetable, and 1 in 3 consumes a sugary drink on a given day.

The major nutritional problems encountered in most countries are excess macronutrient intake (especially saturated fat, protein, and sugar) and insufficient intake of the fibre and micronutrients provided by vegetables, fruits, whole grains, and legumes. This reflects unhealthy nutrition or malnutrition. Malnutrition is one of the main health problems facing children and women in developing countries of the world including Nigeria. According to UNICEF (2018), malnutrition is a direct or underlying cause of 45 percent of all deaths of under-five children. Nigeria has the second highest burden of stunted children in the world, with a national prevalence rate of 32 percent of children under five (UNCEF, 2018).

Nigeria faces the four major forms of malnutrition: acute and chronic malnutrition, iron deficiency anaemia (IDA), vitamin A deficiency (VAD) and iodine deficiency disorder (IDD). The impact of poor maternal and child nutrition is lasting with consequences reaching beyond health (World Bank, 2015). Nutrition is vital to women's overall health. Pregnancy and lactation are critical times when women need additional nutrients, calories and more variety in their diet, not only for themselves, but for the health of their infant as well.

During pregnancy, women need more food, a varied diet and micronutrient supplements. Without an increase of energy and other nutrients from food, a pregnant woman's reserves will be used leaving her depleted and weakened. Inadequate weight gain during pregnancy often results in low birth weight, which increases an infant's risk of illness or death. Pregnant women also require more protein, iron, iodine, vitamin A, folate and other nutrients. Deficiencies of certain nutrients are associated with maternal complications and death, foetal and new-born death, birth defects, and decreased physical and mental potential of the child.

Early-life nutritional exposures are significant determinants of the development and future health of all organ systems. Dietary changes are at the centre of the emerging

epigenetic paradigms that underpin the rise in many modern inflammatory and metabolic diseases. Accordingly, evidence reveals that malnourished individuals, that is, women with a body mass index (BMI) below 18.5, show a progressive increase in mortality rates as well as increased risk of illness (World Health Organization, 2020). For social and biological reasons, women of the reproductive age are amongst the most vulnerable to malnutrition. Increased perinatal and neonatal mortality, a higher risk of low birth weight babies, stillbirths, and miscarriage are some of the consequences of malnutrition in women (Kafatos et al., 2015). While an expectant mother must provide nutrition for both herself and her developing baby, the increased energy requirements of pregnancy are modest. Typically, pregnant women's estimated energy requirements are similar to those of non-pregnant women in the first trimester and increase by 340 calories per day in the second trimester and 452 calories per day in the third trimester. Recommended weight gain during pregnancy varies by pre-pregnancy BMI, with overweight and obese women recommended to gain less weight than underweight or normal weight women. Excess energy intake may result in overly rapid weight gain, conferring a greater risk for labour induction, caesarean section, higher birth weight, and other complications of pregnancy and delivery. Thus, the place of optimal nutrition cannot be overemphasized. Given the fore going, this paper explores nutrition, maternal, neonatal and child health: Implication for nursing practice.

Objectives

The specific objective of this seminar includes to:

1. Discuss the concept of maternal and child nutrition
2. X-ray key nutritional practices that are ideal and crucial to maintaining maternal and child health outcomes
3. Describe current trends in maternal and child nutrition
4. Explore the relationship between maternal nutrition and child health
5. Explain the concept of nutritional counselling in pregnant women
6. Examine the integration of nutritional interventions into maternal and child health programmes
7. Explore the concept of maternal dietary diversity
8. Analyse maternal micronutrient and macronutrient intake
9. Examine exclusive breastfeeding practices among mothers
10. Discuss maternal and child nutrition advocacy and sensitization
11. Explore the implication of current maternal and child nutrition trends for care

Concept of Nutrition

Human nutrition is the act or process of nourishing or being nourished, the sum of the processes by which humans take in and utilizes food substances. According to the Collins English Dictionary (2019), nutrition is the process of taking food into the body and absorbing the nutrients in those foods. Human nutrition is the process by which substances in food are transformed into body tissues and provide energy for the full range of physical and mental activities that make up human life (Britannica, n.d). Eating high

quality foods is essential in nourishing the body and protecting it from inflammation and oxidative stress (Selhub, 2018). An inadequate intake of nutrients in the diet can lead to anything from low energy levels to chronic disease and serious health conditions (Satrazemis, 2017).

Having an awareness and understanding of the different types of nutrients in foods, the effects they have on the body, and how to incorporate them into the diet, makes it easier to live a healthy, balanced lifestyle (Runtastic Team, 2018). The nutrients the body needs to promote growth and development and regulate bodily processes can be divided into two groups: macronutrients and micronutrients. Macronutrients are the nutrients the body needs in larger amounts, namely carbohydrates, protein, and fat. These provide the body with energy, or calories. Micronutrients are the nutrients the body needs in smaller amounts, which are commonly referred to as vitamins and minerals.

Macronutrients are the elements in food that is needed for growth and maintaining normal functioning (Britannica, n.d). All macronutrients are obtained through the diet as the body cannot produce them on its own. Carbohydrates, protein, and fat are the three main suppliers of nutrition in the diet. While all macronutrients provide valuable energy to the body, they each fulfil different functions. Like macronutrients, the body does not produce micronutrients in the quantities that it needs, so eating a diet rich in vitamins and minerals is essential for a healthy body (UNICEF (2018).

Each vitamin and mineral has a specific role in the body and the best way to ensure that all the bodily needs are met is by eating a healthy, varied diet (Lartey, 2008). Not only are micronutrients crucial for nearly every process in the body, they can also act as antioxidants. In the right quantity, they protect the body against disease and deficiencies (Roth, 2018). Eating a balanced diet promotes this and improves the chances of getting a variety of minerals and vitamins through the food into the bloodstream (Satrazemis, 2017).

Nutrition During and Post Pregnancy

Nutritional requirements increase during pregnancy and lactation, in both the adolescent and adult female (Williamson, 2016). The failure to achieve required intakes may increase risk for certain chronic diseases in their children, sometimes manifesting many years later. Malnutrition of women during early pregnancy correlates with higher body weights of their offspring as adults, along with increased risk for coronary heart disease and certain central nervous system anomalies (Caulfield & Elliot, 2015).

Protein requirements in pregnancy rise to 1.1 g/kg/d to allow for fetal growth and milk production (Blumfield et al, 2012). The source of protein may be as important as the quantity. Protein requirements can be more safely met by vegetable than by animal protein (Elango & Ball et al, 2016; Lonnie et al, 2018). Pregnant and/or lactating women also require increased amounts of vitamins A, C, E, and certain B vitamins (thiamine, riboflavin, niacin, pyridoxine, choline, cobalamin, and folate). Folate intake is especially important in early pregnancy for the prevention of neural tube defects and should be consumed in adequate amounts prior to conception. Regardless of folate consumed from

food sources, women capable of becoming pregnant are recommended to take 400 mcg/d of folic acid to reduce the risk of neural tube defects (Institute of Medicine, 2016). Pregnant women also require increased amounts of calcium, phosphorus, magnesium, iron, zinc, potassium, selenium, copper, chromium, manganese, and molybdenum (Haste et al., 2017). Prenatal vitamin-mineral formulas are suggested to increase the likelihood that these nutrient needs will be met (Kramer & Kakuma, 2013).

According to the USAID (2021), the key nutritional practices which need to be promoted during pregnancy and lactation are as follows:

1. Eating one extra meal each day. Eating more helps the baby to develop properly and strengthens the woman for delivery.
2. Eating a variety of foods (cereals, legumes, animal products, fruits and vegetables) to remain healthy and strong and to help the baby grow and develop properly.
3. Taking iron supplements as soon as pregnancy is diagnosed and continuing for at least 3 months after delivery.
4. Taking deforming tablets between the fourth and sixth month of pregnancy to protect mother and baby from infections.
5. Using iodized salt to help the baby's brain and body develop properly. Iodine is an element that is needed for the production of thyroid hormone. Thyroid hormone helps the body use energy, stay warm and keep the brain, heart, muscles, and other organs working as they should. The body does not make iodine, so it is an essential part of the diet. During pregnancy, both the mother and the baby produce their own thyroid hormones, but the baby is dependent on the mother for adequate ingestion of iodine. The American Academy of Paediatrics has recommended against the use of plant-based milks for the first year of life. Liquids, non-dairy "milks," based on plant foods (e.g., soy, rice, almond, or hemp) should not be used as a human milk or infant formula substitute. The caloric density of these products is typically lower than that of human milk or infant formula; protein quality is low and the protein quantity is low for most such beverages; products may not be fortified with micronutrients to levels recommended for infants and young children; and some contain high levels of phytate, which bind iron, zinc, and calcium. Use of such alternative fluids as a major component of the diet has been associated with severe protein energy malnutrition and with growth faltering. Plant-based milks should not be confused with soy-based formula, which may be appropriate for use in infants (up to 12 months of age) with galactosemia and hereditary lactase deficiency.
6. Visiting a health center regularly to monitor bodyweight.
7. Using mosquito nets to prevent malaria.
8. Decreasing work load and getting adequate rest.
9. Avoiding alcohol and smoking during pregnancy. Alcohol and cigarette smoking can harm the health of the foetus in the womb.
10. Avoiding drinking tea and coffee during meals. Tea and coffee change the way the body uses the food eaten. It is better to drink tea and coffee at least one or more hours before or after a meal.

Women who do not get enough energy and nutrients in their diet risk maternal depletion. To prevent this, extra food must be made available to the mother. Breastfeeding also increases the mother's need for water, so it is important that she drinks enough to satisfy her thirst. Maternal deficiencies of some micronutrients can affect the quality of breast milk. These deficiencies can be avoided if the mother improves her diet during lactation.

Based on the demonstrated health benefits of human milk, breastfeeding should be the primary means of nutrition for most infants. Although many mothers experience some problems with breastfeeding, health professionals can use simple strategies to overcome most of these problems. For infants who cannot breastfeed, standard infant formulas support adequate nutrition and growth.

Nutrition in Infancy and Childhood

Requirements for macronutrients and micronutrients are higher on a per-kilogram basis during infancy and childhood than at any other developmental stage. These needs are influenced by the rapid cell division occurring during growth, which requires protein, energy, and nutrients involved in DNA synthesis and metabolism of protein, calories, and fat. According to Baker et al (2012), increased needs for these nutrients are reflected in DRIs for these age groups, some of which are briefly discussed below:

Energy: While most adults require 25 to 30 calories per kg, a 4-kg infant requires more than 100 cals/kg (430 calories/day) (Heller et al, 2014). Infants 4 to 6 months who weigh 6 kg require roughly 82 cals/kg (490 calories/day) (WHO, 2017). Energy needs remain high through the early years. Children 1 to 3 years of age require approximately 83 cals/kg (990 cals/d). Energy requirements decline thereafter and are based on weight, height, and physical activity (WHO, 2017). As an energy source, breast milk offers significant advantages over manufactured formula. Breastfeeding is associated with reduced risk for obesity, allergies, hypertension, and type 1 diabetes; improved cognitive development; and decreased incidence and severity of infections. It is also less costly than formula feeding.

The American Academy of Pediatrics (2018), recommends exclusive breastfeeding for the first 6 months of life, followed by continued breastfeeding as complementary foods are introduced. Breastfeeding may continue for 1 year or longer. Parents often introduce solid foods to their infants before 6 months, of even before 4 months of age. Parents should be encouraged to delay introduction of solid foods until 6 months of age to all for optimal infant nutrition, growth and development (Shaw et al, 2020).

Protein: Older infants, aged 7-12 months, have a Recommended Daily Allowance (RDA) for protein of 1.2 g/kg/d, or 11 g/d of protein. Children aged 1–3 years have an RDA of 1.05 g/kg/d or 13 g/d of protein and children aged 4–8 years have an RDA of 0.95 g/kg/d or 19 g/d of protein (American Paediatric Association, 2018; Smedts et al, 2018).

Water: Total water requirements (from beverages and foods) are also higher in infants and children than for adults. Children have larger body surface area per unit of body weight and a reduced capacity for sweating when compared with adults, and therefore are at greater risk of morbidity and mortality from dehydration. Parents may underestimate these fluid needs, especially if infants and children are experiencing fever, diarrhea, or exposure to extreme temperatures (e.g., in vehicles during summer).

Essential fatty acids: Requirements for fatty acids on a per-kilogram basis are higher in infants than adults (see below). Through desaturation and elongation, linolenic and alpha-linolenic acids are converted to long-chain fatty acids (arachidonic and docosahexanoic acids) that play key roles in the central nervous system. Since both saturated fats and trans fatty acids inhibit these pathways, infants and children should not ingest foods that contain a predominance of these fats.

Early-life nutritional exposures are significant determinants of the development and future health of all organ systems. The dramatic rise in infant immune diseases, most notably allergy, indicates the specific vulnerability of the immune system to early environmental changes. Dietary changes are at the centre of the emerging epigenetic paradigms that underpin the rise in many modern inflammatory and metabolic diseases.

Some evidence in developing countries indicate that malnourished individuals, that is, women with a body mass index (BMI) below 18.5, show a progressive increase in mortality rates as well as increased risk of illness (Gernand, 2016). For social and biological reasons, women of the reproductive age are amongst the most vulnerable to malnutrition. Increased perinatal and neonatal mortality, a higher risk of low birth weight babies, stillbirths, and miscarriage are some of the consequences of malnutrition in women (Anderson, 2017). Diarrhea and other infectious diseases manifested in the form of fever affect both dietary intake and utilization, which may have a negative effect on improved child nutritional status. A comparative study on children's nutritional status (Sommerfelt et al., 2014) indicated that stunting was highest among children with recent diarrhea.

According to UNICEF (2018), specific actions to prevent childhood malnutrition include:

1. Encouraging early initiation of breastfeeding.
2. Providing exclusive breastfeeding from 0 to 6 months.
3. Promoting optimal complementary feeding practices.
4. Feeding a sick child frequently.
5. Implementation of non-feeding actions which include, practicing good hygiene, attending immunization sessions, using insecticide-treated bed nets to prevent malaria, deworming as well as preventing or treating infections.

Relationship between Maternal Nutrition and Child Health

Women of child-bearing age (especially pregnant and lactating women), infants and young children are in the most nutritionally-vulnerable stages of the life cycle. Maternal malnutrition is a major predisposing factor for morbidity and mortality among

African women. The causes include inadequate food intake, poor nutritional quality of diets, frequent infections and short inter-pregnancy intervals. Evidence for maternal malnutrition is provided by the fact that between 5 and 20% of African women has a low BMI as a result of chronic hunger (Centre for Disease Prevention and Control, 2019). Across the continent the prevalence of anaemia ranges from 21 to 80%, with similarly high values for both vitamins A and Zn deficiency levels (Lartey, 2008).

The consequences of poor maternal nutritional status are reflected in low pregnancy weight gain and high infant and maternal morbidity and mortality. Suboptimal infant feeding practices, poor quality of complementary foods, frequent infections and micronutrient deficiencies have largely contributed to the high mortality among infants and young children in the region (World Bank, 2018). Maternal nutrition also influences foetal growth and birth weight (UNICEF, 2018). The presence of an intergenerational link between maternal and child nutrition means a small mother will have small babies who in turn grow to become small mothers. Some findings on the relationship between maternal and child nutrition showed that a high proportion of low-birth-weight and stunted children were observed among malnourished mothers (Loaiza, 2017; Teller et al., 2020; Genebo et al., 2019). Childhood stunting remains a global public health concern. It is well documented that malnutrition delays growth and development and also exposes individuals to increased risk of acquiring an infectious disease especially in developing countries, where malnutrition contributes to over 50% of childhood deaths (Ross-Suits, 2010; UNICEF, 2018).

Trends in Maternal and Child Nutrition

Lartey (2008) while examining current nutritional practices of mothers and how such affects children conducted a quantitative 24-hour dietary recall for the previous day was used to estimate the dietary practices of children. The specific IYCF indicators assessed were timely initiation of breast feeding, timely complementary feeding, minimum dietary diversity, minimum meal frequency and minimum acceptable diet (MAD), appropriate complementary feeding and Infant and child feeding index (ICFI), a composite index which measures complete feeding practices for infants and young children. The study noted the following trend timely initiation of breast feeding within 1 hour, avoidance of prelacteal feeding, avoidance of bottle feeding, introduction of complementary foods at 6 months, minimum meal frequency, and minimum dietary diversity and feeding child with colostrum.

In another study conducted by Christian, Mullany and Hurley (2015), maternal diet was characterized by the excessive intake of soluble carbohydrates and solid fat and added sugar (SFAs). Similarly, Blumfield et al (2012) reported high intake of carbohydrate and fatty food among pregnant women with low intake of fruits, vegetable, proteins and supplements. Williamson (2016) noted heavy intake of caffeinated meals among pregnant women. On infant feeding, evidence reveals empirical poor breastfeeding and overall infant feeding practices among mothers. Children were introduced to general family diets in less than 6 months of birth (Concina et al, 2021). According to Concina (2021), this negative trend is associated with poverty, poor knowledge of pregnancy and childbirth related nutritional guidelines, poor hygiene and sanitation practices and unavailability or inadequate food supply.

Nutritional Counselling for Pregnant Women

Unfavourable maternal, neonatal and child health outcomes remain prevalent in developing countries (Abu-Saad & Fraser, 2020). According to Belizan et al (2015), the main causes of maternal morbidity and mortality are pregnancy-induced hypertension (PIH), haemorrhage, severe anaemia, obstructed labour, infections, unsafe abortions and their subsequent complications. Numerous studies report a role for modifiable maternal nutrition practices in these poor health outcomes. For example, women with calcium deficiency have greater risk of PIH while supplementation is associated with a 50% reduction in the risk of pre-eclampsia (Ritchie & King, 2015). Anaemia, and especially severe anaemia, are associated with an increased risk of maternal mortality. It is estimated that a population increase in maternal haemoglobin of 1 g/dL could reduce the risk of mortality by approximately 25%. (Ndiaye et al, 2019). Micronutrient deficiencies during pregnancy as well as inadequate weight gain have significant implications for neonatal and infant outcomes including preterm delivery, low birthweight (LBW) and birth defects (Villar et al, 2013). Interventions that improve maternal nutrition before and/or during pregnancy can reduce the risk of poor health outcomes in mothers and their children. A widely used strategy to improve nutritional status of women during pregnancy is nutrition education and counselling (NEC) (Rush, 2015).

Nutrition, education and counselling strategies typically focus on enhancing maternal diet quality by increasing the diversity and amount of foods consumed, adequate weight gain through consumption of sufficient and balanced protein and energy, and the consistent and continued use of micronutrient supplements, food supplements or fortified foods (Briley et al, 2012).

A review by Nielsen et al. (2016), observed that prenatal NEC interventions in pregnant adolescents positively impacted nutrition knowledge and diet quality. Interventions also modestly improved gestational weight gain and birthweight. Another review of studies, largely in high-income countries (HIC) reported that nutrition education during pregnancy reduced excessive gestational weight gain (Kafatos et al, 2019). Finally, a 2010 Cochrane systematic review that found that specific advice to increase protein and energy intakes during pregnancy improved intakes of these nutrients (Ronnberg & Nilsson, 2010).

Thus, nutrition counselling is a cornerstone of prenatal care for all women during pregnancy. A woman's nutritional status not only influences her health, but also pregnancy outcomes and the health of her foetus-neonate (Kominiarek, 2016). Physicians and other healthcare providers need to be cognizant of nutritional needs during pregnancy, as they differ significantly compared to non-pregnant populations (Girard & Olude, 2012). Furthermore, an individualized approach to nutritional counselling that considers a woman's access to food, socioeconomic status, race-ethnicity and cultural food choices, and body mass index (BMI) is recommended. In addition, many of the recommendations are geared for uncomplicated pregnancies, so adjustments need to be made when complications, such as gestational diabetes, arise.

According to the Institute of Medicine (2020), caloric intake should increase by approximately 300 kcal/day during pregnancy. This value is derived from an estimate of 80,000 kcal needed to support a full-term pregnancy and accounts not only for increased maternal and foetal metabolism but for foetal and placental growth (Forsum & Lof, 2017; Otten & Meyers, 2016). Dividing the gross energy cost by the mean pregnancy duration (250 days after the first month) yields the 300 kcal/day estimate for the entire pregnancy. However, energy requirements are generally the same as non-pregnant women in the first trimester and then increase in the second trimester, estimated at 340 kcal and 452 kcal per day in the second and third trimesters, respectively (Hibbeln et al, 2017). Furthermore, energy requirements vary significantly depending on a woman's age, BMI, and activity level (Siega-Riz & Mehta, 2020).

Integration of Nutritional Interventions into Maternal and Child Health Programs

Maternal undernutrition affects a large proportion of women in many developing countries, but seem to have received little attention as an important determinant of poor maternal, new-born, and child health (MNCH) outcomes such as intrauterine growth restriction, preterm birth (PTB), and maternal and infant morbidity and mortality (Nguyen et al, 2017). There is growing recognition of the importance of maternal nutrition interventions as part of antenatal care (ANC) to improve maternal and infant health outcomes. In 2016, the WHO issued new guidelines on ANC for a positive pregnancy experience with high priority given to nutrition through dietary interventions and micronutrient supplementation, together with health system interventions to improve the use and quality of ANC. The need to integrate nutritional interventions into maternal and child health programmes was buttressed in several studies as a way of enhancing overall maternal and child health outcomes (Ramakrishnan et al, 2014).

One of the nutritional interventions that have been applied in improving maternal and child health outcomes is daily iron supplementation. According to the World Health Organization (2018), daily iron supplementation refers to day to day administration of oral iron supplements (i.e. as tablet, capsule, dispersible tablet, syrup, or drops) and includes any form of iron compound, such as ferrous sulphate, ferrous gluconate, ferric pyrophosphate, and ferric citrate (WHO, 2018). The goal of iron supplementation interventions is to improve iron status by increasing haemoglobin concentrations and iron stores (Auerbach, 2016). Iron supplementation may be used as an intervention both to prevent and to treat iron deficiency anaemia and iron deficiency in at-risk populations (Lopez, 2016).

Another nutritional intervention crucial to maternal multiple micronutrient (MMN) supplementation. MMN is a supplement with 15 minerals and vitamins including iron and Zinc (Zn) which are important for a child's healthy physical and cognitive development (Shaheen et al, 2018). There is scientific evidence to show that providing multiple micronutrients is much more beneficial than giving iron supplements alone because Zn and iron deficiency generally co-exist (Tofail et al, 2018). Supplementation with iron and folic acid during pregnancy has been found to be associated with reduction

in the risk of maternal anaemia and infants with LBW (Haider 2013; Pena-Rosas 2015). To overcome other possible maternal micronutrient deficiencies, the United Nations Children's Fund (UNICEF), United Nations University (UNU) and the WHO, in 1999, agreed on the composition of a proposed multiple-micronutrient (MMN) tablet. This tablet provides one recommended daily allowance of vitamin A, vitamin B1, vitamin B2, niacin, vitamin B6, vitamin B12, folic acid, vitamin C, vitamin D, vitamin E, copper, selenium and iodine with 30 mg of iron and 15 mg of zinc for pregnant women. However, a lower dose of iron was recommended as the absorption of iron was expected to be enhanced due to vitamin C, vitamin A, and riboflavin, and given that the majority of pregnant women suffer from mild anaemia and the potential side-effects associated with higher doses of iron (Oriji 2011; Seck, 2018).According to Family Health Bureau (2022), MMN group received daily supplementation of vitamin A 3000 mcg RE, beta carotene 3.5 mg, thiamine 1.5 mg, riboflavin 1.6 mg, B6 2.2 mg, B12 4 mcg, niacin 17 mg, C 80 mg, D 10 mcg, E 10 mg, zinc 15 mg, copper 1.2 mcg and selenium 65 mcg while the other group received a placebo.

Protein-energy supplementation is another nutritional intervention targeted at enhancing overall maternal and child health outcomes. Maternal diet during pregnancy is one of the most important factors associated with adequate foetal growth. There are many complications associated with foetal growth restriction that lead to lifelong effects. Hence the place of protein-energy supplementation cannot be over-emphasized. Balanced protein energy supplementation (containing up to 20% of energy as protein) given to pregnant women with energy or protein deficit appears to improve foetal growth, increase birth weight (by 95–324 g) and height (by 4.6–6.1 mm), and decrease the percentage of low birth weight (by 6%). However, supplements with excess protein (>20% of energy as protein) provided to women with a diet already containing adequate protein may conversely impair foetal growth.

Major nutritional interventions crucial to maternal and child health programmes include daily iron supplementation, maternal multiple micronutrient (MMN) supplementation, balanced protein-energy supplementation, the use of antimalarials in pregnancy, educational/counselling interventions, Vitamin A supplementation, intermittent iron supplementation in children and supportive interventions (Bhutta & Das, 2014).

Reports from a study conducted by Bhutta & Das (2014) revealed that among the maternal interventions, daily iron supplementation results in a 69% reduction in incidence of anaemia, 20% in incidence of low birthweight (LBW) and improves mean birthweight. MMN supplementation during pregnancy has been shown to significantly decrease the number of LBW infants by 14% and small for gestational age (SGA) by 13%. Balanced protein-energy supplementation reduces the incidence of SGA by 32% and risk of stillbirths by 38%. Antimalarials when given to pregnant women increase the mean birthweight significantly and were associated with a 43% reduction in LBW and severe antenatal anemia by 38%. Among the neonatal and child interventions, educational/counseling interventions increased exclusive breastfeeding by 43% at 4-6

weeks and 137% at 6 months. Vitamin A supplementation (VAS) reduces all-cause mortality by 24% and results in a 14% reduction in the risk of infant mortality at 6 months. Intermittent iron supplementation in children reduces the risk of anemia by 49% and iron deficiency by 76%, and significantly improves hemoglobin and ferritin concentration.

Preventive zinc supplementation in populations at risk of zinc deficiency decreases morbidity from childhood diarrhea and acute lower respiratory infections, and increases linear growth and weight gain among infants and young children. Among the supportive interventions, hand washing with soap significantly reduces diarrhea morbidity by 48%, though it depends on access to water. The effect of water treatment on diarrhea morbidity also appears similarly large with a 17% reduction. Recent research has established linkages of preconception interventions with improved maternal, perinatal and neonatal health outcomes, and it has been suggested that several proven interventions recommended during pregnancy may be even more effective if implemented before conception. These proven interventions, if scaled up have the potential to reduce the global burden of undernutrition substantially.

Nguyen et al (2017) further identified other intervention directed at meeting the nutritional need of mothers and children to include counselling on diet diversity and quantity, provision of free IFA and calcium tablets provided by health workers with an emphasis on compliance during home visits, weight measurement, taking rest and avoiding heavy workload, counselling on breastfeeding, community mobilization etc.

Maternal Dietary Diversity

Multiple micronutrient deficiencies remain a major public health concern in low-income and middle-income countries (LMICs) especially among reproductive women. Pregnancy places an additional burden on women's nutritional requirement, as nutrient needs increase to meet the demands of both the mother and the developing foetus. Hence the increasing emphasis on maternal dietary diversity.

Maternal dietary diversity is a proxy indicator of maternal nutrient adequacy and improves health outcomes for both mothers and babies. However, little is documented on dietary diversity among pregnant mothers. In a study conducted by Abu-Saad and Fraser (2015), maternal dietary diversity with adequate nutrient intake during pregnancy was found to reduce the risk for low birth weight (19%), small-for-gestational-age births (8%), preterm birth by 16%, and infant mortality by 15% in those highly adhered to the regimen. Another study revealed that in underweight women, multiple micronutrient supplementation initiation before 20 weeks' gestation decreased the risk of preterm birth by 11% (Haider & Bhutta, 2017).

Antenatal healthy diet initiation in pregnancy and high adherence to multiple micronutrients supplements also provided greater overall benefits (Lee et al, 2012). Dietary diversification is one of the best strategies highly recommended among pregnant women which associated with improved diet adequacy through increased food groups in daily diet. Dietary diversity has been defined as the number of different food groups that are consumed over a specific reference period (WHO, 2016; Kennedy et al, 2019).

The burden of nutritional deficiency among pregnant women is still high in sub-Saharan Africa (Lukket et al, 2015; Lartey, 2018). Even though dietary diversification is essential for the health of the mother and the foetus in Ethiopia, 22% of women are thin and 8% of women are obese due to inadequate dietary intake, limited diet diversity (vegetables and fruits), and changing lifestyles (Smith et al, 2012). Studies have revealed that the global mortality and morbidity due to malnutrition have not significantly changed over the last 30 years (Abay, 2017). In order to improve it, dietary diversification status of pregnant women needs to be sustainably improved through addressing of information and reduction of barriers of adherence.

Maternal Micronutrient and Macronutrient Intake

Pregnancy is a time of rapid and profound physiological changes from the time of conception until birth. Nutritional requirements increase during pregnancy to maintain maternal metabolism and tissue accretion while supporting foetal growth and development. Nutritional status during pregnancy can have a significant impact on maternal and neonatal health outcomes. Poor dietary intakes or deficiencies in key macronutrients and micronutrients can therefore have a substantial impact on pregnancy outcomes and neonatal health.

Increasing evidence suggests that the effects of foetal nutrition may persist well into adulthood, with possible intergenerational effects Although a healthy and varied diet remains the preferred means of meeting nutritional requirements, some nutritional needs in pregnancy are challenging to meet with diet alone. As such, supplement use may be prescribed and food fortification programs such as salt iodization, vitamin D-fortified milk and folate-fortified breads and cereals also play an important role in supporting women to meet the increased nutritional demands of pregnancy. Despite a large body of evidence supporting the importance of adequate nutrition in pregnancy, around 20% to 30% of pregnant women worldwide suffer from some vitamin deficiency.

Requirements for macronutrients such as energy and protein increase during pregnancy to maintain maternal homeostasis while supporting foetal growth. Energy restriction can limit gestational weight gain in women with obesity; however, there is insufficient evidence to support energy restriction during pregnancy (Mousa et al, 2019). In undernourished women, balanced energy/protein supplementation may increase birthweight whereas high protein supplementation could have adverse effects on foetal growth. Modulating carbohydrate intake via a reduced glycaemic index or glycaemic load diet may prevent gestational diabetes and large-for-gestational-age infants. Certain micronutrients are also vital for improving pregnancy outcomes, including folic acid to prevent neural tube defects and iodine to prevent cretinism.

Exclusive Breastfeeding Practices among Mothers

Exclusive breastfeeding is encouraged and recommended to all mothers worldwide with efforts being made both in the private and public sector as a way of achieving the Millennium Development Goals (MDGs) on improving maternal health (Idris et al, 2015). These efforts are also directed at reducing infant morbidity and

mortality related to mixed-feeding as breast milk is very vital for the newly born babies. According to UNICEF (2019), exclusive breastfeeding is giving baby breast milk only and nothing else, not even sips of water except for medicines prescribed by the doctor or nurse for the first six months of life (Al-Binali, 2012).

EBF is an important public health strategy for improving children's and mother's health by reducing child morbidity and mortality and helping to control healthcare costs in society. Additionally, EBF is one of the major strategies which help the most widely known and effective intervention for preventing early childhood deaths. Every year, optimal breastfeeding practices can prevent about 1.4 million deaths worldwide among children under five (UNICEF, 2019).

Beyond the benefits that breastfeeding confers to the mother-child relationship, breastfeeding lowers the incidence of many childhood illnesses, such as middle infections, pneumonia, sudden infant death syndrome, diabetes mellitus, malocclusion, and diarrhea (Shinshaw et al, 2015). Also, breastfeeding supports healthy brain development and is associated with higher performance on intelligence tests among children and adolescents. In mothers, breastfeeding has been shown to decrease the frequency of hemorrhage, postpartum depression, breast cancer, ovarian and endometrial cancer, as well as facilitating weight loss. The lactation amenorrhea method is an important choice for postpartum family planning (Yang et al, 2018).

Maternal and Child Nutrition Advocacy and Sensitization

Maternal prenatal nutrition and the child's nutrition in the first 2 years of life (1000 days) are crucial factors in a child's neurodevelopment and lifelong mental health. Child and adult health risks, including obesity, hypertension, and diabetes, may be programmed by nutritional status during this period (Schwarzenberg, & Georgieff, 2018). Calories are essential for growth of both fetus and child but are not sufficient for normal brain development. Although all nutrients are necessary for brain growth, key nutrients that support neurodevelopment include protein; zinc; iron; choline; folate; iodine; vitamins A, D, B_6, and B_{12}; and long-chain polyunsaturated fatty acids. Failure to provide key nutrients during this critical period of brain development may result in lifelong deficits in brain function despite subsequent nutrient repletion. Understanding the complex interplay of micro- and macronutrients and neurodevelopment is key to moving beyond simply recommending a "good diet" to optimizing nutrient delivery for the developing child. Leaders in paediatric health and policy makers must be aware of this research given its implications for public policy at the federal and state level. Paediatricians should refer to existing services for nutrition support for pregnant and breastfeeding women, infants, and toddlers. Finally, all providers caring for children can advocate for healthy diets for mothers, infants, and young children in the first 1000 days. Prioritizing public policies that ensure the provision of adequate nutrients and healthy eating during this crucial time would ensure that all children have an early foundation for optimal neurodevelopment, a key factor in long-term health.

Current Maternal and Child Nutrition Trends: Implication for Nursing Practice

Maternal under nutrition affects a large proportion of women in many developing countries, but has received little attention as an important determinant of poor maternal, new-born, and child health (MNCH) outcomes such as intrauterine growth restriction, preterm birth (PTB), and maternal and infant morbidity and mortality.

Women, especially pregnant and lactating women, infants and young children are among the most nutritionally vulnerable groups. Their nutritional vulnerability stems from their physiologically-higher nutrient requirements, which are often not met. Pregnancy and lactation places additional demands on women. Similarly, for infants' rapid growth and development results in an increase in nutrient requirements. Infants and young children suffer frequent infections and have poor-quality diets. These factors create an ideal environment for malnutrition to thrive. Malnutrition further predisposes African women and children to morbidity and mortality.

Better nutrition is related to improved infant, child and maternal health, stronger immune systems, safer pregnancy and childbirth, lower risk of non-communicable diseases. It is therefore important that healthcare providers specifically nurses to do the following to solve the problem of maternal and child malnutrition and the associated health problems:

1. Multi-sectoral actors should be targeted, sectoral actors to improve knowledge and skills to support individuals, households, and communities to improve nutrition. Such skills may include essential nutrition and hygiene, ideal infant and young child feeding methods, breastfeeding amongst others
2. Building evidence-base through different types of studies, including formative research, for effective and efficient programs
3. Advocating for greater visibility, understanding and funding around nutrition at all levels, from the village to national level and beyond
4. Applying a systems lens focused on building local capacity to strengthen health, food and water, sanitation and hygiene systems for improved nutrition
5. Designing evidence-based and context-specific nutrition education programmes across multiple sectors that meet local needs and align with national priorities
6. Leveraging community media to improve nutrition norms and behaviours
7. Integrating nutrition into agricultural initiatives
8. Establish support groups for maternal and child nutrition

Summary/Conclusion

This seminar paper examined Nutrition in maternal and child health: Implication for nursing practice. It discussed the concept of maternal and child nutrition, key nutritional practices that are ideal and crucial to maintaining maternal and child health outcomes, current trends in maternal and child nutrition, the relationship between maternal nutrition and child health and implication of current maternal and child nutrition trends for care. It was shown that nutrition plays key roles as crucial determinants of maternal and child health outcomes.

Recommendations

Based on the fore going, the following are hereby recommended:

1. Nurses, dietitians and related healthcare professionals should provide mothers and parents with nutritional focused interpersonal counselling with emphasis on child health.
2. Key players in maternal and child health should conduct community mobilization players in form of nutrition intervention based outreaches aimed at educating members of the community on how best to provide the best nutrition to children within their limited resources.
3. Government and non-government agencies should engage in community based child health programmes directed at improving child nutrition and overall health. Such programmes may include distribution of free micronutrient supplements, provision of weight-gain monitoring services etc.
4. The establishment of support group and agency for the maintenance of child nutrition managed by members of the community is crucial as this would help bring the concept and the true meaning of child health and nutrition to the populace within the context of their culture.
5. Community leaders should put up programmes to support parents with poor financial standing to take care of the nutrition of children aged 0-5 years.

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