Utilization Of Nutrition Services Provided At Health Facilities For Pregnant Women In Moshi – Urban, Kilimanjaro, Tanzania. A Cross Sectional Study

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Abstract

Nutrition during pregnancy is of utmost important to ensure positive pregnancy outcomes after delivery. This study examined the utilization of nutrition services provided at health facilities to pregnant women. A cross sectional study design, involving 105 pregnant women and 5 RCH providers from 2 health facilities was used. Structured questionnaires, and structured observations were used in data collection. SPSS software version 25 was used in data analysis.

Results showed that, RCH providers had inadequate nutrition knowledge due to limited nutrition courses during nursing training and on job trainings/seminars. All RCH providers advised that, nutrition knowledge is important to pregnant women hence they were responsible for its delivery. In adequate staff and lack of teaching materials contributed to the poor delivery of quality nutrition education to all pregnant women as it was observed that there is variations in nutrition information given to women.

More than a half of all pregnant women (63%) started their ANC clinic during their first trimester where they received all nutrition services including education on importance of nutrition during pregnancy which helped them to be aware of the relationship between diet maternal nutrition and birth outcomes (63.8%).

Most common food group that has been consumed more by pregnant women was grains, roots and tubers and plantains, while also there was high consumption of fruits and vegetables by all women as they are being more emphasized during routine clinics to prevent anemia.

Also, there are some barriers that were identified by the service providers which makes their work difficult such as inadequate teaching materials like brochures, posters and jobs aids, also shortage of staff was found to be the core cause of

Literature Review

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services being provided occasionally as it is the RCH nurse who provide the education and counselling as there is no any nutritionist hired by government at the facility.

Regional and district nutrition officers should coordinate and conduct on job training to health providers on issues related to nutrition in order to update their nutrition knowledge and facilitate clear, accurate and more evidence based nutrition information delivered.

Introduction

Background Information

Nutritional status in pregnancy is a key determinant of birth outcomes. Under nutrition among pregnant women is clearly linked to negative maternal health outcomes, including the risk of maternal mortality and negative pregnancy outcomes (13). Research indicates the outcomes associated with under nutrition during pregnancy include low birth weight, preterm birth, micronutrient deficiencies, low nutrient stores in infants, fetal growth restriction, perinatal mortality, child stunting, later adulthood chronic diseases, and maternal mortality. Furthermore, one quarter of all newborn deaths related to under nutrition may be linked to poor maternal nutrition during pregnancy and fetal under nutrition. Moreover, anemia during pregnancy has also been identified as an underlying cause in approximately 20% of maternal deaths and is a key contributor to short stature (stunting), a consequence of chronic under nutrition during early childhood. Thus, malnutrition during pregnancy has far-reaching consequences as it can serve as a fertile ground for the intergenerational cycle of malnutrition in women and their newborn children (4).

In pregnancy, requirements of energy, protein, and essential micronutrients (vitamins and minerals) are increased not only to maintain the mother's own health, but to also support optimal physical and brain development in the fetus. To sustain the production of adequate quantity and nutritional quality of breast milk, lactating women have higher requirements of energy, protein, and other micronutrients. Poor maternal nutrition over this period risks depletion of the mother's own nutrient stores and health, and harms the nutrition and health of the growing child. Deficiencies of energy, protein, iron, calcium, iodine, vitamin A and folic acid during pregnancy predispose mothers to maternal complications and even mortality. These also contribute to fetal birth defects, low birth weight, restricted physical and mental potential, and fetal or newborn mortality (23).

Pregnancy requires an increased intake of macronutrients and micronutrients for maternal and fetal needs, and malnourishment or inadequate dietary intake during pregnancy can lead to adverse perinatal outcomes. Observational study that was done by Rush (18), have indicated that both gestational weight gain and energy intake are strongly and positively associated with fetal growth, and possibly associated with a reduced risk of preterm birth. Moreover, these associations are stronger in undernourished women, i.e. those with low prepregnancy body mass index (BMI) (16).

During pregnancy, a baby developing inside the womb receives all its nutrition from its mother. Inadequate dietary intake during pregnancy can lead to malnutrition and poor outcomes for the baby. Therefore, advising women on their diet and providing food supplements during pregnancy may help babies to grow well and improve pregnancy outcomes. The 2016 WHO recommendations on routine antenatal care (ANC) for pregnant women and adolescent girls provide comprehensive guidance on the practice, organization and delivery of ANC and priorities woman-centred care to facilitate a positive pregnancy experience. Recognizing that ANC provides a strategic platform for important healthcare

functions including health promotion and disease prevention, 14 out of the 49 recommendations in the WHO ANC guideline relate to nutrition. Antenatal micronutrient interventions recommended in this guideline for pregnant women and adolescent girls include daily elemental iron (30–60 mg) and folic acid (0.4 mg) to prevent maternal anemia; calcium supplementation (1.5–2 g daily) in populations with low dietary intake of calcium to prevent pre-eclampsia; and vitamin A supplementation (up to 10 000 IU vitamin A daily or up to 25 000 IU vitamin A weekly) in populations with a high prevalence of night blindness. Calcium supplementation is also recommended prior to pregnancy for the prevention of pre-eclampsia and its complications (28, 29)

The aim of this study is to assess the utilization of nutritional services as provided to pregnant women in health facilities and explore the nutritional knowledge of both providers and pregnant women attending reproductive and child health clinic.

Problem Statement and Justification

Maternal and child health care services is essential component to promote family health. Despite of being provided free of cost, adequate utilization on of services is still the issue affecting health of both mother and child. Low utilization of health and nutrition services is a major setback to the attainment of ultimate health of many populations in developing countries.

Globally 52% of maternal deaths are attributable to hemorrhage, sepsis, and hypertensive disorders; 28% to non-obstetric causes; 8% to unsafe abortion. Anemia, which results from deficiencies of nutrients such as iron and folic acid is an important risk factor for hemorrhage; a leading cause of maternal mortality. Calcium deficiency during pregnancy also increases the risk of pre-eclampsia, another cause of maternal mortality. Improving nutrition alongside good antenatal care can reduce these numbers significantly. Maternal nutritional status before and during pregnancy is an important contributor to pregnancy outcomes and early child health.

In a review by Siekmans and colleages (20), iron and folic acid (IFA) supplementation programmes in seven countries (Afghanistan, Bangladesh, Indonesia, Ethiopia, Kenya, Nigeria and Senegal) suggests that much remains to be done to improve uptake and adherence of essential nutritional supplements in pregnancy. Barriers to coverage include supply chain issues, lack of quality control and coordination, and inadequate staff training and patient counselling.

Study Objectives

General Objective

1. To assess extent of utilization of nutritional services provided at health facilities for pregnant women in Moshi Urban district, Kilimanjaro.

Specific Objectives

1. To document the timing and delivery of nutritional services provided at health facilities for pregnant women in Moshi Urban district
2. To assess availability, accessibility and challenges while accessing nutritional services provided at health facilities for pregnant women in Moshi Urban district
3. To assess maternal knowledge and attitude on nutrition of pregnant women attending reproductive and child health clinic (RCH) at health facilities in Moshi Urban district
4. To assess dietary diversity of pregnant women attending reproductive and child health clinic (RCH) at health facilities in Moshi Urban district

Literature Review

Nutrition Situation of Pregnant Women

Maternal nutrition plays an important role in placental-fetal growth and development. Maternal under nutrition during pregnancy results in intrauterine growth restriction (IUGR) which is associated with increased perinatal morbidity and mortality. These children have an increased risk for development of metabolic syndrome in adult life. Evidence shows that the animal embryo comprises two group of cells in the early embryonic stage. The inner cell mass which develops as the fetus and the outer cell mass become the placenta. These developmental process is influenced by nutrition and hormones (2)

Conception triggers thousands of complex and sequenced biological changes that transform two united cells into a member of the next generation of human beings. The rapidity with which structures and functions develop in mother and fetus and the time-critical nature of energy and nutrient needs make maternal nutritional status a key element of successful reproduction (5). Physiological changes in pregnancy can be divided into two basic groups: those occurring in the first half of pregnancy and those in the second half. Changes in the first half are considered "maternal anabolic "changes because they build the capacity of the mother's body to deliver relatively large quantities of blood, oxygen, and nutrients to the fetus in the second half of pregnancy. The second half is "maternal catabolic" changes in which energy and nutrient stores, and the heightened capacity to deliver stored energy and nutrients to the fetus, predominate. Approximately 10% of fetal growth is accomplished in the first half of pregnancy, and the remaining 90% occurs in the second half.

The importance of perinatal nutrition and its role in offspring health, is recognized. Nutrition during pregnancy is an important factor associated with both maternal and infant health outcomes. Very little is known about the diet and nutritional status of pregnant women in South Africa, specifically residing in urban areas (22). Furthermore, understanding the associations of maternal diet and nutritional status during pregnancy with birth outcomes, as well as offspring health and development in the South African population will form the basis for the development of context-specific nutrition interventions that may improve birth outcomes and long-term quality of life of the mother and her offspring.

Nutritional status of pregnant women

Maternal under nutrition at the time of conception have shown fewer cells in the inner cell mass in experimental animal studies, which is associated with reduced birth weight and postnatal growth, altered organ/body weight ratios and the development of chronic diseases as type 2 diabetes, hypertension (HTN), coronary artery disease (CAD) (12). Evidence has also suggested that disturbances during critical periods of fetal development alter the structure or function of distinct cells, organ systems or omoeostatic pathways. Therefore, the subjects will have an increased risk of developing cardiovascular disease and type 2 diabetes in later life. In a study by Eriksson and colleages (8) found the association between maternal malnutrition in early pregnancy and the occurrence of Coronary artery disease in the offspring. They have shown that exposure to malnutrition, especially in late gestation, is linked to impaired glucose tolerance, while exposure in early gestation is linked to atherogenic lipid disorders and obesity.

On the other hand, maternal under nutrition prior and during pregnancy has serious consequences on infant's health and survival. It causes intrauterine growth retardation (IUGR), can initiate and perpetuate

an intergenerational cycle of under nutrition and is a leading cause of low birth weight babies (21). Low birth weight (weight less than 2500g at birth) is a leading cause of increased neonatal and infant mortality rates, impaired immune function, and increased risk of cognitive and neurological impairment (5).

In a study conducted Tuncalp by and colleagues (25), the most common micronutrient deficiency in pregnancy known to impact maternal health is iron deficiency due to increased iron demands. Iron deficiency is a common cause of anemia, which is estimated to affect 40% of pregnancies globally, highest in South-East Asia (49%), Africa (46%) and the Eastern Mediterranean (41%) and lower prevalence in Western Pacific (33%), the Americas (26%) and Europe (27%).

Health status of pregnant women

Maternal and child under nutrition contributes greatly to mortality and morbidity of women and children in Pakistan, and is also one of the most important contributing factors to intergenerational poverty (19). Around 51% of Pakistani women of reproductive age are anemic. In pregnancy, requirements of energy, protein, and essential micronutrients (vitamins and minerals) are increased not only to maintain the mother's own health, but to also support optimal physical and brain development in the fetus. Furthermore, nutrition reserves are built over pregnancy to produce breast milk for the post-child birth phase. The impact of poor nutrition on maternal health and survival is indisputable. Anemia, which results from deficiencies of nutrients such as iron and folic acid is an important risk factor for hemorrhage; a leading cause of maternal mortality. Calcium deficiency during pregnancy also increases the risk of pre-eclampsia, another cause of maternal mortality. Improving nutrition alongside good antenatal care can reduce these numbers significantly. Globally 52% of maternal deaths are attributable to hemorrhage, sepsis, and hypertensive disorders; 28% to non-obstetric causes; 8% to unsafe abortion.

Very little is known about the diet and nutritional status of pregnant women in South Africa, specifically those residing in urban areas (22). Furthermore, understanding the associations of maternal diet and nutritional status during pregnancy with birth outcomes, as well as offspring health and development in the South African population will form the basis for the development of context-specific nutrition interventions that may improve birth outcomes and long-term quality of life of the mother and her offspring. Consequently, the Nutrition during Pregnancy and Early Development (NuPED) cohort study was initiated to investigate nutritional status during pregnancy and assess early nutritionrelated exposures predictive of early childhood development in urban South Africa.

Food consumption and dietary Intake

Nutrition for women in pre-pregnancy, pregnancy, and over the first two years of the child's life is of utmost importance for the survival, health and development of mothers and their children. Maternal diet during pregnancy is thought to be one of the most influential factors on child health and development (18). However, dietary interventions during this period may miss a critical window to improve health during childhood, as well as adult life. Maternal over nutrition as well as under nutrition have been known to adversely affect metabolic regulation in offspring and increase the risk for metabolic disease development.

When adolescence is confronted with pregnancy, the nutrition requirements further becomes more demanding (15). Pregnancy presents another special stage in life that has the potential to positively

impact on maternal health and that of the preceding generation. Adequate nutrition is imperative to meet the added demands of nutrients for the mother's body, that of the growing fetus and instills a strong biological basis for the present and coming health, productivity and wellbeing of the mother. Other investigators further demonstrate that devastating effects of poor nutrition status at adolescent into motherhood, maternal body conformation, altered metabolism and supply of nutrients to the placenta can enhance positively or negatively the fetal development, growth and is interrelated to pregnancy outcome. Moreover, the relationship between nutrition status and pregnancy at adolescent is complex and attributed to different biological, economic, demographic and social factors which vary widely depending on the population in the interplay.

Food taboos and beliefs during pregnancy deprive women of necessary nutrients and foods available. Studies done in southern Tanzania showed that, pregnant women are discouraged from consuming fish and meat based on the belief that, these foods are linked with anemia during pregnancy (26). In other areas of Tanzania, pregnant women are advised to eat low portions of food because of the local belief that eating more during pregnancy would result into a big baby that would be difficult to deliver.

Nutrition Services for Pregnant Women at Health Facilities

Health policy for improvement of maternal nutrition

In Tanzania, policies related to health, food and nutrition, agriculture, child and community development sectors addressed a wide range of nutrition issues. For example the National Health Policy (2007) has included statements such as improving nutritional status; promotion of adequate nutrition, advocacy for nutrition and it has a section on nutrition with policy statements such as "Strengthen better nutrition practices and general care for vulnerable groups including children, pregnant and breastfeeding women, adolescents, the elderly, the sick, those in disaster situations and institutions" (27).

The government of Bangladesh introduced Health, Population and Nutrition sector Development Program, where malnutrition was addressed directly through mainstreaming implementation of nutrition services into health and family planning (21). As per the National nutrition services operational plan 2011, the ministry of health and family welfare is providing services on some key issues like maternal nutrition, micronutrient or medicine supplement.

A timeline of policy documents developed since 2003 to improve nutrition outcomes in Afghanistan alongside the generation of nutritional related data (11) The Public Nutrition Policy 2003 and National Health Policy 2005 focus on child malnutrition and household access to fortified foods and micronutrient intake but do not explicitly outline maternal malnutrition strategies; Public Nutrition Department, 2003. Policies aiming to improve maternal nutrition status initially focused on the health sector.

In addition, The 2003 National Reproductive Health Strategy integrates nutrition strategies to improve reproductive health through the safe motherhood initiative, specifically during ANC, PNC, and family planning counselling. Maternal nutrition strategies focus on micronutrient supplementation (IFA, calcium, and vitamin A) and nutrition education at community and facility levels.

Nutrition education and counselling

The aim of public health nutrition is to improve the nutritional status of an entire population, with specific focus group. It tries to improve nutritional service coverage by unifying existing resources in a country and its appropriate utilization (21)

At Narok County in Kenya, study revealed that adolescents who are pregnant or lactating dominantly receive information on nutrition and health through face to face interaction with service provider (87.2%) (16). Radio broadcasting or TV also become useful methods through which information is relayed at 32.8%,

Within facility-based sources of information, nutrition advises and services were significantly sought at dispensary level (67.2%) higher than expected frequency of 50%. They also indicated that other than dispensaries, other facilities recorded significantly lower than expected frequency of 50% as sources of nutrition information. It appeared that in TransMara East Sub-County, nurses are the main providers of nutrition advice needed (55.2%), followed by the community health workers (24.2%), then nutritionists (21.5%), clinical officers (17.6%), social worker (3.0%) and pharmacist (1.8%) in that order.

In another study in Afghanistan, maternal nutrition-related education and food-based approaches were incorporated across sectors, particularly messaging promoting healthy foods for pregnant women, increased caloric intake during pregnancy, and overall household food safety and hygiene (11)

Nutritional supplements

The 2016 WHO recommendations on routine antenatal care (ANC) for pregnant women and adolescent girls provide comprehensive guidance on the practice, organization and delivery of ANC and prioritize woman-centred care to facilitate a positive pregnancy experience. Recognizing that ANC provides a strategic platform for important healthcare functions including health promotion and disease prevention, 14 out of the 49 recommendations in the WHO ANC guideline relate to nutrition. Antenatal micronutrient interventions recommended in this guideline for pregnant women and adolescent girls include daily elemental iron (30–60 11 Sokoine University of Agriculture Department of Food Technology, Nutrition and Consumer Sciences. , , mg) and folic acid (0.4 mg) to prevent maternal anemia; calcium supplementation (1.5–2 g daily) in populations with low dietary intake of calcium to prevent pre-eclampsia; and vitamin A supplementation (up to 10 000 IU vitamin A daily or up to 25 000 IU vitamin A weekly) in populations with a high prevalence of night blindness. Calcium supplementation is also recommended prior to pregnancy for the prevention of pre-eclampsia and its complications (25).

Iodine requirement during pregnancy is increased to provide for the needs of growing the fetus and to compensate for the increased loss of iodine in the urine due to increased renal clearance of iodine during pregnancy. Iodine plays a critical role in neuropsychological development of the fetus throughout gestation and in the first two years of life (14). During the first two trimesters of pregnancy the fetus is entirely dependent on the maternal thyroid hormone supply as the fetal thyroid does not develop until 13-15 weeks gestation. An adequate iodine intake during pregnancy is essential for the synthesis of maternal thyroid hormones and normal brain development in the fetus. If iodine insufficiency leads to inadequate production of thyroid hormones and hypothyroidism during pregnancy, then irreversible fetal brain damage would result.

More recently, analysis from the UK National Diet and Nutrition Survey suggest that less than 10% of women of reproductive age meet the recommended daily intakes during pregnancy for several key micronutrients including zinc, vitamin A, folate, and calcium. Only 30% of women meet the daily intake recommendations for iron.

A lack of success of multiple micronutrient supplementation during pregnancy in improving child health outcomes, including survival, growth, body composition, and blood pressure, indicate the importance of correcting such nutritional deficiencies well before pregnancy (17)

Role of Reproductive and Child Health Providers in providing Nutrition services

Health care providers in the reproductive and child health clinics (RCH) needs to provide nutritional education as well as various nutritional services. In contrast to (26) a case study of Temeke district revealed that RCH providers had inadequate nutrition knowledge due to limited nutrition courses during nursing training and in- service training. Understaffing and lack of teaching aids also contributed to the failure in the delivery of quality nutrition education.

In addition to that, Most pregnant women (81%) started attending antenatal care in the second trimester and were neither aware of nutritional needs during pregnancy nor the relationship between maternal dietary intake and birth outcomes.

Availability and Accessibility of and Challenges in the provision of Nutrition services

Availability and Accessibility of Nutrition services

In a study conducted in Ethiopia, indicated that the dietary quality of pregnant women in the study area remains poor and in some cases, poorer quality than pre-pregnancy (1). Across study sites, heavy workloads, food taboos and avoidances, low husband support, lack of economic resources, lack of awareness, low educational level of women, poor dietary habits, increased expenditure for cultural and religious festivities, “dependency syndrome”, low physical access to health facilities, poorly equipped health facilities, focus on child health and nutrition, poor coordination among nutrition specific and sensitive sectors, and limited sources of nutrition information were identified as the demand and supply side barriers limiting the uptake of nutrition services during pregnancy.

Challenges, barriers and satisfaction of nutrition services

In a study carried out in Ethiopia, by Bezabih and colleages (1) demand and supply side barriers that limits the uptake/utilization of nutritional information among pregnant women includes food taboos, poor dietary habits, low physical access to health facilities, poor equipped health facilities, poor coordination among nutrition specific and sensitive sectors, as well as limited sources of information were among the barriers for utilization of nutrition services during pregnancy .

Poor women of Bangladesh in rural or urban areas have face more maternal mortality and receive low proportion of antenatal care and of births assisted by the skilled health personnel. Nutrition is central fact for fetal growth and directly related to the maternal anthropometric and placental volume (21). The main barriers social (early marriage, perception of pregnancy and childbirth, high financial cost), physical (distance and waiting time), low quality services, lack of nutrition knowledge.

In addition, in Tanzania a case study of Temeke district in Dar es Salaam revealed that about 54% of pregnant women were not satisfied with antenatal services provided at the surveyed clinics (26). Reasons mentioned included, spending long hours at clinic, high costs of some services and inadequate number of service providers.

Methodology

Description of the Study Area

Moshi is a municipality and the capital of Kilimanjaro region in the north eastern Tanzania. As of 2017, the municipality has an estimated population of 201,150 and a population density of 3,409 persons per km2 . In the last official census of 2012, the municipality had a population of 184,292. The municipality is situated on the lower slopes of Mount Kilimanjaro, a dormant volcano that is the highest mountain in Africa. The name Moshi has been reported to refer to the smoke that emanates from the nearby mountain. The municipality covers about 59 square kilometers (23 sq mi) and is the smallest municipality in Tanzania by area.

Moshi Urban is one of the seven districts of the Kilimanjaro Region of Tanzania. The regional capital of Moshi is located in the Moshi Urban District. The district is bordered to the north by the Moshi Rural District, to the east by the Mwanga District and to the south and west by the Manyara Region. According to the 2002 Tanzania National Census, the population of the Moshi Urban District is 144,336. According to the 2012 Tanzania National Census, the population of Moshi Urban District was 184,292.

Moshi is administratively divided into 21 wards and then subdivided into 60 hamlet .

Moshi urban has lower altitude and drier climate mean that the main crops grown on the higher slopes of Mt Kilimanjaro, are coffee and bananas, do not thrive there. The surrounding areas in Moshi urban district are known for extensive farms of maize and beans, grown once per year during the long rainy season (known as "masika" in Kiswahili). In addition, the Tanganyika Planting Company operates a very large sugar cane plantation and company town 20 kilometers (12 mi) south of Moshi.

Study Design

The study design used was cross sectional study in which primary data was collected from pregnant women and service providers at reproductive and child health clinic. A cross sectional study is an observational study. It is relatively cheap and can be conducted in a very short period of time, also can be used for public health planning as well as hypothesis formulation (10). This study design was chosen because it is time and cost effective since it was one time survey and fit within the allocated time and resources available.

Study Population

The study involved pregnant women attending health facilities, reproductive and child health workers, and reproductive and child health in charge. The health workers of RCH were involved because they are the one providing the nutrition services to pregnant women so they can give the needed information on the extent of utilization of nutrition services. The RCH in charge involved because the general information about the schedule of provision of nutrition services to pregnant women. The inclusion criteria's for this study were pregnant women at the reproductive and child health clinic as well as the service providers.

Sampling Procedures and Sample Size Determination

Sampling Procedure

Sampling procedure that was used to obtain a sample from the population in this study was non-probability sampling where by purposive sampling was preferred as this is best when having individuals with the predetermined characteristics to be included in this study.

Sample Size Determination

For the determination of the sample size the criteria of time and financial resources was the one considered. Since the time to conduct the research was limited but also the resources in terms of finance. For the collection of data within two weeks the sample size of 110 16 Sokoine University of Agriculture Department of Food Technology, Nutrition and Consumer Sciences. , participants was preferred which included pregnant women as well as the service providers at RCH clinic .

Data Collection

Quantitative and qualitative data were obtained from both health care providers as well as the clients. The application of more than one technique in data collection was vital in order to provide checks and balances. Data were collected through structured questionnaire, in-depth interviews with the RCH in charges, and structured observation.

Primary Data

Socio-demographic and socio-economic factors

A structured questionnaire was used to document socio-demographic and socio-economic characteristics of the respondents. The structured questionnaire contained information on age, education level, marital status, occupation, and parity, age of young child and size of the family.

Timing and Delivery of Nutritional Services

A structured questionnaire was used to the health care providers at the reproductive and health clinic. Structured observation of health facility staff delivering nutrition services was conducted. Key issues for observation were; times and frequency of delivery of services, conduct (ways and environment) of nutrition -health education sessions, ways in which the anthropometric measurements were taken (weight and height), provision of supplementation to pregnant women (Ferrous sulphate and Folic acid (FEFO), hemoglobin test.

Availability, Accessibility and Challenges of Nutritional Services

Structured questionnaires were used to all pregnant women to determine their response on the availability, accessibility and challenges encountered in utilizing the nutritional services provided in the health facilities. Also in-depth interview with the RCH in charge was done to 17 Sokoine University of Agriculture Department of Food Technology, Nutrition and Consumer Sciences. , determine the availability and challenges encountered in provision of nutritional services as well as number of staff well equipped with maternal nutritional knowledge.

Dietary Diversity of Pregnant Women

24 hours food recall method of nutritional assessment was used to assess dietary diversity of the pregnant women 24 hours prior to the survey. The method was chosen because of its reliability and the ability for the respondents to remember what was consumed previous day rather than the last seven days and also it is easy to collect information .

Maternal Knowledge and Attitude on Nutrition during Pregnancy

Structured questionnaires were used as a guidance tool to obtain information on maternal knowledge and attitude towards nutrition during pregnancy. Also, awareness on the nutrition services that were offered to pregnant women at the health facilities was assessed. In terms of attitude, their perceptions, myths and barriers towards practising the nutritional advice given by the service providers were all assessed and reported.

Data Management and Analysis

Data were entered in and analyzed using Statistical Product for Service Solutions (SPSS) for windows version 25. Descriptive statistics was applied to continuous and categorical data. Variables with continuous data were presented as mean and standard deviation. Qualitative data were analyzed based on content analysis technique in which information from key messages provided with regard to nutrition services grouped according to their sources.

Ethical Issues

Permission to conduct the study was obtained from Sokoine University of Agriculture (SUA) and Moshi Municipality. The selected respondents gave verbal informed consent. This was done after explaining the purpose of the study, study procedures and the purpose of the study. High levels of individual consent and confidentiality were observed.

Results

Socio – demographic information

The total of 105 pregnant women were involved in the study. Their mean age was 27.6 ± 5.61 (range: 18-38) years. Majority of pregnant women ranged between 18 -30 years with 71.4%. Additionally 22.9% of pregnant women were ranging between 31 – 35 years. And those pregnant women who were above 36 years were 5.7% who are termed as high risk women during pregnancy according to the ANC guidelines. Also, in terms of parity 35.2% of all pregnant women were having their first pregnancy, where 29.5% had one child, 21.9% and 13.3% they had more two or more children. On the other hand more than a half of the respondents started the ANC visits in their first trimester 63% as compared to 43% who started their visit during second trimester. Other demographic information includes marital status, education level, as well as occupation are presented in the Table 1.

Table 1. socio-demographic characteristics of the respondents

Variables	**n**	%
Marital status		
Cohabit	21	20
Married	47	44.8
Single	37	35.3
Education status		
Primary	9	8.6
Secondary	36	34.3
University/college	60	57.1
Occupation		
Business	14	13.3
Employed in formal sector	32	30.5
Not employed	41	39
Employed in informal sector	18	17.1

Nutrition related services available

Four variables were assessed during the study to identify nutritional related services that are available and provided in health facilities. The results shows that most pregnant women attending RCH clinic are being monitored their weight and height (100%), while 83.8% of the respondents reported about the availability of education sessions which includes nutrition education during their antenatal visit, with more than a half 72.4% on ferrous folic supplementation which is the lowest of all services provided because of inadequate supply of these supplements to the clinics by government which makes pregnant women to go and buy them from pharmacies outside the clinic. Lastly, hemoglobin test was readily available to pregnant women by 77.1%.

Maternal knowledge and attitude on nutrition during pregnancy

Knowledge about nutrition during pregnancy

Under this category pregnant women were allowed to provide more than one answer regarding the knowledge on nutrition during pregnancy. The results reveal that most pregnant women 89.5% have the knowledge on the number of meals per day during pregnancy, followed by awareness on the amount of fluid intake during pregnancy with 45.7% and those who knew about the nutrients required during pregnancy were 11.4% of all the respondents.

Also the study reveals that 63.8% of pregnant women knows the relationship between diet, maternal nutrition and birth outcomes. On the other hand 43.8% of the respondents said there is nutrition difference throughout pregnancy and 73.3% acknowledged the nutrition sessions during antenatal visit that it helps them improve their nutritional status. The major sources of nutrition information among pregnant women involved in the survey where they were allowed to provide more than one answer are presented in the Table 2 .

Table 2. The major sources of nutrition information among pregnant women

Variables	**n**	**%**
Hospital	93	88.6
Mass media including social media	67	63.8
Relatives and friends	46	43.8
Journals and books	2	1.9

Availability, Accessibility and Challenges of nutritional services

Nutrition education provided at the Reproductive and Child health Clinic (RCH)

Results shows that group education was the most used method in the study to provide nutrition education to pregnant women attending RCH clinic with 89.5%, unlike the one to one education with 29.5% of the respondents. Also, majority of women 98.1% reveal that they are given opportunity to discuss their personal concerns in private, very few 1.9% report that they were not given this opportunity to discuss some issues in private.

In another aspect some women 39% reported of some foods/drinks being more emphasized during education session such as fruits and vegetables emphasized more than others in order to increase blood while others like alcohol, cigarette and energy drinks and coffee/black tea with meals were highly restricted. Also pregnant women were able to identify several nutrition topics/issues which are taught during the education session. The main topics identified were balanced diet, exclusive breast feeding, increase consumption of green vegetables and fruits, increasing frequency of meals and effects of under nutrition. Table 3 presents the topic/nutrition issues that are most commonly facilitated at the RCH clinic as identified by pregnant women and they mention more than one issue facilitated by the health providers during their routine clinic.

Table 3. Nutritional issues/topic taught during ANC

Variables	**n**	**%**
Balance diet	89	84.8
Food groups	33	31.4
Exclusive breastfeeding	55	52.4
Effects of under nutrition	46	43.8
Supplementation	30	28.6
Fruits and vegetables intake	47	44.8
Meal frequency	42	40
Drinking enough water	54	51.4
Exercises	15	14.3

Moreover, 18% of pregnant women reported the use of visual aids (job aids, brochures or leaflets) during nutrition education sessions. In addition, majority of women (87%) reported 21 Sokoine University of Agriculture Department of Food Technology, Nutrition and Consumer Sciences. , that they were not provided with the nutrition reading materials to read at home after ANC session.

Dietary Advice Practice and Factors Hinder the Practice

Out of 105 pregnant women involved in the study, 78.1% of them all reported practice of dietary advice that they receive from the health providers during education sessions with only 21.9% of the respondents do not practice dietary advice due to various reasons such as low income 18.1%, high workload 8.6%, loss of appetite and food preparation time both had (8.6% and 7.6%) respectively.

Dietary Diversity of Pregnant Women

Food groups consumed by pregnant women 24 hours prior to the survey

The dietary consumption of pregnant women 24 hours prior to the survey showed that Grains, plantains, white roots and tubers (bananas, cassava, potatoes, yams and sweet potatoes) were the most consumed

Table 4. Food groups consumed by pregnant women 24 hours prior to the survey

Food groups	n	%
Grains, white roots and tubers, and plantains	105	100
Pulse/legumes	41	39
Nuts and seeds	17	16.2
Dairy products	69	65.7
Meat, poultry and fish	88	83.8
Eggs	23	21.9
Dark green leafy vegetables	82	78.1
Vitamin A- rich fruits and vegetables	43	41
Other vegetables	87	82.9
Other fruits	69	65.7

(100%) of all food groups followed by meat, poultry and fish (beef, chicken, duck, canned fish, octopus, fresh frozen or dried fish all species) with 83.8%, where the least consumed food groups are nuts and seeds as well as the eggs with 16.2% and 21.9%, respectively. The mean dietary diversity was 5.95 ±1.1 (range: 4 – 9), where minimum was 4 food groups and maximum was 9 food groups. The detailed food groups consumed are shown in Table 4.

Timing and Delivery of Nutrition Services

Observation of service provision at RCH clinics

The provision of the nutrition services was observed in the two health facilities under the study. It was observed that the services starts from 8:00am or 9:00 am and ends at 3.30pm but most pregnant women will be attended before that time though sometimes the time might be extended up to 4pm if the cue is too big to be completed on time. (This was found in one facility that had heavy flow of clients). But on the other hand some pregnant women tend to attend late to the clinic for their scheduled visits which also makes it difficult for the providers to give them proper education compared to those who were attended early when they were not much exhausted.

The education session in both facilities mostly given in groups with the first group for those who came early at around 8:00-8:30am and the second group at around 10:00am-10:30am for those who will come after the first group. Also it was observed that all health facilities have weighing scale for weight measurements and stadiometer was found in one facility while the other one used measurement drawn on walls for height measurement of pregnant women. Supplements were also given to pregnant women but not all pregnant women were receiving supplements, because of shortage they consider those with low hemoglobin levels first.

The general environment was good and well cleaned with good arrangements though the RCH department is does not meet the needs of all pregnant women as there is no enough space for them.

Interview with RCH in charges

In an interview with the two reproductive and child health clinic in charges. They reported that nutritional education is given to all pregnant as it has crucial relationship with the birth outcomes of the new born baby and can affect the normal growth of the fetus in the uterus. But they both address the shortage of staff and Reproductive and Child Health workload as one of the factor that sometimes hinders timely and effective delivery of this crucial components during pregnancy which is a result of lack of nutrition trainings or seminars among health providers makes their work to be hard as they lack updated nutrition information and they all relied on the short course that they receive during their nursing training because most of them they use their general knowledge acquired during nursing training.

Also during the interview both in charges outlined the nutrition related services that are being offered at their facilities which includes micronutrients supplementation like ferrous sulphate and folic acid, anthropometric measurements like weight and height, hemoglobin test and sometimes the availability of ready to use foods (RUTF). Common nutrition problems which was reported by all staff was anemia in pregnancy which is seem as a major problem among pregnant women.

Discussion

The aim of this study was to assess the utilization of nutrition services provided at the health facilities to pregnant women. Nutrition play a major role to health pregnancy outcomes and the well-being of the forthcoming baby, therefore provision of nutrition related services are of great importance to support pregnancy outcomes.

With regards to the study objectives, it has reveals some of the major findings regarding the nutrition services provisions. Firstly, there was several nutritional services provided at the observed health facilities to pregnant women by the health providers. Secondly, the study reveals that most pregnant women apart from just being educated and advised on the importance of nutrition during pregnancy most of them (82%) practice the dietary advice received while few of them had some obstacles towards implementing the advice given.

Moreover, the study also reveals that despite constant presence of nutritional related services provided at the clinics providers have in adequate knowledge and lack nutritional trainings and so, they just use their experience and knowledge acquired during their nursing school. And there is high increase of fruits and vegetables consumption by the pregnant women which was heavily influenced by the education sessions that has been conducted at the RCH clinic.

The following is the discussion of the result of this study in relation with the specific objectives of the study as stated in chapter one:

Timing and Delivery of the Nutrition Services

The study reveals that the timing and delivery of the nutritional education to pregnant women was perfect due to the fact that more than a half of all women surveyed started their ANC clinic during their first trimester of the pregnancy which is the period of rapid development of the child within the uterus and also the essential equipment's to provide the needed services was available. This has been supported by Billah et al., (3) in a study that was conducted in Bangladesh it showed that in order for the nutrition services to be

properly provided to the to pregnant women at RCH clinic there are things that should be put under control that is; presence of essential equipment and guidelines for service delivery, provision of basic nutrition training to all service providers and also proper arrangement of areas for services delivery so that all people get services without interference from other groups.

However, health care providers face some challenges in giving timely nutrition education and services to all pregnant women due to their inability to manage time despite the clinic being started at not as early as 7am but majority of the health workers reported women being late coming for their scheduled visits where they are found mostly kind of being tiresome due to high workload and inadequate number of providers at the RCH clinic.

Availability, Accessibility and Challenges of Nutrition Services

The study also assessed the availability and accessibility of services at the clinics. The study reveal that there are four nutrition services commonly provided to pregnant women at antenatal clinics from the surveyed facilities were nutrition education, iron and folic acid supplementation, weight and height measurements, and hemoglobin level monitoring. The services are being provided daily to all women in their routine clinic and there is constant documentation of the services that they receive in every visit which is being documented on their ANC cards as well as the MTUHA books for health information management in hospitals.

Among the services provided at the facilities, weight and height measurements was the most provided service to all women in all facilities as this is the important parameter in the prevention of pregnancy complications during pregnancy and delivery such as gestational diabetes and pre-eclamsia, which was followed by nutrition education to help pregnant mothers eat well and balanced diet to assist in the health development of the fetus, ferrous folic supplementation and lastly, was hemoglobin test to all women in every visit, all these are there to assist women in the prevention of anemia during pregnancy and reduce maternal mortality.

Furthermore, service providers identified some of the challenges which makes their work a little more difficult such as inadequate visual aids during education sessions for providers, inadequate nutrition reading materials and less emphasis given to nutrition by other RCH providers and the government.

In a study by conducted Dolatian et al., (7) on weight gain during pregnancy outlined the adverse effects of excessive weight gain during pregnancy in quoting “Gestational weight gains above and below recommendations have been shown to be associated with prenatal adverse outcomes, So that excessive weight gain during pregnancy is associated with poor neonatal outcomes like early asphyxia, birth injury and hypoglycemia, large-for-gestationalage infants, while inadequate weight gain is a major risk factor for adverse fetal/neonatal outcomes such as intrauterine growth restriction, preterm birth and low birth weight. In addition, according to the study of Davis, Stange and Horwitz (6), chronic stress leads to change biological behaviors, which is followed by an imbalance diet, excessive weight gain during pregnancy and postpartum obesity.

Therefore, understanding the relative contribution of each group of factors to the risk of excessive and inadequate gestational weight gain is important in identifying at-risk pregnant women and designing effective interventions.

In addition, in Tanzania a case study of Temeke district in Dar es Salaam revealed that about 54% of pregnant women were not satisfied with antenatal services provided at the surveyed clinics (26). Reasons mentioned included, spending long hours at clinic, high costs of some services and inadequate number of

service providers. This also was seen in this study where there was no enough RCH staff to attend to all pregnant women in a short time, hence, lead them to stay for long time at the clinic waiting for service especially in the clinic where there was high heavy flow of clients.

Maternal Knowledge and Attitude on Nutrition during Pregnancy

Maternal knowledge assessed in the study also shows that majority of women are aware of the relationship between nutrition and health pregnancy outcomes. This is a result of being constantly informed on nutritional issues at the health facilities during pregnancy although there is slight variations on the massages delivered o pregnant women at the clinics by various providers. Also the source of nutrition information that they most used was hospitals despite occasional nutrition education provision at these clinics unlike other sources like friends and relatives, reading books and journals related to nutrition during pregnancy as well as the use of mass media. The main topics identified were balanced diet, exclusive breast feeding, increase consumption of green vegetables and fruits, increasing frequency of meals and effects of under nutrition.

In previous study by Mosha, (24) the study done in Morogoro, Tanzania. Shows that inadequacy of nutrition knowledge of the surveyed pregnant women might be contributed by several factors reported in the study. These included occasional provision of nutrition education during ANC visits, inadequate use of visual aids during education sessions by providers, inadequacy of nutrition reading materials and less emphasis given to nutrition by RCH providers and the government. Women also reported that, increased consumption of green vegetables and fruits, which were aimed at increasing maternal blood, were among the most emphasized topics as opposed to other topics.

Food consumption and Dietary intake of Pregnant Women

The study shows that dietary consumption of pregnant women 24 hours prior to the survey mainly were grains, plantains, white roots and tubers (bananas, cassava, potatoes, and rice), followed by meat, poultry and fish where the least consumed food groups are nuts and seeds as well as the eggs. Vitamin A-rich vegetables and tubers such as carrots and tomatoes were consumed daily as were mostly added in other dishes such as meat/fish or any other stew prepared as a family meal. Fruits and green vegetables were frequently consumed by majority of women. High consumption of fruits and green vegetables could have been influenced by the nutrition education delivered to these women during ANC visits. Also, the Tanzania focused antenatal care guidelines put more emphasize on the increased consumption of fruits and vegetables by pregnant women (9)

Also, the study found that all women involved in the study were not consuming tea/coffee/Pepsi/coke drinks with food. This is because they have been discouraged during the nutrition sessions where they were told about the effects on absorption of some minerals such as Iron, whereby some of them were associated poor pregnancy outcomes like miscarriage and abortion. Despite nutrition sessions being occasionally provided by the health provider's women seems to have mastered what they have been taught as evidenced by the high consumption of fruits and vegetables.

According to Symonds & Ramsay (23) Women's nutrient needs increase during pregnancy and lactation. Some of the increased nutrient requirements protect maternal health while others affect birth outcome and infant health. If the requirements are not met, the consequences can be serious for women and their infants. During pregnancy all women need more food, a varied diet, and micronutrient supplements. When energy and other nutrient intake does not increase, the body's own reserves are used, leaving a pregnant woman weakened. Energy needs increase in the second and particularly the third trimester of pregnancy. 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, fetal and newborn death, birth defects, and decreased physical and mental potential of the child.

Conclusion

In conclusion the study aimed at assessment of the utilization of nutrition services provided to pregnant women at health facilities with four specific objectives of the study which are; to document timing and delivery of the nutrition services, availability, accessibility, and challenges in provision of nutrition services, maternal knowledge and attitude towards nutrition during pregnancy and lastly, the dietary diversity of pregnant women.

- In terms of timing and delivery of services at health facilities the study reveals that despite constant presence and provision of services there is still gap in the knowledge of health workers on nutrition during pregnancy which is influenced by lack of on job trainings or seminars on nutrition issues
- Also the study identified some of the services that have been provided and are all accessible by all pregnant women but some of them were inadequately utilized due to various reasons such as cost in hemoglobin test and buying ferrous sulphate supplements, where these makes a challenge towards effective utilization of nutrition services.
- Moreover, pregnant women at the surveyed clinics were found to have adequate knowledge on nutrition during pregnancy this was due to the provision of education sessions by the providers and also women start their ANC visit as early as first trimester which is the perfect timing for the development of the fetus and constantly increase in demand of nutrients for both mother and fetus.
- Furthermore, the surveyed pregnant women at the respective health facilities had consumed variety of foods prior to the survey and also this is the result of provision of nutrition education sessions by the health providers although it is being provided occasionally but women tend to be more attentive and follow what they have been advised by the professionals .
- Lastly, there are some barriers that were identified by the service providers which makes their work difficult such as inadequate teaching materials like brochures, posters and jobs aids, also shortage of staff was found to be the core cause of the services being provided occasionally as it is the RCH nurse who provide the education and counselling as there is no any nutritionist hired by government at the facility.

Reccomendations

- To increase coverage of the nutrition and health needs of pregnant women, governments, donors and implementing organizations have to develop a range of service delivery packages including training materials, job aids such as brochures, posters or counselling cards and monitoring and supervision tools.
- Also, nutritional campaigns should be arranged with the help of government basket fund which is being provided to health facilities which will emphasize the need for pregnant women to attend RCH clinics in order to increase their awareness of nutritional needs.

- Regional and district nutrition officers should coordinate and conduct on job training to health providers on issues related to nutrition in order to update their nutrition knowledge and facilitate clear, accurate and more evidence based nutrition information delivered.
- To establish nutrition department in every Health Centre and nutritionist should be employed to help provide accurate nutrition information and follow to other health providers and this also will help to close the gap on nutrition information at the health facility not only to pregnant women but also to other clients.

Abbreviations

SPSS	Statistical Product for Service Solutions
ANC	Antenatal Care
PNC	Postnatal Care
WHO	World Health Organization
BMI	Body Mass Index
FEFO	Ferrous Sulphate and Folic Acid
IFA	Iron and Folic Acid
RCH	Reproductive and Child Health Clinic
IUGR	Intra-Uterine Growth Retardation
CAD	Coronary Artery Disease
HTN	Hypertension
NuPED	Nutrition during Pregnancy and Early Development
IU	International Unity
UK	United Kingdom
SUA	Sokoine University of Agriculture
FANC	Focused Ante Natal Care
RUTF	Ready to Use Food
HIV	Human Immunodeficiency Virus
AIDS	Acquire Immunodeficiency Syndrome
URT	United Republic of Tanzania

APPENDICES

APPENDIX 1: QUESTIONNAIRE FOR RCH PROVIDER ON NUTRITION SERVICES AT RCH CLINICS FOR PREGNANT WOMEN

My name is ALEX GASPER MEELA, a BSc student in Human Nutrition from Sokoine University of Agriculture. I am conducting a research titled UTILIZATION OF NUTRITIONAL SERVICES FOR PREGNANT WOMEN AT HEALTH FACILITIES, IN
MOSHI URBAN TANZANIA. The purpose of this study is "To assess the extent of utilization of nutrition services provided in health facilities among pregnant women in Moshi- Urban Tanzania".
I kindly request your cooperation and assistance in obtaining your responses to questions that I will ask you. All information that will be collected about you will be kept confidential and any information that

will have your name, your name will be removed and replaced with a number so that you cannot be identified.

SECTION A. Demographic Information

Age Years.

Marital status?

1. Single 2. Married 3. Divorced/separated

Educational level

1. Primary 2. Secondary 3. Certificate 4. Diploma 5. Graduate/ degree

Occupation category.

1. Nurse Officer 2. Assistant Nurse Officer 3. Nurse Midwife 4. Public Health Nurse

SECTION B. Timing and Delivery of Nutritional Services

How long have you been providing RCH services? Years.

Have you received any basic training on focused ANC?

Yes 2. No.

What is the main source of information for your nutrition knowledge?

1. Mass media (radio, television) 2. Nursing school syllabus 3. Nutrition trainings in work 4. Others specify……..

In past five years, have you attended any nutrition training/seminar/short course?

Yes 2. No

Which nutritional services are being provided or given to pregnant women at this facility?

……

……..

……

……

…….

What nutrition problems are common among pregnant women attending this facility?

……

……..

……

……..

When do the majority of pregnant women start attending ANC for the first time (indicate the month after each response).

1. First trimester 2. Second trimester 3. Third trimester

Do you use specific guideline in the delivery of nutrition education?

Yes 2. No

If YES, which one of these?

1. Job aids 2. Counselling cards 3. Leaflets and brochures 4. Others, **specify**……..….....

If NO, how do you deliver the nutrition education to pregnant women?

……

……

……

……..

What techniques do you use to deliver nutrition information to mothers?

1. Group education 2. One to one counseling 3. Both.

Do information about the risks of using tobacco, alcohol, illicit drugs provided to pregnant women?

Yes 2. No

How do you assess nutrition status of pregnant women?

1. Dietary assessment 2. Biochemical assessment 3. Anthropometric assessment 4. Clinical assessment

What advice most common given pregnant women on their overall nutrition status?

……

……

……..

……..

Do you think providing adequate, correct and timely nutrition education to pregnant women will reduce the problem of maternal malnutrition?

Yes 2. No

Is there a service which is given more emphasis? 1. Yes 2. No

If YES, which one(s) and why

……

……

……..

Why……

……

……

……

In your opinion, do you think the government gives priority to nutrition services at the RCH clinics?

Yes 2. No

If YES, how?

……

……

……

……

……

……

If NOT, what do think could be the main reasons?

……

……

.

……

…

……..

APPENDIX 2. QUESTIONNARE FOR PREGNANT WOMEN AT RCH CLINICS ON NUTRITIONAL SERVICES.

My name is **ALEX GASPER MEELA,** a BSc student in Human Nutrition from Sokoine University of Agriculture. I am conducting a research titled **UTILIZATION OF NUTRITIONAL SERVICES FOR PREGNANT WOMEN AT HEALTH FACILITIES,**
IN MOSHI URBAN TANZANIA. The purpose of this study is "To assess the extent of utilization of nutrition services provided in health facilities among pregnant women in Moshi- Urban Tanzania".
I kindly request your cooperation and assistance in obtaining your responses to questions that I will ask you. All information that will be collected about you will be kept confidential and any information that will have your name, your name will be removed and replaced with a number so that you cannot be identified.

SECTION A: Demographic Information

Ward.....
Number of the respondent……
Age of mother (yrs.)
Marital status? 1. Married 2. Single 3. Divorced 4. Cohabit
Education level.
1. Some primary 2. Primary 3. Secondary 4. University/college
Occupation of the mother?
1. Employed 2. Self-employed 3. Business 4. None
Parity.....
Age of the youngest child.....
Family size (including yourself)…… Children.....Adult.....
How old is your pregnancy? Months.
At what trimester did you start ANC visit? 1. First trimester (1 to 3months) 2. Second trimester (4 to 6months) 3. Third trimester (7 to 9months)
What services have you received up to today for this pregnancy from the clinic? 1. Fefo supplements 1=Yes 2=No 2. Nutrition Education 1=Yes 2=No 3. Weight and height measurements 1=Yes 2=No 4. Hemoglobin test 1=Yes 2=No
Do you think ANC services are important to pregnant women? 1=Yes 2=No

SECTION B: MATERNAL KNOWLEDGE AND ATTITUDE ON NUTRITION DURING PREGNANCY
What do you know about the diet of a pregnant woman?
1. Meal frequency per day 2. Amount of fluids per day 3. Nutrients required
Do you know the relationship between diet, maternal nutrition and birth outcomes? 1=Yes 2=No
What is your major source of nutrition information?
1. Hospital 2. Relatives and Friends 3. Mass media including social media 4. Journals and books
Is there any food/drink which is restricted to be used during pregnancy? 1=Yes 2=No
If YES, please mention them.
……..

…….

……

On your opinion, why do you think these foods/ drinks are restricted to be used during pregnancy?

……

……

……

Do you think nutrition requirements are the same or differ throughout pregnancy?

1. Same 2. Different 3. Don't know

Do you think the nutrition knowledge you are receiving from RCH clinics is enough for you to improve your nutrition status? 1. Yes 2. No

SECTION C: AVAILABILITY, ACCESSIBILITY AND CHALLENGES OF NUTRITIONAL SERVICES

Do RCH providers usually offer nutrition education during ANC? 1. Always 2. Occasionally 3. Not at all

How is nutrition education provided at the ANC? 1. Group education 2. One to one 3. Others **specify**……

What nutrition issues/topics are taught during ANC? Please mention.

…….

……

……

……..

…….

During nutrition education sessions, are some foods emphasized more than others?

1. Yes 2. No

If YES, which foods are more emphasized than others and why?

Are you normally given reading materials to read at home? 1. Yes 2. No

If YES, the materials related to what issues? 1=Food types 2=Nutrition/diet for pregnant women 3=Drinks during pregnancy 4=All the above

Do the providers give you opportunity to discuss your concerns? 1=Yes 2=No

Do you usually practice dietary advice given to you? 1. Yes 2. No

If NOT, what hinders you from practicing what you are advised?

……

……

……

……

S/N	FOOD ITEMS	REASONS
1		
2		
3		
4		
5		

……

SECTION D: DIETARY DIVERSITY OF PREGNANT WOMEN

This section is about your dietary diversity, and I will ask you to please describe the type of foods (Meals and snacks or bites) that has been consumed in the past 24hours (day and night)

PART A: 24 HOUR FOOD RECALL

PART B: CHECKLIST FOR FOOD GROUPS CONSUMED BY PREGNANT WOMEN

Breakfast	Snack	Lunch	Snack	Dinner

S/N	TYPE OF FOOD GROUP CONSUMED	1=YES 0=NO
1	Grains, white roots and tubers, and plantains (bananas, cassava, potatoes, yams, sweet potatoes)	
2	Pulse (soy beans, cow peas, lentils)	
3	Nuts and seeds (cashew nuts, ground nuts, walnuts, chia seeds, sesame seeds, pumpkin and melon seeds)	
4	Dairy products (yoghurt, cheese, fresh whole, low fat and skimmed milk)	
5	Meat, poultry and fish (beef, chicken, duck, canned fish, octopus, fresh frozen or dried fish all species)	
6	Eggs (chicken eggs, duck eggs, guinea fowl eggs)	
7	Dark green leafy vegetables (amaranth, broccoli, carrot greens, cassava greens, pumpkin greens, spinach, sweet potatoes leaves)	
8	Vitamin A- rich fruits and vegetables (carrot, pumpkin, red pepper, sweet potatoes {orange/dark yellow}, mango, papaya, passion fruit, tree tomato)	
9	Other vegetables (eggplant, cauliflower, onions, cabbage, beans, cucumber, mushroom, tomato, green pepper)	
10	Other fruits (oranges, pineapple, Apples, watermelons, tamarind, grapes, citrus fruits, dates, coconut fresh, banana-ripe, blackberries, baobab fruit, guava, lemon)	

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