ANTENATAL CARE PROVIDERS' AWARENESS OF MATERNAL DIET'S EFFECT ON OFFSPRING'S NON-COMMUNICABLE DISEASES RISK IN ILALA.

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By

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A Dissertation Submitted in Partial Fulfilment of the Requirements for the Degree of Master of Public Health of Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation entitled **"*Antenatal care providers' awareness of maternal diet's effect on offspring's non-communicable diseases risk in ilala*"** in partial fulfillment of the requirements for the degree of Master of Public Health of Muhimbili University of Health and Allied Sciences.

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Date: _____

DECLARATION AND COPYRIGHT

I, **Deogratius Joachim**, declare that this dissertation is my original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature.....Date…….....**.**

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TABLE OF CONTENTS

CERTIFICATION i

DECLARATION AND COPYRIGHT ii

ACKNOWLEDGEMENT iii

LIST OF TABLE vii

LIST OF FIGURE viii

ABBREVIATIONS ix

ABSTRACT xi

CHAPTER ONE 1

1.0 INTRODUCTION 1

1.1 Background of the study 1

Problem Statement 5

Adapted from Nyaboga, J. M., & Muathe, S. M. (2022). (33) 7

1.4 RATIONALE FOR THE STUDY 8

1.5 Research questions. 8

1.5.1 Main Research Question 8

1.5.2 Specific Research Questions 8

1.6 THE OBJECTIVES 9

1.6.1 Main objective 9

1.6.2 Specific objectives 9

CHAPTER TWO 10

2.0 LITERATURE REVIEW 10
2.1 Current level of awareness of ANC providers 10
2.3. Factors associated with ANC provider's awareness 13
CHAPTER THREE 15
3.0 RESEARCH METHODOLOGY 15
3.1 2 Study design 15
A health-facility-based cross-sectional design with a quantitative approach was employed. 15
3.3 Target population 15
3.4 Study population 15
3.6.1 Inclusion Criteria 17
3.6.2 Exclusion Criteria 17
3.7 Variables and measurement 17
3.7.1 Dependent variable 17
3.7.2 Independent variables 18
3.8 Data Collection Method 18
3.9 Tool/Instruments 18
3.12 Data Collection Procedure 19
3.13 Data Management in the Field 19
3.14 Data analysis 19
CHAPTER FOUR 21

CHAPTER FIVE 28
CHAPTER SIX 30
CONCLUSION 30
REFERENCES 32
APPENDICES 41
APPENDIX I: CONSENT FORMS 41
CONSENT FORM: ENGLISH VERSION 41
CONSENT FORM: SWAHILI VERSION 44
APPENDIX II: QUESTIONNAIRE GUIDELINES 47
QUESTIONNAIRE GUIDELINES: ENGLISH VERSION 47
ETHICAL CLEARANCE 51
INTRODUCTION LETTER 53

LIST OF TABLE

Table 1: Demographic characteristics of study participants.....21
Table 2: Bivariate and Multivariate Analysis of Health Condition Awareness 26
Table 3: Bivariate and Multivariate Analysis of Offspring's Disease Awareness 27

LIST OF FIGURE

Figure 1: CONCEPTUAL FRAMEWORK 7
Figure 2: Availability of support 23
Figure 3: Access to information 23
Figure 4: Awareness Respondent on Offspring's Diseases risks Due to Maternal Diet 24
Figure 5: Awareness Respondent on Offspring's Health Conditions risks Due to Maternal Diet Health Risk 25

ABBREVIATIONS

ANC Antenatal Care

DOHAD Development Origins of Health and Diseases

IUGR Intra Uterine Growth Restriction

NCDs Non - Communicable Diseases

WHO World Health Organization

DEFINITION OF TERMS

1. Non-Communicable Diseases (NCDs): including conditions such as cardiovascular diseases, diabetes, cancer, and chronic respiratory diseases, these are major causes of worldwide morbidity and mortality, and their prevalence and cost are expected to continue growing. NCDs are characterized by their long duration and slow progression.
2. Maternal Diet: The dietary intake of a pregnant woman, encompassing the food and beverages consumed during pregnancy. Maternal diet can modify the epigenome of offspring, producing different phenotypes and altered disease susceptibilities.
3. Antenatal Care (ANC) Providers: Healthcare professionals who deliver medical care and support to pregnant women before the birth of the child. This group includes obstetricians, gynecologists, midwives and nurses.
4. Fetal development: The growth and maturation processes that occur in the fetus during pregnancy, which can be influenced by maternal diet.

ABSTRACT

Background: Non-communicable diseases (NCDs) are a significant public health concern and emerging evidence suggests that maternal diet, lifestyle and environment can influence the risk of NCDs in offspring. Awareness of antenatal care providers regarding these effects remains unclear.

Objective: This study was aimed to assess antenatal care providers' awareness, access to information, available support and identified factors associated with their awareness on maternal diet's effects contributing to offspring's risk of NCDs.

Methods: A cross-sectional study was conducted, structured questionnaires were used to collected data, descriptive statistics to summarize and binary logistic regression explored the relationships. Variables with a p-value of less than 0.2 were further analyzed in multivariate logistic regression to control confounders. Crude and adjusted odds ratios with their 95% confidence intervals were calculated to identify statistically significant associations ($p < 0.05$). Ethical approval was obtained and confidentiality was ensured.

Results: The study included 380 ANC providers, majority were female (70.8%), age 25-34 years (43.7%). Diploma holders (61.6%), bachelor's degrees (29.7%). Nurses were the largest group (52.6%). Only 47.74% of ANC providers were aware of effects of maternal diet NCDs risks in offspring. 59% lack support and 60% lack access to information.

Discussion: The findings show a gap since only 30.67% of providers were aware of risks of NCD in offspring while immediate health conditions such as low birth weight were well known (78.2%), chronic diseases like cancer were alarmingly under-recognized. Lack of support and access to information affects their ability to counsel expectant mothers effectively.

Conclusion: The low levels of awareness, lack of access to information and support indicate an urgent need for targeted educational programs and resources to empower ANC providers.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the study

Non-communicable diseases (NCDs) such as cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes (1) account for over 80% of all premature NCD deaths and have become a significant public health concern worldwide, resulting in 41 million deaths each year (2) equivalent to 74% of all deaths globally (3). Understanding that certain factors during pregnancy and early childhood can influence the likelihood of developing non-communicable diseases (NCDs) presents an opportunity to implement interventions during this crucial period.

Fetal origin of non-communicable diseases explains that non communicable diseases like cancer, diabetes, hypertension and cardiovascular diseases they originate from the effects of under nutrition to the fetus, these effects bring permanent changes in the structure and functions of the body of the offspring (4). For many years it was believed that developmental period was controlled by genetics and it was not know that maternal diet, maternal lifestyle and environment plays a huge role in NCDs risk in offspring especially during the 1000 days when cells are differentiating and tissues developing. This was discovered Barker and Osmond in 1986 and later cemented by evidences of molecular pathways that have been proven to control gene expression.

Awareness and skills of healthcare providers are important in guiding pregnant women to follow a healthy dietary habits which influence maternal and fetal health outcomes. Healthcare providers play a very important role in counselling expectant mothers about proper maternal diet and the effects in offspring (5). Their awareness of dietary guidelines, nutrient requirements, and the potential risks associated with poor dietary choices empowers them to provide tailored advice and support.

Fetal origin of no-communicable diseases is a critical area of research, showing the profound and lasting effects that maternal diet can have on various organ system and diseases risks. A well-balanced diet rich in essential nutrients prevents deficiencies that can lead to complications and risk of NCDs (4). Poor dietary choices during pregnancy example high consumption of sugars and processed foods can program the fetus for future non-communicable diseases (NCDs) like obesity, diabetes, and cardiovascular conditions (6). As we dig deeper into this topic it is essential to understand how maternal diet influences the development, function and problems of specific organs such as liver, kidney, bones and other, leading to later affecting the long term health of the offspring.

Research has shown that maternal diet has profound and long lasting effects on the liver of the offspring (7), Impaired growth during late gestation associated with fetal under-nutrition can have effects on liver growth. Individuals with reduced rates of fetal growth specifically small abdominal circumference at birth, tend to have raised serum concentrations of total cholesterol, low-density lipoprotein (LDL) cholesterol and apolipoprotein B in adult life. Impaired liver development during fetal and infant stages could lead to altered levels of fibrinogen and factor VII, these are hemostatic factors involved in blood clotting (2). This may contribute to an increased risk of cardiovascular disease in later life.

Similarly offspring's adult kidney diseases can be significantly influenced by maternal diet during pregnancy, Research has shown that low glomerular number, which is established during fetal development, can pose a lifelong burden on the kidneys. (8). Studies conducted on rodents suggest that maternal protein intake during pregnancy influences the number of nephrons formed in the offspring. When protein intake is restricted during gestation, the offspring may develop hypertension as they mature (9) supporting the idea that nephron numbers may be programmed during gestation.

Osteoporosis in later life can be impacted by intrauterine and early postnatal stages (10), Human skeleton can be "programmed" by under-nutrition during critical periods of early development, leading to changes in skeletal structure (11). Rickets is an illustration of insufficient nutrition during a crucial period in early life, resulting in permanent alterations in the body's structure.

Cancer incidences have increased explorations beyond the somatic mutation theory, Maternal high-fat diet can increase offspring susceptibility to colorectal cancer by activating intestinal inflammation and altering gut microbiota (12). For breast cancer, maternal diets high in methyl nutrients (lipotropes) have shown to suppress mammary carcinogenesis in female rat offspring by alterations in gene expression (13). Maternal diets high in n-6 polyunsaturated fats may increase breast cancer risk in female offspring by altering mammary gland development, accelerating puberty onset, and increasing circulating estradiol levels (14). Based on findings in (15), Cancer prevention should begin during gestation by improving the quality of the maternal diet.

Obesity susceptibility can be induced by maternal diet during intrauterine development and influence developmental and metabolic disorders later in life. Animal studies (rodent model) have linked maternal under-nutrition or exposure to low-protein diets or glucocorticoids with adverse intrauterine conditions (16), From the same studies it was also noted that Hyperphagia (excessive food intake) is a consequence of programming and plays a key role in the development of metabolic disorders.

Diabetes mellitus type 2 susceptibility in Later life can be increased by poor maternal diet, and poor fetal nutrition leading to impaired development of the endocrine pancreas. (17) Recent research shows that adults who had a low birth weight, thin at birth with a low ponderal index are more likely to be insulin resistant and have a higher risk (18). Also the research shows

mild obesity in mothers can result in glucose intolerance during pregnancy and insulin deficiency in offspring adulthood.

Cardiovascular disease risks are contributed by insufficient maternal diet in key stages of fetal development. Inadequate intake of essential nutrients such as folate, iron, and omega-3 fatty acids disrupt normal cardiovascular development, (19) leading to structural and functional abnormalities that persist into adulthood. Poor maternal diet can contribute to intrauterine growth restriction (IUGR) where the fetus fails to reach its full growth potential. IUGR is associated with an increased risk of cardiovascular diseases. (20) Researchers suggest that prenatal factors influence vascular development and contribute to the long-term risk of cardiovascular disease. (21,22) While genetic factors play a role in the development of NCDs, emerging evidence (23) suggests that modifications resulting from maternal diet during pregnancy can significantly impact the long-term health of offspring.

From these shared evidences maternal diet plays a crucial role in shaping the health trajectory of the offspring, influencing the development and function of vital organs and the susceptibility to various diseases. Due to maternal diet problems some of these organs might not reach their maximum growth potential, causing them to underperform and put the offspring in higher risk of non-communicable diseases. These effects above show the need for targeted interventions. This study aims to assess the awareness of Antenatal Care Providers on this issue, examine their access to information and the availability of support and to identify factors hindering their awareness. Through identifying gaps in awareness we hope to provide actionable insights and recommendations that can reduce the burden of NCDs to our health systems, families and the future generation.

Problem Statement

In an ideal situation all pregnant women can easily get complete information about the risk of NCDs in offspring during their antenatal care visits. This information includes methods on how to protect, raise and teach their offspring in a proper way that will lead to a generation free from NCDs. Eventually eradicating non communicable diseases and preventing the future generations from this heavy burden. Health centers are well-staffed with trained workers who are aware of the risks of NCDs in offspring and give good care to prevent this risk. This includes helpful advice on maternal diet, communicating and removing barriers that hinder their awareness, updating their level of awareness on NCDs and improving the quality of ANC services.

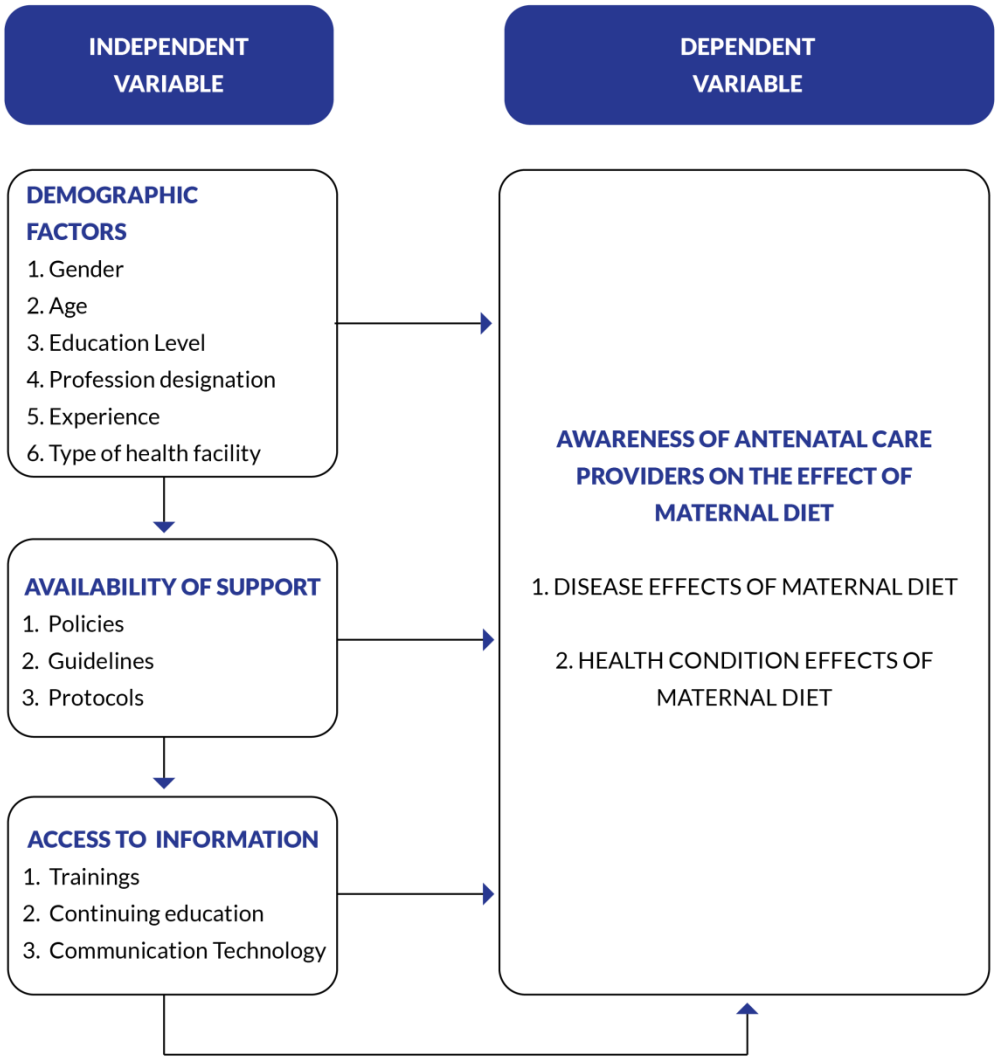
In the real situation Africa exhibits unique epidemiological characteristics that make it more prone to NCDs and an important context to study the effects of maternal factors on NCD risk in offspring. Factors such as high fertility rates, rapid urbanization, changing dietary patterns, and exposure to environmental challenges contribute to the complex interplay between genetic, maternal diet and environmental determinants of NCDs.(24) Africa's maternal malnutrition is estimated to be 23.5%. (27) Malnutrition among pregnant women is a common problem in Sub-Saharan Africa, This study(26) showed that 18% of women were classified as underweight, with 2% being severely underweight. On the other hand, 22% of women were overweight, and 4% were classified as obese.

The current dietary guidelines in Tanzania (27,28)emphasize the importance of consuming a balanced diet rich in essential nutrients, yet many women are not aware of how their dietary practices directly affect their children's health outcomes. This may be due to lack of awareness among ANC providers caused by many reasons. Example the Tanzania Mainland Food-Based Dietary Guideline (29) only explains on the nutritional needs but doesn’t address broader contexts like impacts on long-term health effects, including but not limited to NCDs. The document also does not address the systemic challenges faced by antenatal care providers,

Factors such as lack of awareness, research, training, guidelines, protocols, resources, technology, and collaboration on maternal diet issues and its impacts in Tanzania have led to adverse birth outcomes such as low birth weight, (30) preterm birth, and intrauterine growth restriction. These outcomes are associated with increased risks of neonatal complications and long-term consequences for the child, including cognitive impairment, stunting, and childhood obesity. (30,31) All these put the offspring at a higher NCD risk.

Antenatal care is very important for prevention of maternal diet's effects, both short term effects like underweight and long term effects like NCDs. Awareness level of ANC providers on this matter in Tanzania is not well known because it has never been documented. Their lack of awareness can lead to low adherence on NCDs precautions by pregnant women and result to increase in the burden of NCDs in Tanzania. This gap is a big problem for the health of mothers and babies, This study wants to look into the awareness level of ANC providers in Ilala city, Dar-Es-Salaam region and identify several factors that hinder their awareness.

1.3 Figure 1: CONCEPTUAL FRAMEWORK



Adapted from Nyaboga, J. M., & Muathe, S. M. (2022). (33)

1.4 RATIONALE FOR THE STUDY

The aim of this study was to enhance awareness and offer readers insights into NCD risk factors in offspring and maternal diet effects. It also aimed to contribute to the development of strategies and initiatives that empowered individuals to adopt long-term preventive and management measures against NCD risks in offspring. The study's findings would serve as a basis for future research, expanding upon existing awareness and ongoing studies in the field. This would be beneficial for other researchers as it would help them identify unexplored areas of interest for their investigations.

This information would play a vital role in understanding the current level of awareness among ANC providers on the effects of maternal diet on the risk of non-communicable diseases (NCDs) in offspring and suggesting preventive and control strategies. It is also worth noting that the lead investigator personally values this study as it fulfills partial requirements for his master's degree.

1.5 Research questions.

1.5.1 Main Research Question

What is the level of awareness of antenatal care providers in Ilala, Dar-Es-Salaam on the effects of maternal diet on non-communicable disease risk in offspring and which factors influence this awareness by December 2024?

1.5.2 Specific Research Questions

1. What is the level of awareness of ANC providers in Ilala, Dar-Es-Salaam on the effects of maternal diet on NCD risk in offspring by December 2024?
2. How do ANC providers in Ilala, Dar-Es-Salaam access information on maternal maternal diet’s risk of non-communicable diseases (NCDs) in offspring and what support mechanisms are available to them by December 2024?

3. What are the factors hindering awareness of ANC Providers in Ilala, Dar-Es-Salaam on the Effects of Maternal Diet on Non-Communicable Diseases Risk in Offspring by December 2024?

1.6 THE OBJECTIVES

1.6.1 Main objective

To study the awareness of Antenatal Care Providers in Ilala, Dar-Es-Salaam on the Effects of Maternal Diet on Non-Communicable Diseases Risk in Offspring and identify the factors associated with this awareness by December 2024.

1.6.2 Specific objectives

1. To measure the level of awareness of ANC providers in Ilala, Dar-Es-Salaam about maternal diet's effects on NCDs risk in offspring by December 2024.
2. To examine ANC providers in Iala, Dar-Es-Salaam regarding their access to information concerning maternal diet's effects on NCDs risk in offspring and availability of support resources by December 2024.
3. To identify factors hindering awareness among ANC Providers in Ilala, Dar-Es-Salaam on the effects of Maternal Diet on NCD Risk in Offspring questionnaires by December 2024.

CHAPTER TWO

2.0 LITERATURE REVIEW

Numerous studies have highlighted the role of maternal factors including diet, lifestyle, and environment, in influencing the developing fetus and subsequent NCD risk in offspring. For example, Barker's hypothesis on the Developmental Origins of Health and Disease (DOHAD) (34) suggested that adverse maternal conditions during pregnancy can lead to long-term health consequences in the offspring. This concept was supported by this study (35) demonstrating associations between maternal diet and lifestyle choices, such as high-fat diets, smoking, and exposure to environmental toxins, with increased risk of NCDs in offspring.

Maternal diet's effects may have extended beyond a single generation. The effects of nutrition on fetal growth are complex (36), on cell division and enlargement are also mentioned, This study (37) mentioned that small animals or children who were undernourished during critical periods may grow but do not catch up to their expected growth curves.

2.1 Current level of awareness of ANC providers

Maternal diet during pregnancy has been recognized as a significant factor influencing the risk of non-communicable diseases (NCDs) in offspring (37). Antenatal care (ANC) providers have played a critical role in providing guidance and support to pregnant women in making informed dietary choices (38). This study (39) indicated that ANC providers often lacked awareness about the influence of specific nutrients, such as omega-3 fatty acids, vitamins, and minerals on fetal development and the prevention of NCDs in later life.

In the literature, it has been suggested that ANC providers may not always provide consistent and evidence-based dietary guidance to pregnant women (41). Some studies have highlighted that ANC providers do not focus on the specific needs and risks of individual women (42,43).

This lack of personalized guidance may have resulted from limited awareness of the latest research on maternal diet and NCD risk in offspring.

The review has also revealed challenges that ANC providers encountered in effectively communicating dietary information to pregnant women (44). Language barriers, cultural differences, and limited time during prenatal visits could have hindered the delivery of comprehensive dietary advice (45). The literature highlighted the need to enhance awareness (46). Improving their understanding of specific nutrients and tailoring dietary guidance to individual women's needs could optimize maternal and child health outcomes (47). Efforts to improve communication skills and resources have been considered essential to effectively convey dietary information to pregnant women (48). There has been a critical need to improve the awareness of ANC providers regarding the effects of maternal diet on NCD risk in offspring.

2.2 ANC providers' access to information and availability of support

ANC providers' awareness of the impact of maternal diet on offspring's NCD risk varies across different healthcare settings. Studies have shown that while ANC providers generally acknowledge the importance of maternal nutrition, there are gaps in their awareness regarding how maternal diet influences the risk of diseases such as obesity, diabetes, and cardiovascular conditions in offspring (49). According to a study by (50) ANC providers often focus on immediate pregnancy-related outcomes and may not fully integrate discussions about long-term health implications for offspring during routine prenatal consultations. This suggests a need for interventions to enhance ANC providers' awareness of the broader impacts of maternal diet beyond pregnancy outcomes alone.

2.2.1Access to Information Sources

Access to reliable and up-to-date information on maternal diet and NCD risk is crucial for ANC providers to effectively counsel expectant mothers. Literature shows that ANC providers primarily rely on clinical guidelines, peer-reviewed journals, continuing education programs, computers and mobile phones connected to the internet to stay informed about maternal nutrition (51). It is important to note that disparities in access to these resources exist, particularly in low-resource settings and they may face challenges in accessing online databases or attending professional development workshops.

Continuing education play a crucial role in enhancing ANC providers' awareness of maternal diet and the relationship between maternal nutrition and NCD risk (9). But access to such programs is often limited, leading to variability in awareness among providers. Many ANC providers express a need for ongoing education on maternal nutrition and its long-term impacts on offspring health (52). The quality and comprehensiveness of available information sources can vary, affecting the consistency and accuracy of nutritional advice provided to pregnant women. This study (53) highlighted the importance of tailored educational materials and accessible platforms that cater specifically to ANC providers' informational needs regarding maternal diet and offspring health outcomes. Resource Constraints in institutions is another problem in low and middle income countries, such as lack of access to updated clinical guidelines and nutritional resources, hinder providers’ ability to deliver informed care.

2.2.2 Availability of Support

The availability of support systems for ANC providers varies across healthcare settings and organizational structures. Support may include policies, guidelines, protocols and multidisciplinary team collaborations involving nutritionists, dietitians, and public health professionals to enhance the depth of maternal nutrition counseling provided during prenatal care visits (54). Inter professional collaboration among healthcare professionals is vital in

supporting ANC providers. Interdisciplinary approaches that involve nutritionists and public health experts can bolster the awareness base and provide comprehensive care to expectant mothers (55). But it is worth noting that structured collaborative frameworks are often lacking in many healthcare settings in Tanzania, limiting the effectiveness of this support.

Studies have emphasized the role of institutional policies and professional networks in facilitating ongoing education and mentorship opportunities for ANC providers. For instance, programs integrating nutrition training into ANC provider curricula have shown promising results in improving confidence and awareness regarding maternal diet and NCD prevention strategies (9,56). This study can set up the tone for the modification of teaching curriculums in health universities to provide awareness on the latest discoveries and researches on NCD risk in offspring which are originating from maternal diet. Inspite of NCDs being the leading cause of premature death globally, medical curriculums in Tanzania have not made enough adjustment targeting long term control. The World Health Organization (WHO) and other health bodies have recommended integrating nutrition education into ANC practices, yet implementation varies widely across regions (57). Establishment of clear guidelines and policies regarding maternal diet is essential, National and local health policies that prioritize maternal dietary education can serve as a foundational support system for ANC providers.

2.3. Factors associated with ANC provider's awareness

In the literature review, maternal diet during pregnancy played a crucial role in shaping the health outcomes of offspring, particularly regarding non-communicable diseases (NCDs) (58). Studies suggested that while ANC providers generally acknowledge the importance of maternal nutrition, their understanding of the specific nutrients and dietary components impacting long-term health outcomes remains limited (51). Some providers lack awareness of the significance of micronutrients, such as folate, iron, and omega-3 fatty acids, in mitigating

NCD risk (60). This lack of specific awareness potentially hinders their ability to provide tailored dietary advice to pregnant women.

Studies highlighted that providers often focused on general recommendations, such as promoting a balanced diet and avoiding excessive weight gain, without delving into the specific dietary factors that can impact NCD risk (61). This standardized approach may overlook the importance of individualized dietary counseling, taking into account factors such as preexisting health conditions, cultural preferences, and socioeconomic disparities.

Some ANC providers expressed limited confidence in their ability to effectively communicate dietary information to pregnant women, due to barriers such as language differences, low health literacy, and time constraints during prenatal visits (62). This may have resulted in missed opportunities to provide comprehensive and tailored dietary guidance to pregnant women, impacting their ability to make informed choices for NCD prevention in their offspring.

Globally and in Tanzania, there have been gaps in the awareness and practice regarding the effects of maternal diet on NCD risk in offspring (63). Ensuring evidence-based and individualized dietary counseling and addressing barriers to effective communication are essential (47). Regional variations should be considered when designing interventions and educational programs to meet the specific needs of ANC providers.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 2 Study design

A health-facility-based cross-sectional design with a quantitative approach was employed.

3. 2 Study area

The research was conducted in Ilala City, one of the five districts in the Dar es Salaam Region of Tanzania. Ilala is the most urbanized area in the country, characterized by numerous offices, shops and markets. The urban environment contributes to a higher risk of sedentary lifestyles among its residents due to the availability of modern conveniences and limited opportunities for physical activity. Ilala City is also notable for its prevalence of food outlets selling junk food contributing to unhealthy dietary habits, This urban lifestyle possessed a higher risk to a rising population of obese and overweight individuals. According to the Tanzania National Nutrition Survey 2018, Dar-Es-Salaam had 20.6% prevalence of obesity which was the highest level of obesity in Tanzania mainland. Tanzania has a high burden of Non-communicable diseases making up 34% of deaths (2019) according to WHO Africa, Country disease outlook report released in August 2023 cardiovascular diseases, diabetes, cancer, and respiratory diseases being the most prevalent. The rise in NCDs was closely linked to lifestyle changes, including poor dietary habits, physical inactivity, and increased consumption of tobacco and alcohol.

3.3 Target population

The target population was ANC providers, including obstetricians, gynecologists, midwives, and nurses involved in providing prenatal care to pregnant women.

3.4 Study population

ANC providers on duty at specific date and time of data collection working in the particular health center on data collection found in Ilala, Dar-es-salaam were identified as potential

participants for this study. Participant identification involved collaborating with administrators of selected health facilities.

3.5 Sample Size

The Fischer's/Lesley formula was used in calculating the sample size;

$$N = (z^2\, p(100-p))/\varepsilon^2$$

We used the study of 2008 which found a proportion (p) which is 32.43% ((64))

z = standard normal deviate=1.96 for 95% confidence level

ε = margin of error (precision) (5% or 0.05) and non-response rate of 10%

n = number of samples

p = expected proportion with characteristic of interest was 31.8%. (The characteristic of interest was the awareness level of ANC providers on the effects of maternal diet on the risk on non-communicable diseases (NCDs) in offspring with an expected proportion of 31.8)

n = (1.96〗^2×32.43(100-32.43))/5^2, n=337

Nonresponse rate of 10% = Sample size after adjusting for non-response of 10% =1/R

R=0.9, =1/0.9 = 1.11 n= 337 x 1.11= 374

A sample size was 380 participants

3.6 Sampling procedures

This study employed systematic sampling and random sampling. The principal researcher gathered a list of health facilities providing ANC service in Ilala, Dar-es-salaam that provided antenatal care services from the District Medical officer's office. Using systematic sampling method. In a pool of 172 facilities we selected at regular intervals which was every odd numbered selection (1,3,5,7,..) which we ended up obtaining a total of 82 health facilities. Followed by random sampling, Names of all 82 health facilities were written in pieces of papers and placed in a basket for random selection of 41 health facilities which we contacted

them to obtained permission and support from the head of each facility for recruiting participants. All ANC providers meeting the inclusion criteria were invited to participate in the study. 6 private owned health centers through their administration rejected participation. On top of that we fell short of the intended 8-10 participants per center, averaging 9 but some centers had fewer participants due to rotations, sick or not giving consent. To compensate we re-conducted randomization and added 18 health centers, replacing the 6 that rejected and 12 were added enable the number of participants reach the sample size.

3.6.1 Inclusion Criteria

The study included ANC providers who had been practicing for at least one year, were willing to participate, and were working in the selected health facilities in Ilala, Dar-Es-Salaam at the particular date and time of the study.

3.6.2 Exclusion Criteria

ANC providers who were unwilling to participate in the study, or on leave, retired, or not working for any reason were excluded.

3.7 Variables and measurement

3.7.1 Dependent variable

The dependent variable was awareness level of ANC providers on the effects of maternal diet in Ilala. The effects are categorized into two distinct aspects: health conditions and disease effects.

The overall level of awareness was calculated first by determining the average awareness percentages from two sections of the questionnaire. Section B which focused on offspring's diseases which gave an average awareness of 30.67% while section C which was addressing health outcomes reported a higher average which was 64.87%. These two averages were then combined to calculate the overall figure which then reflected the general awareness.

3.7.2 Independent variables

Demographic characteristics (gender, age, experience, education level, professional designation and type of health facility) access to information and availability of support were measured by asking participants to respond to multiple-choice questions or true and false questions

3.8 Data Collection Method

Data was collected through a self-administered structured questionnaire administered to the ANC providers. Respondents filled out and returned it to the researcher/research assistant.

3.9 Tool/Instruments

Structured questionnaires with closed-ended questions adapted from maternal diet effects studies were used, consisting of 22 questions translated into both English and Swahili

3.10 Training

One research assistant was recruited and trained in data collection using the research instruments.

3.11 Pilot study

The pretest was conducted with a group of ten respondents from Muhimbili National Hospitals to check for faults in the wording of questions, overall date collection instrument clarity and flow of the date collection process. Through analyzing the respondents understanding and responses it helped a lot to go back and redesign the questions to ensure that they effectively address the objectives and align with the study design. The feedback from this pilot study was important in refining the tool and increase validity and reliability.

3.12 Data Collection Procedure

The data collection process occurred during working days and hours. Data collection took place where ANC providers were practicing, using a list from the district medical officer as a sampling frame.

3.13 Data Management in the Field

The researcher and research assistant checked the filled questionnaire forms daily for accuracy, identified and discussed errors, and labeled the questionnaires to avoid repetition.

3.14 Data analysis

The filled questionnaires were manually entered into the Statistical Package for Social Sciences (SPSS 16) and analyzed and later STATA was used to verify the analysis. SPSS was used for statistical evaluation and STATA for ensuring accuracy by cross checking findings to strengthen the reliability of our findings and also the biggest reason was on presenting tables with clarity. Tables, charts and graphs made by STATA were nice and easier for readers to interpret complex data and identify trends.

Descriptive statistics, binary logistic regression, and multivariate logistic regression were employed to examine the relationship between various factors and the outcome variable. To control confounding, variables with a p-value less than 0.2 in the bivariate analysis were included in a multivariable logistic regression model for further analysis. Crude and adjusted odds ratios, along with their corresponding 95% confidence intervals, were calculated. Variables with a p-value less than 0.05 in the multivariable analysis were considered statistically significant in their association.

To address specific objective 1, Tables 2 & 3 presented the frequencies and percentages of awareness among respondents regarding specific diseases and health conditions related to maternal diet. For specific objective 2, The awareness tables were accompanied by Binary Logistic Regression analyses, which explored the influence of various demographic and

professional variables on the awareness of ANC providers. Multivariate logistic regression was interpreted to conclude each dependent variable.

3.15 Ethical Consideration

Ethical approval with reference number **DA.2821298/01.C/1856** was obtained from the Research and Publication Committee of the Muhimbili University of Health and Allied Science. Permission to conduct the study was obtained from the office of the Regional Commissioner of Dar-Es-Salaam, Mayor of Ilala City Municipal council, Office of the City Medical Officer (CMO) and finally from the Directors of hospitals/health centers from which the ANC providers are employed. Strict adherence to ethical concerns was maintained through the entire process, Informed concern was given to the participants after making sure each participant was aware of the study objectives, their role, how the data will be utilized those willing to proceed gave their verbal consent through spoken communication. Respondents were assured of confidentiality, autonomy was respected with participants given the freedom to join or withdraw from the study at any time without fear of investigators time and effort wasted. The principle of non-maleficence was observed to prevent any harm either personal or professional to the participant. Efforts were made to maximize societal benefit by ensuring that the results findings could help improving maternal healthcare practices. Full transparency was also observed by clearly communicating any potential conflict of interest in this study.

CHAPTER FOUR
RESULTS

Table 1: Demographic characteristics of study participants

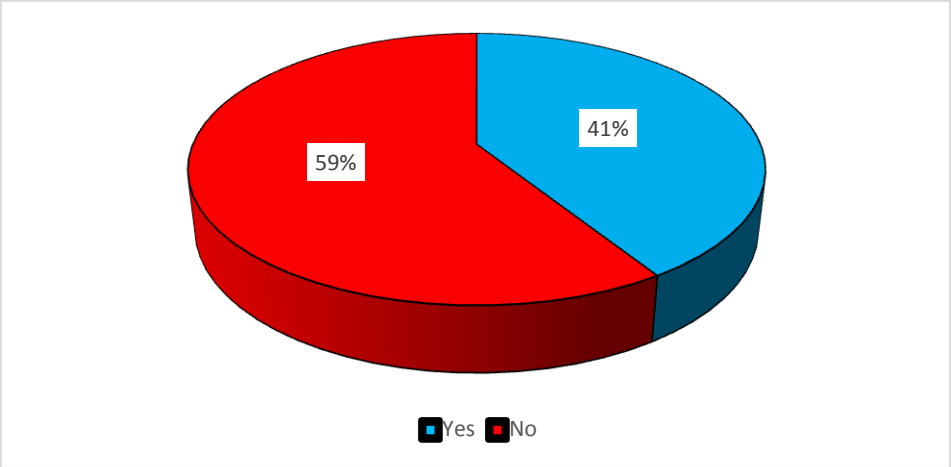
DEMOGRAPHIC VARIABLES		N	%
Gender	Male	111	29.2
	Female	269	70.8
Age	18-24 years	63	16.5
	25-34 years	166	43.7
	35-44 years	82	21.6
	45+ years	69	18.2
Education level	Certificate	22	5.8
	Diploma	234	61.6
	Bachelor's degree	113	29.7
	Graduate degree	11	2.9
Profession Designation	Doctor	55	14.5
	Nurse	200	52.6
	Midwife	82	21.6
	Other	43	11.4
Experience	Less than 2.5 years	71	18.7
	3-5 years	149	39.2
	6-9 years	56	14.7
	More than 10 years	104	27.4
Type of Health Facility	Public	108	28.4
	Private	204	53.7
	Faith-based	43	11.3
	Other	25	6.6

Were more female participants (70.8%) than males (29.2%). Secondly, most participants fell in the age group of 25-34 (43.7%), indicating strong youth involvement. This suggest the results will strongly impact the future.

In education, most participants had a diploma (61.6%), followed by those with a bachelor's degree (29.7%), The remaining part either had diploma (10.%) or postgraduate degree (4.8%). This indicates that majority of ANC providers had a solid education foundation likely enhancing their awareness of NCDs and maternal diet, enabling them to understand basic terms and key concepts related to these topics.

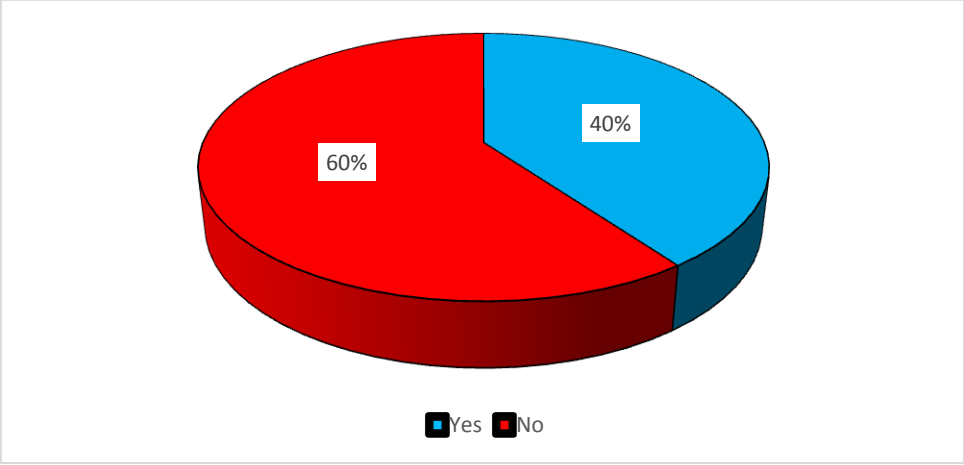
Nurses made up the largest professional group (52.6%), while doctors (14.5%) and midwives (21.6%) also played significant roles. In terms of experience, a good portion had 3-5 years of experience (39.2%), and when it comes to health facilities, more participants were associated with private facilities (53.7%) compared to public (28.4%), faith-based (11.3%), or other types of facilities (6.6%) Understanding these demographic information helps researchers and professionals tailor their approaches and solutions to fit the needs of these specific groups better.

Figure 2: Availability of support



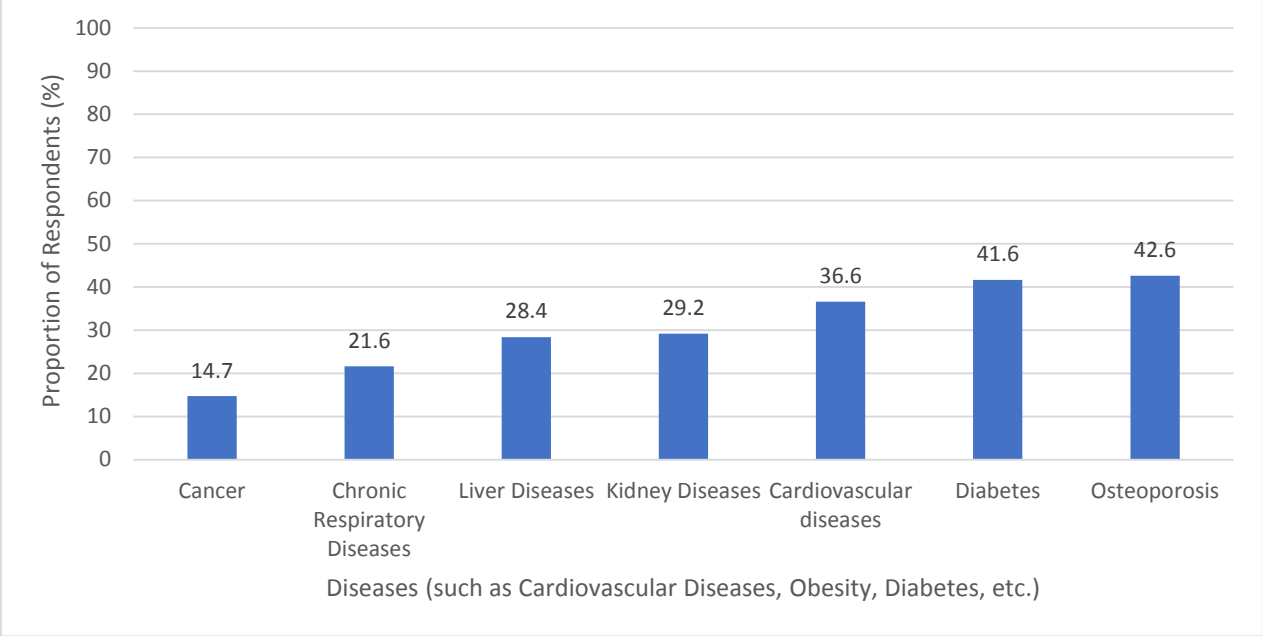
59% of antenatal care providers reported not receiving support from their institutions to be aware of maternal diet's effect on offspring's non-communicable diseases risks.

Figure 3: Access to information



60% of antenatal care providers reported not having access to information especially those necessary for awareness of maternal diet's effect on offspring's non-communicable diseases risks.

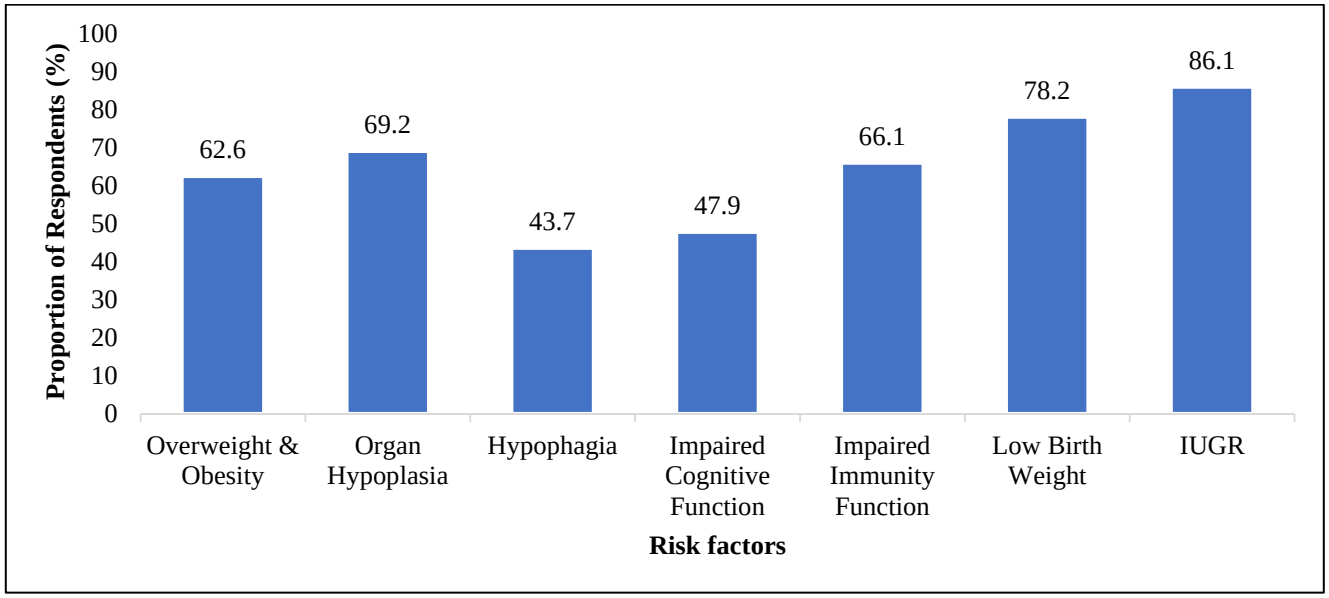
Figure 4: Awareness Respondent on Offspring's Diseases risks Due to Maternal Diet Disease risk



Awareness of Diabetes as one of the risks of maternal diet's effects was 41.6%, while cardiovascular diseases were 36.6%. Osteoporosis (42.6%), chronic respiratory diseases 21.6%, kidney diseases 29.2% and liver diseases 28.4%.

On the other hand, cancer had a lower reported frequency of 14.7%. These findings show the distribution of awareness of ANC providers on specific diseases within the surveyed population, forming a basis for understanding the type of information conveyed to pregnant women.

Figure 5: Awareness Respondent on Offspring's Health Conditions risks Due to Maternal Diet Health Risk



Shifting the focus to awareness of ANC providers on health conditions related to maternal diet, the results are as follows, Overweight and obesity 62.6% of ANC providers were aware, Organ hypoplasia 69.2%, hypophagia 43.7%, impaired cognitive function 47.9% and impaired immunity function 66.1%. The highest reported awareness was IUGR-Intrauterine Growth Restriction with 86.1%. Low birth weight, another critical health concern, was reported highly by 78.2% of ANC providers.

The awareness level of 47.74% addressed the first objective of the research, showing that less tha half of ANC providers are not aware of maternal diet's effects on NCD risk in offspring. This overall level of awareness was calculated by determining the average awareness percentages from two sections of the questionnaire. Section B which focused on offspring's diseases awareness 30.67% and section C addressing health outcomes awareness 64.87%.

Table 2: Bivariate and Multivariate Analysis of Health Condition Awareness

Variable	Category	Health Condition Awareness					
		Bivariate analysis			Multivariate analysis		
		cOR	P Value	95%CI	aOR	P Value	95%CI
Gender	Male	1.22	0.490	0.776-1.915			
	Female (Ref)	1.000					
Age	18-24 years	0.34	0.096	0.090-1.272	0.34	0.096	0.054-0.047
	25-34 years	0.48	0.141	0.159-1.441	0.48	0.141	0.025-0.097
	35-44 years	0.68	0.362	0.301-1.550			
	45+ years (Ref)	1.000					
Education	Graduate	1.79	0.758	0.153-4.120			
	Bachelor	0.99	0.990	0.153-6.403			
	Diploma	1.73	0.542	0.197-5.137			
	Certificate (Ref)	1.000					
Profession	Doctors	1.20	0.822	0.663-1.627			
	Nurses	1.18	0.925	0.531-1.913			
	Midwives	0.90	0.840	0.474-2.762			
	Other (Ref)	1.000					
Experience	< 2.5 years	1.98	0.249	0.547-7.172			
	3-5 years	1.36	0.469	0.489-3.753			
	6-9 years	4.96	0.002	2.274-10.782	1.01	0.318	0.967-1.062
	10+ years (Ref)	1.000					
Type of Health Facility	Public	1.96	0.223	0.653-5.888			
	Faith	1.92	0.211	0.688-5.328			
	Private	2.51	0.128	0.737-8.526	1.00	0.718	0.965-1.044
	Other (Ref)	1.000					
Access to information	Yes	1.11	0.036	0.323-0.965	0.56	0.001*	1.042-1.188
	No (Ref)	1.000					
Availability of Support	Yes	0.60	0.058	0.348-1.020	1.07	0.073	0.997-1.153
	No (Ref)	1.000					

Table 2 shows gaps in health condition awareness among ANC providers. Bivariate analysis shows no significant difference between genders. Experience is important, providers with 6-9 years initially show higher awareness but this diminishes when adjusted. Access to information responded positively in bivariate analysis but negatively in multivariate analysis. Availability of support is significant in both analyses showing the need for supportive systems.

Table 3: Bivariate and Multivariate Analysis of Offspring's Disease Awareness

Variable	Category	Offspring's Disease Awareness					
		Bivariate analysis			Multivariate analysis		
		cOR	P Value	95%CI	aOR	P Value	95%CI
Gender	Male	1.02	0.962	0.441-2.343			
	Female (Ref)	1.000					
Age	18-24 years	1.07	0.934	0.243-4.640			
	25-34 years	0.33	0.079	0.097-1.136	1.02	0.638	0.971-1.073
	35-44 years	1.17	0.780	0.516-2.652			
	45+ years (Ref)	1.000					
Education	Graduate	3.11	0.130	0.853-11.387	0.97	0.233	0.922-1.016
	Bachelor	1.88	0.402	0.458-7.701			
	Diploma	0.76	0.762	0.081-7.153			
	Certificate (Ref)	1.000					
Profession	Doctors	1.80	0.900	1.037-3.274			
	Nurses	1.12	0.765	0.684-3.726			
	Midwives	2.56	0.644	3.675-4.816			
	Other (Ref)	1.000					
Experience	< 2.5 years	0.56	0.399	0.189-1.660			
	3-5 years	0.60	0.365	0.216-1.697			
	6-9 years	0.90	0.866	0.329-2.352			
	10+ years (Ref)	1.000					
Type of Health Facility	Public	1.21	0.734	0.482-3.026			
	Private	2.06	0.178	0.788-5.396	0.98	0.306	0.946-1.021
	Faith	1.13	0.852	0.386-3.275			
	Other (Ref)	1.000					
Access to information	Yes	0.95	0.873	0.472-1.917			
	No (Ref)	1.000					
Availability of Support	Yes	1.14	0.036	0.292-0.977	0.56	0.001	1.063-1.243
	No (Ref)	1.000					

Table 3 examined awareness of offspring`s disease risks among ANC providers, showing gender had no significant impact. Education showed higher odds of being aware but lacked significance. Availability of support was strong predictor of awareness, emphasizing the importance of institution support.

CHAPTER FIVE

DISCUSSION

Unlike most research which addresses only immediate effects like underweight, this study goes beyond that to show its novelty by examining both immediate and long-term risks like NCDs. Findings reveals a gap in awareness among ANC providers by showing low awareness level of 30.67% across long term NCDs risk and 64.83% on immediate health risks. This clear difference shows low awareness on long-term implications of maternal nutrition was also documented by (65,66). Awareness level is highest for low birth weight 78.2% yet critically low for cancer 14.7% Low cancer risk awareness level linked to maternal diet is particularly concerning, given the increasing global burden of cancer (67–69) and the emerging evidence linking prenatal nutrition to cancer susceptibility in offspring (70). This gap shows the need for awareness on long-term outcomes. Integrating it into ANC training can foster a more holistic approach to prenatal care and potentially reducing the future burden of NCDs.

Findings resemble several previous studies of maternal diet, 60% of ANC providers lacking sufficient access to information was similar to findings from Rwanda (71). 59% of ANC providers reported not receiving adequate support. Showing a gap in the availability of institutional support systems for ANC providers same to findings from Ethiopia (72). Providers with greater access to such resources are better equipped to educate expectant mothers about the critical role of dietary choices during pregnancy in mitigating long-term NCD risks for their children (73). These findings shows a critical need for stakeholders and policymakers to prioritize the development and implementation of supportive policies, protocols and guidelines. Empowering delivery of more effective maternal diet counseling.

Findings contradicts our cultural belief that certain demographics (i.e older women) may be more aware of maternal diet issues (55–57) gender and age were not significant. Education level was considered determinant of health literacy in several literatures (58,59), findings

show a standardized level of awareness, suggesting interventions on maternal diet should know no educational boundaries. The professional role was not significant but showed inconsistency. Doctors exhibited higher awareness, suggesting gaps in the curriculums.
Experience of providers having 6-9 years of experience showed higher, The reduced significance for older ones could be due to challenges in new awareness acquisition, unfamiliarity with technology or over reliance on experience. The study agree with literatures that length of service alone does not enhance awareness but the quality of experience and regular training (60,61). Private facility providers showed a higher awareness though not statistically significant and was also seen in (62). Access to information was not significant for the diseases but was significant for health conditions awareness, Those with access to information demonstrated higher levels of awareness in this study and in (63) while support systems were significant predictor of any awareness, emphasizing collaborative environments.

Not all ANC providers were willing to participate in the study and those who didn't participate may have distinct characteristics compared to the responders. The sample size in this study included the non-respondent as the mitigation for this limitation. The findings of this study have broad applications in clinical practice, academia, health policy, public health initiatives, research, and interdisciplinary collaboration. ANC providers should improve their counseling practices, while academic institutions need to update teaching curriculums to reduce the NCD burden by stating mothers' roles in dietary behaviors of their children. More research is needed on the link between maternal diet and NCD risk in offspring. Policymakers can use these insights to upgrade available guidelines to prioritize NCD risks for mothers and children. Public health campaigns can raise awareness and collaboration among nutritionists, dietitians, scientists, and healthcare providers which is something very important if we want to deliver a comprehensive health information and ensuring a holistic approach to ANC services.

CHAPTER SIX

CONCLUSION

This study has assessed the awareness of antenatal care providers regarding the effects of maternal diet on the risk of NCDs in offspring. Findings showed an overall awareness level of 47.74%, with specific diseases risk varying differently, diabetes risk in offspring awareness was 41.6% while for cancer was only 14.7%. Despite being dominated by female 70.8% and diploma education 61.6% participant pool, the awareness level on diseases risk in offspring did not half of the population, indicating a need for improved training and applications of awareness related to maternal diet. While also identifying factors that influence this awareness.

Examination of antenatal care providers' access to information showed gaps with 60% of them reporting insufficient access to necessary resources and 59% lacking support. This limitations reduced their ability to educate patients effectively on maternal diet and its risks especially NCDs in offspring. The findings has shown the urgent need of supplying and improving educational resources, internet and other communication channels to keep providers well informed on the latest researches and updates that will keep ANC providers informed of current best practices in maternal diet and NCDs prevention.

The study also identified that demographic factors had minimum impact on awareness levels, the availability of support systems was a significant predictor of awareness this emphasizes the importance of creating a supportive environment for health care providers. Improving ANC providers awareness requires addressing systemic factors such as improving access to information and providing enough support to their working environment, this includes trainings on awareness of maternal diet and its risks to better equip them for educating expectant mothers.

RECOMMENDATIONS

1. Tailored educational programs for healthcare professionals are recommended to be developed and implemented after recognizing the variation in awareness, with doctors showing higher awareness than the rest including nurses who made up the largest population in this study and so higher odds to bring more impact if they are empowered.
2. Since ANC providers reported to be lacking access to information and support, Improving access to information and the existing channels for disseminating health information by leveraging technology, providing internet services and strengthening community networks. Online platforms, mobile applications, and community health workers can reach wider audience. The burden of protecting mothers and offspring should not be carried by ANC providers alone, Cross-sector collaboration between healthcare institutions, educational bodies, media platforms, religious institutions and other community organizations is needed. Joint efforts in curriculum development, dissemination of research reports, and resource-sharing will improve ANC services.
3. ANC providers should be aware of cultural maternal diets, forsaking those emphasizing overweight and obesity in women post-conception. Obese women have risks and behaviors that can be later passed to their children, tailored ANC for those who inherited NCDs, those who acquired NCDs and those at higher risk due to their diet, lifestyle (example alcoholism, smoking and physical inactivity) and environment (example water pollutants like mercury for those living near mining areas, workplace hazards like toxic chemicals and heavy metals like lead) should be counselled on how to protect their offsprings.
4. Promoting supportive working environments is recommended in healthcare settings, educational institutions, and community spaces. Mentorship programs, peer support, and collaborative learning initiatives are encouraged to create a culture of awareness exchange.

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APPENDICES

APPENDIX I: CONSENT FORMS

CONSENT FORM: ENGLISH VERSION

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

DIRECTORATE OF RESEARCH & PUBLICATIONS

ID-NO: ……. /……/…….

Consent to participate in this study

Greetings, my name is Deogratius Joachim, I am a student pursuing a Master of Public Health from Muhimbili University of Health and Allied Sciences, Dar es Salaam. At the moment, we are carrying out a study on the antenatal care providers' awareness of maternal diet's effect on offspring's non-communicable disease risk in Ilala.

Purpose of the study

This study aims to investigate the awareness levels of antenatal care providers regarding the impact of maternal diet on the risk of noncommunicable diseases in offspring. By examining this topic, this study aims to contribute valuable insights into public health and enhance preventive measures. Although there may be no direct personal benefits to the participants, their participation will significantly contribute to the well-being of Tanzanian children and women. We sincerely appreciate your willingness to participate by responding to the study's questions.

What participation involves

If you agree to participate in this study, the following will occur

1. You will sit with the trained interviewer and you will be required to answer questions that have been prepared for the study through a structured questionnaire to obtain the intended information to inform policymakers on how to improve awareness among antenatal care providers regarding the effects of maternal diet in offspring and associated risk factors.
2. No identification of information such as names will be collected from participants during this interview.
3. You will be interviewed only once for approximately 30 minutes in a private setting

Confidentiality

I assure you that all the information collected from you will be kept confidential. Only people working in this research study will have the success of the information. We will ensure that any information included in your report does not identify you as a respondent as we will not put your name or other identifying information on the records of the information you provide.

Risks

You will be asked questions about your awareness of the effects of maternal diet on the risks of NCDs in offspring. Some questions could potentially make you feel uncomfortable. You may refuse to answer any particular question and stop the interview at any time. We do not expect any harm to happen to you because you participated in this study

Rights to withdraw and alternatives

Your participation in this study is completely voluntary. If you choose not to participate in the study or if you decide to stop participating in the study you will not get any harm. You can stop participating in this study at any time, even if you have already given your consent.

Refusal to participate or withdraw from the study will not involve penalty or loss of any benefit to which you are otherwise entitled.

Benefits

The information you provide is extremely important and valuable. It will help ANC providers, policymakers, researchers, and other stakeholders at every level to improve awareness, and practice. There is no direct benefit, but; individual benefit will be obtained through intervention programs, which can be conducted in this particular area.

In case of injury

We are not anticipating that any harm will occur as a result of your participation in this Study.

Compensation

There will be no compensation for time spent during the interview but your participation is highly appreciated.

Who to contact

If you have any questions about this study, please do not hesitate to contact:

1. DEOGRATIUS JOACHIM principal investigator (+255)753950807, deojoe67@gmail.com
2. Dr. Isaac Maro and Dr Mariam Amour, supervisors of this study, MUHAS, P.O. BOX 650001, Dar es Salaam
3. Prof. Bruno Sunguya, Chairperson of Research and Publications of MUHAS, P.O. BOX 65001, Dar es Salaam, Tanzania, Email drp.muhas.ac.tz

Participant: I have read the consent form and I have understood the content of the study and how it will be done. I agree to participate in this study.

Participant agrees ( )

Participant disagrees ( )

Signature of participant _____

Signature of research assistant _____

Date of signed consent _____

CONSENT FORM: SWAHILI VERSION
CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI MUHIMBILI

KURUGENZI YA UTAFITI NA MACHAPISHO

Namba ya Utambulisho……/……/…….

Ridhaa ya kushiriki katika utafiti huu

Habari, Jina langu naitwa Deogratius Joachim, mimi ni mwanafunzi wa shahada ya uzamili ya afya ya jamii katika chuo kikuu cha Afya na Sayansi shirikishi Muhimbili, Dar es salaam. Ninafanya utafiti huu kuchunguza kiwango cha uelewa wa watoa huduma katika kliniki za uzazi ikiwa wanafahamu athari za lishe ya mama zinavyochangia kuongeza hatari ya magonjwa yasiyoambukiza kwa watoto watakaozaliwa.

Lengo la utafiti

Kwa kuchunguza mada hii utafiti huu unalenga kuchapisha kiwango cha ufahamu wa watoa huduma katika kliniki za uzazi juu ya atahari za lishe ya mama kupelekea madhara kwa watoto watakaozaliwa. Kiwango cha ufahamu ni muhimu ili kulinda afya ya umma na kuimarisha hatua za kuzuia magonjwa yasiyoambukiza kwa vizazi vijavyo. Ingawa hakuna faida za moja kwa moja kwa washiriki lakini ni wazi kuwa ushiriki wao utachangia sana maboresho kwa watumishi wa kada husika ambayo yanalenga kusaidia ustawi wa watoto na wanawake wa kitanzania na dunia. Tunashukuru sana kwa nia yako njema ya kushiriki kwa kujibu maswali ya utafiti wetu.

Ushiriki unahusisha nini?

Ukikubali kushiriki katika utafiti huu kwa pamoja tutasimamaia na kutekeleza yafuatayo:

1. Utapewa karatasi ya maswali na mtafiti/mwandishi wa mahojiano aliyepewa mafunzo na utahitajika kujibu maswali yaliyotayarishwa kwa utafiti kupitia taratibu maswali na kuyajibu kwa umakini. Lengo ni kupata taarifa sahihi na ile inayokusudiwa ni ambayo itasaidia kuboresha uelewa kati ya watoa huduma wa kliniki za uzazi kuhusu athari za lishe ya mama kwa watoto na hatari zinazohusisha magonnjwa yasiyoambukiza kwa watoto watakaozaliwa.
2. Hakuna taarifa zozote za utambulisho wako zitakazokusanywa wakati wa usahili isipokuwa umri na kiwango chako cha elimu.
3. Utahojiwa mara mojatu kwa takribani dakika 30 kwenye sehemu ya faragha

Usiri

Napenda kuchukua nafasi hii kukuhakikishia kwamba taarifa zote zitakazo kusanywa kutoka kwako zitakuwa ni siri na watu wanaofanya kazi katika utafiti huu tu ndio pekee wanaweza kuziona taarifa hizi. Aidha ninakuhakikishia ya kwamba taarifa zitakazojumuishwa kwenye ripoti yetu hazitobeba utambulisho wako wa aina yoyote.

Madhara

Utafiti huu hauna madhara yeyote yanayotegemewa kutokana na kushiriki kwako katika utafiti huu. Ikiwa kuna kipengele au swali litakufanya usijisikie vizuri tafadhali unaweza kukataa kujibu, pia unaweza kusimamasha usaili wakati wowote utakapoona ni vyema kwako kufanya hivyo.

Haki yakujitoa na mbadala wowote

Ushiriki wako katika utafiti huu ni wa hiari. Kama utachagua kutoshiriki au utaamua kusimamisha ushiriki wako hautapata madhara yeyote. Unaweza kusimamisha ushiriki katika muda wowote utakapoona ni vyema kufanya hivyo hata kama ulisharidhia kushiriki. Kukataa kushiriki au kujitoa katika utafiti hakukufanyi upoteze haki au stahili yeyote unayotakiwa kupata.

Faida

Taarifa utakayotupatia muda mfupi ujao ni ya muhimu sana na yenye thamani kubwa kwani itasaidia kuwafahamisha wadau mbalimbali kuhusu kiwango cha ufahamu na sababu zinazopelekea watoa huduma wa kliniki za uzazi kutokufahamu athari za lishe ya mama kwa watoto na hatari zinazohusisha magonnjwa yasiyoambukiza kwa watoto watakaozaliwa.

Endapo utaumia: Hatutegemei madhara yeyote kutokea kwa kushiriki kwako katika utafiti huu.

Fidia ya muda: Hakutakuwa na fidia ya muda uliotumika wakati wa kufanya mahojiano au majadiliano katika utafiti lakini ushiriki wako katika utafiti huu ni wa muhimu sana, utashukuriwa na kutathiminiwa.

Kama una maswali katika utafiti huu usisite kuwasiliana

DEOGRATIUS JOACHIM kwa barua pepe deojoe67@gmail.com au simu namba (+255) 753950807 au unaweza wasiliana na Dr. Isaac Maro na Dr. Maryam Amour, wasimamizi wa utafiti huu, MUHAS, P.O.Box 650001, Dar es Salaam

Ikiwa una maswali yoyote kuhusu haki yako kama mashiriki, unaweza kuwasiliana na Prof. Bruno Sunguya, mwenyekiti wa Utafiti na Uchapishaji wa MUHAS, P.O.Box 65001, Dar es Salaam, Tanzania, barua pepe drp.muhas.ac.tz.

Unakubali kushiriki na kujibu maswali yatafiti hii

Mshiriki: Nimesoma/kusomewa form ya ridhaa na nimeelewa maudhui ya utafiti na jinsi utavyofanyika. Ninakubali kushiriki katika utafiti huu.

Mshiriki amekubali ( )

Mshirika amekataa ( )

Na kubali kushiriki katiaka utafiti huu.

Sahihi ya Mshiriki _____

Sahihi ya mtafiti msaidizi _____

APPENDIX II: QUESTIONNAIRE GUIDELINES

QUESTIONNAIRE GUIDELINES: ENGLISH VERSION

QUESTIONNAIRE: ENGLISH VERSION

INSTRUCTIONS:

I. Section A, D, and E: Circle the correct answer for each question.
II. Section B and C: Put a tick (√) on either 'Yes,' 'No,' or 'N/A' based on your response

SECTION A

1. What is your gender? a) Male b) Female
2. What is your age group? a) 18-24 years b) 25-34 years c) 35-44 years d) 45 years and above
3. Your highest education level? a) Certificate b) Diploma c) Bachelor degree d) Graduate degrees
4. What is your professional designation? a) Doctor b) Nurse c) Midwife d) Other
5. Years of experience? a) Less than 2.5 years b) 3-5 years c) 6-9 years d) More than 10 years
6. Type of healthcare facility? a) Public hospital b) Private hospital c) Faith-based e) Other

SECTION B: Which offspring's diseases are effects of maternal diet?

DISEASES	**YES**	**NO**	**N/A**
1. MALARIA			
2. DIABETES MELLITUS			
3. CARDIOVASCULAR DISEASES			
4. OSTEOPOROSIS			
5. CANCER			
6. CHRONIC RESPIRATORY DISEASES			
7. KIDNEY DISEASES			
8. LIVER DISEASES			

SECTION C: Which health conditions are effects of maternal diet?

HEALTH OUTCOMES	**YES**	**NO**	**N/A**
1. A child becomes overweight or obese			
2. During pregnancy, a baby's organs do not develop properly			
3. A child uncontrollably eats too much			
4. A child experiences difficulty in thinking, learning, and problem-solving			
5. A child has a weaker ability to fight off infections			
6. A baby is born weighing less than the normal range			
7. A baby doesn't grow at the expected rate inside the mother's womb			

SECTION D: Do you have access to updated information, educational resources, or training related to the effects of maternal diet on non-communicable disease risk in offspring? (a) Yes (b) No

SECTION E: Are there policies, guidelines, or protocols in your healthcare facility that provide support/guidance regarding maternal diet effects on the risk of NCDs in offspring? (a) Yes (b) No

MWONGOZO WA MASWALI: TOLEO LA KISWAHILI

MAELEKEZO:

I. Sehemu A, D na E: Zungushia duara herufi ya jibu sahihi kwa kila swali.

II. Sehemu B na C: Weka tiki (√) kwenye 'Ndiyo,' 'Hapana,' au 'Sijui' kulingana na jibu lako.

SEHEMU A

1. Jinsia yako ni ipi? a) Mwanamke b) Mwanaume
2. Kundi lako la umri ni lipi? a) Miaka 18-24 b) Miaka 25-34 c) Miaka 35-44 d) Miaka 45 na zaidi
3. Kiwango chako cha elimu cha juu ni kipi? a) Cheti b) Diploma c) Shahada ya Kwanza d)Shahada za Juu
4. Taaluma yako ni ipi? a) Daktari b) Muuguzi c) Mkunga d) Mwingine
5. Una uzoefu wa muda gani? (a)Chini ya miaka 2.5 b) Miaka 3-5 c) Miaka 6-9 d) Zaidi ya miaka 10
6. Unatoa huduma wapi? a) Hospitali ya umma b) Hospitali binafsi c) taasisi ya kidini e) Nyingine

SEHEMU B: Ni magonjwa yapi mtoto anakuwa hatarini kuyapata kutokana na lishe duni kwa mama wakati wa ujamzito?

MAGONJWA	**NDIO**	**HAPANA**	**SIJUI**
1. MALARIA			
2. KISUKARI			
3. MAGONJWA YA MOYO			
4. UDHAIFU WA MIFUPA			
5. SARATANI			
6. MAGONJWA YA FIGO			
7. MAGONJWA YA INI			
8. MAGONJWA YA MFUMO WA HEWA			

SEHEMU C: Hali ipi ya mtoto ni matokeo ya lishe duni kwa mama wakati wa ujauzito?

MATOKEO YA KIAFYA	**NDIYO**	**HAPANA**	**SIJUI**
1. Udumavu wa viungo wakati wa ukuaji wa kijusi			
2. Mtoto kuwa mlaji kupita kiasi			
3. Uwezo mdogo wa kiakili kwa mtoto			
4. Mfumo dhaifu wa kingamwili kwa mtoto			
5. Mtoto kuzaliwa na uzito mdogo kuliko kawaida			
6. Mtoto kuwa hatarini kuzidi uzito au unene maishani			
7. Mtoto kupungua kasi ya ukuaji ndani ya kizazi			

SEHEMU D: Je unapata rasilimali za kielimu au mafunzo yanayohusiana na athari za lishe ya mama kwa mtoto? (a) Ndiyo (b) Hapana

SEHEMU E: Je kituo kina mwongozo unaoelekeza njia za kumlinda mtoto dhidi ya magonjwa yasiyoambukiza yatokanayo na lishe ya mama wakati wa ujauzito? (a) Ndiyo (b) Hapana

ETHICAL CLEARANCE

UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

OFFICE OF THE DIRECTOR – RESEARCH, PUBLICATIONS AND INNOVATION

Ref. No.DA.282/298/01.C/1856 Date: 13/08/2023

MUHAS-REC-08-2023-1856
DEOGRATIUS JOACHIM
SHOOL OF PUBLIC HEALTH AND SOCIAL SCIENCES
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: AWARENESS OF ANTENATAL CARE PROVIDERS ON THE EFFECTS OF MATERNAL DIET ON NON-COMMUNICABLE DISEASES RISK IN OFFSPRING IN ILALA, DAR-ES-ALAAM.

Reference is made to the above heading,
I am pleased to inform you that the Chairman has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.

APPROVAL DATE: 13/08/2023
EXPIRATION DATE OF APPROVAL: 13/08/2024

STUDY DESCRIPTION:
Purpose:
The purpose of this quantitative cross sectional study is to assess the awareness of Antenatal care providers on the epigenetic effects of maternal diet on Non-communicable diseases (NCDs) risk in offsprings in Ilala, Daresalaam.

The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided:
https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%2014380.pdf and in the MUHAS archives.

The PI is required to:

1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration if the study is not completed at the end of this ethical approval. You may not continue with any research activity beyond the expiration date without the approval of the IRB. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.
4. Obtain IRB amendment (s) approval for any changes to any aspect of this study before they can be implemented.
5. Data security is ultimately the responsibility of the investigator.
6. Apply for and obtain data transfer agreement (DTA) from NIMR if data will be transferred to a foreign country.
7. Apply for and obtain material transfer agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country,
8. Any researcher, who contravenes or fail to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III section 10 (2)
9. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
10. PI is required to be versed with necessary laws and regulatory policies that govern research in Tanzania. Some guidance is available on our website https://drp.muhas.ac.tz/.

Dr. Nahya Salim Masoud,
Chairperson, MUHAS Research and Ethics Committee



INTRODUCTION LETTER

UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR – POSTGRADUATE STUDIES

In reply quote:
Ref. No. HD/MUH/T.800/2022 15th December, 2023

Regional Administrative Secretary,
P.O. Box 5429,
DAR ES SALAAM.

Re: INTRODUCTION LETTER

We would like to inform you that the bearer of this letter is Deogratius Joachim with Reg. No. HD/MUH/T.800/2022 is a student at Muhimbili University of Health and Allied Sciences (MUHAS) pursuing Master of Public Health.

As part of his studies, he will be doing an elective research titled: "AWARENESS OF ANTENATAL CARE PROVIDERS ON THE EFFECTS OF MATERNAL DIET ON NON-COMMUNICABLE DISEASES RISK IN OFF-SPRING IN ILALA, DAR ES SALAAM."

The research has been approved by the Chairman of University Senate.

Kindly provide him the necessary assistance to facilitate the conduct of his research.

We thank you for your cooperation.

Ms. Victoria Mwanilwa
For: DIRECTOR, POSTGRADUATE STUDIES
c.c Deogratius Joachim

9 United Nations Road; Upanga West; P.O. Box 65001, Dar Es Salaam: Tel. G/Line: +255-22-2150302/6; Ext. 1015; Direct Line: +255-22-2151378; Telefax: +255-22-2150465; E-mail: dpgs@muhas.ac.tz; Web: https://www.muhas.ac.tz

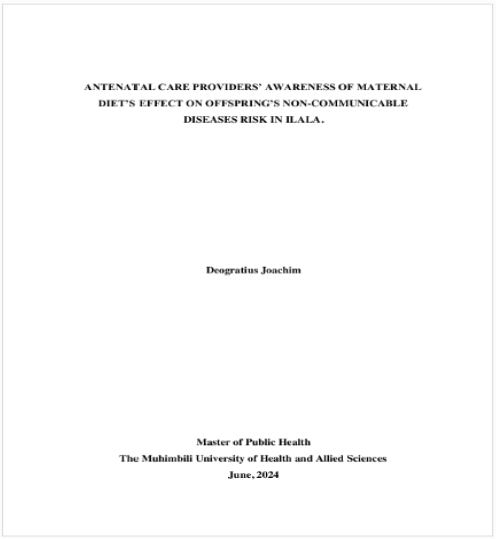
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ANTENATAL CARE PROVIDERS' AWARENESS OF MATERNAL DIET'S EFFECT ON OFFSPRING'S NON-COMMUNICABLE DISEASES RISK IN ILALA.

Deogratius Joachim

Master of Public Health
The Muhimbili University of Health and Allied Sciences
June, 2024

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