Socio-Cultural and Economic Factors Affecting the Dietary Pattern of Pregnant Women in Ona-Ara Local Government, Oyo State

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Certification

This is to certify that **Abimbola Ajoke, AGBOOLA** with matriculation number LCU/PG/002273 carried out this research work titled "Socio Cultural and Economic Factors Affecting the Dietary Pattern of Pregnant Women in Ona-Ara Local Government, Oyo State "in the Department of Public Health, Faculty of Public health, Lead City University, Ibadan for the award of Master's Degree in Public Health (MPH) and this has not been previously submitted.

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Dedication

This work is dedicated to this work to God.

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Abstract

Maternal nutrition during pregnancy is crucial to both mother and child's health and well-being. Inadequate nutrition during pregnancy can lead to a range of negative health consequences, including low birth weight, preterm birth, and developmental delays. This study aimed to assess socio- cultural and economic factors affecting dietary pattern of pregnant women in Ona Ara Local Government Area of Oyo State. A facility-based cross-sectional study was used with a sample size of 341 pregnant women. An adopted questionnaire was used to collect data and the data was analyzed using Statistical Package for Social Sciences (SPSS) and statistical significance was set at p <0.05. 51.6% pregnant women do not adhere to these taboos and beliefs, 32.3% were classified as having a prudent dietary pattern. 34% were classified as having a mixed dietary pattern. 33.7% were classified as having a western dietary pattern. Marital status, ethnicity and number of meals per day were factors influencing dietary pattern among the respondents.

Keywords: 250
Word Count: Nutrition, Dietary Pattern

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Chapter One

Introduction

1.1 Background to the Study

Pregnancy is a vital and fragile condition in which the nutritional status of the mother has the greatest impact on the health of both mother and child [1]. During pregnancy, the need for nutrients, particularly micronutrients, increases relative to other life stages, resulting in higher nutritional needs [2]. Insufficient maternal nutrition during pregnancy is associated with negative immediate and long-term health effects for both mother and infant [3]. Literature acknowledges that environmental factors like dietary habits during pregnancy may contribute to the development of particular diseases in offspring, as well as the emergence of metabolic alterations (overweight or obesity) in pregnant women, particularly in early pregnancy, which increases the likelihood of obesity in their offspring [4].

Globally, there is a growing interest in evaluating the nutrition status of mothers, which is a significant issue [5]. This may be due to the known fact that pregnancy has been linked to an increase in the physiologic, metabolic, and nutritional demands imposed on a woman by her growing child [6]. About 13%, 54%, and 50% more energy, protein, vitamins, and minerals are required by the organism during pregnancy respectively[7]. Therefore, pregnancy is a crucial time for meeting these macro- and micronutrient requirements. In order to enhance physical and mental development, the developing fetus requires a substantial amount of energy and nutrients from the mother. As a result, a healthy dietary lifestyle is essential [8]. A healthy diet during

pregnancy helps avoid problems related to pregnancy, assists recovery from childbirth, sustains breastfeeding effectively, and prevents the development of adult diseases [9]. However, sufficient nutrition can only be sustained during pregnancy by preserving the nutritional status of pregnant women.

Pregnancy is also a crucial period for the development of the fetus, which necessitates an adequate intake of energy and micronutrients, which has been shown to reduce the likelihood of low birth weight in infants [10]. It has been established that low birth weight is associated with mortality among babies, respiratory disorders, and developmental metabolic difficulties in the future [11]. A number of studies utilizing dietary patterns and the nutrient analysis of groups have demonstrated the significance of a healthy diet in pregnancy-related outcomes. According to studies examining the relationship between dietary patterns during pregnancy and pregnancy outcomes, food categories that were high in energy, low in nutrient density, and high in saturated and trans fats were linked to lower birth weight.

Nutrient-dense foods, such as fruits, vegetables, and whole cereals, are associated with positive pregnancy outcomes is a significant outcome of maintaining a positive nutritional status throughout pregnancy [12]. Nevertheless, there are inconsistencies in the associations between pregnancy outcome and dietary habits and nutritional status, as some studies have demonstrated an association between pregnancy outcomes and sociodemographic characteristics[13]. Vitamin deficiencies have been linked to negative pregnancy outcomes regarding fetal growth, skeletal growth and development, and future childhood development [14]. Aside from the studies that predominantly examine the effects of folic acid with iron supplementation and vitamin D on birth outcomes,

there are a few studies that emphasize the significance of B vitamins. A review indicates that thiamin, riboflavin, folate, or vitamin B12 deficiency is associated with elevated homocysteine levels in the blood, which in turn was associated with adverse pregnancy outcomes [14] . The availability of the nutrients listed above during pregnancy will depend directly on the nutritional status of expectant women as determined by an assessment.

Food insecurity and malnutrition are two of the primary causes of maternal and neonatal morbidity, as well as other long-term effects that can affect the growth and development of the fetus, for women living in developing nations such as Nigeria [15]. Both under- and over-nutrition can have a significant impact on the long-term health status and life expectancy of the mother and embryo. Inadequate diet and/or inadequate access to food are believed to play a crucial role in the overall health status of the mother and fetus [16]. Women's nutrition is also not optimal in Nigeria, where a dual risk of malnutrition is evident: the prevalence of thinness (body mass index [BMI] <18.5) among non-pregnant women of reproductive age is 11%, and the prevalence of overweight/obesity (BMI >25.0) is 28%, although this varies by socio-demographics [17].

For the evaluation of nutrient status, numerous techniques have been developed. Conceptually, they fall into two categories: static measurements, which include the determination of nutrient amounts in blood or tissues, and functional measurements, which include a variety of tests to determine the sufficiency of nutritional status to support the functions of subcellular constituents, cells, tissues, organs, biologic systems, or the entire body [26]. Several factors identified in the literature as influencing

the outcomes of the above measurements include social factors such as level of education and age of the mother, cultural factors such as dietary preferences, and economic factors such as the individual and family income of the pregnant woman [26].

Current trends in the care of expectant women emphasize the importance of lifestyle factors, especially nutrition status, in pregnancy. [18]. In addition to social and cultural factors, the nutritional knowledge of pregnant women can influence their food intake [19]. Religion is a cultural factor that influences the diet of believers, as most religions impose restrictions on the consumption of certain foods, differentiate between pure and impure foods, establish fasting periods, etc [19] [21]. Similarly, psychological disorders such as depression, anxiety, or tension may influence the dietary preferences and nutritional status of pregnant women [21]. For these motives, it is of the utmost significance to identify the sociocultural and economic factors that influence the nutritional status of pregnant women in the Ona-Ara local government area of Oyo State.

1.2 Statement of Problem

Nigeria cannot be exempt from the scourge of malnutrition and other nutrition-related problems, particularly among pregnant women, for whom malnutrition is one of the leading causes of maternal mortality and a major determinant of a successful pregnancy and a healthy, well-nourished baby [22]. Developing countries account for 99 percent of all maternal fatalities worldwide [23]. Nigeria has one of the highest rates of maternal mortality in the globe, with 576 deaths per 100,000 live births[24]. This study will be limited to Ona-Ara Local Government Area, Oyo State, which is the proposed local government where it will be conducted. It has been reported that the prevalence

of anemia among pregnant women in specified health care centres across two levels of health care in Ibadan was 30%, which was associated with poor nutritional status among pregnant women [25].This study aims to assess sociocultural and economic factors influencing the nutritional status of expectant women in Ona-Ara Local Government Area, Oyo State.

1.2.1 Justification of the Study

The incidence of maternal mortality and morbidity has been on the rise in Nigeria, as the country has not been exempted from struggling with such a threat to growth and development as other developing nations have. Studies have found that the nutritional status of the pregnant woman is a significant predictor of the pregnancy outcome; therefore, it is necessary to conduct a study that evaluates the factors that influence the nutritional status of pregnant women in Ona Ara Local Government Area of Oyo State.

1.3 General Objective of the Study

The general objective of this study is to assess socio-cultural and economic factors affecting dietary pattern of pregnant women in Ona Ara Local GovernmentArea of Oyo State.

1.3.1 Specific Objective of the Study

1.To describe the socio – cultural and economic characteristics of pregnant women in Ona Ara Local Government

2.To investigate cultural belief and food taboos among pregnant women in Ona Ara Local Government

3.To assess the dietary pattern of pregnant women in Ona Ara Local Government

4.To identify factors associated with dietary pattern of pregnant women in Ona Ara Local Government

1.4 Research Questions

1.What is the socio-cultural and economic characteristics of pregnant women in selected PHC centres in Ona Ara Local Government Area of Oyo State?

2.What are the Cultural Belief and Food Taboos of pregnant women in selected PHC centres in Ona Ara Local Government of Oyo State?

3.What is the dietary pattern of pregnant women attending selected PHC centres in Ona Ara Local Government area of oyo state?

4.What are the factors associated with dietary pattern of pregnant women in Ona Ara Local Government?

1.5 Significance of the Study

Outcome of this study should be of great help to the society in helping the people particularly pregnant mothers to be aware of effective means of preventing themselves from nutritional deficiency such as malnutrition that might want to subtly affect pregnant women thus informing them of how to take general care of themselves by making informed nutrition choices, Findings from this study can also inform and serve as guide for programs aimed at Nutritional status of pregnant women in this country. Findings from this study may also serve as reference material for other researchers interested in the area of pregnant women's Nutritional status

1.6 Delimitation/Scope of the Study

The study will be delimited to independent variable of Socio-cultural and economic factors of level of education, food taboo preference and level of income and dependent variable of (Nutritional status), 250 respondents as a sample from the population of pregnant women attending primary health care centres in Ona ara local government, questionnaire as instrument for data collection. 6 Selected Primary Health Care Centres in Ona ara local government

1.7 Definition of Terms

Socio-cultural factor: Social cultural factors in this study has to do with the factors of age, level of education and preference for food taboos

Nutritional status: a pregnant woman's health condition as it is influenced by the intake and utilization of nutrients which can be assessed through different measurements such as anemia estimations

Endnotes

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Chapter Two

Literature Review

This chapter of the study considered the review of literature of concepts important to this study which was done.

2.1 Conceptual review

Meaning of Nutrition

This is the science that explains the relationship between nutrients and other substances in food and an organism's maintenance, growth, reproduction, health, and disease. It consists of dietary consumption, digestion, absorption, assimilation, biosynthesis, catabolism, and excretion [4]. Diet is the food consumed by an organism, which is primarily determined by the availability and desirability of food. A healthy diet for humans includes food preparation and storage methods that protect nutrients from oxidation, heat, or leakage and reduce the risk of foodborne illness.

A poor diet can lead to deficiency-related diseases such as blindness, anemia, scurvy, preterm birth, stillbirth, and cretinism in humans, as well as nutrient excess health-threatening conditions such as obesity and metabolic syndrome; and common chronic systemic diseases such as cardiovascular disease, diabetes, and osteoporosis. In acute cases of malnutrition, atrophy and marasmus can occur; in chronic cases, stunting can occur [5,6].

Nutrition knowledge and Nutrition Education

Different terminology is used to describe healthy diet promotion interventions between and within countries, as well as between and within institutions implementing or supporting such interventions. The two most prevalent are "nutrition

education" and "BCC - Behavior Change Communication," both of which rely on the knowledge gained through nutrition education.

Online searches of documents, mission statements, professional publications, and textbooks yielded the following definitions. Nutrition education empowers individuals, families, and communities to make dietary and lifestyle decisions that promote their physiological health, economic prosperity, and social well-being .

Nutrition education is any mix of educational techniques, coupled with environmental supports, designed to promote the voluntary adoption of healthful dietary choices and other nutrition- and food-related behaviors[7]. Multiple channels and activities at the individual, community, and policy levels are utilized to impart nutrition education.

Nutrition education is a component of Applied Nutrition that focuses its resources on learning, adapting, and accepting healthy eating habits in accordance with one's own food culture and scientific knowledge of nutrition, with the ultimate goal of promoting individual or community health[8].

In health promotion and primary prevention, it is of great value to encourage the development of healthy eating practices in various settings. It is also an effective strategy for therapeutic nutritional prescriptions and secondary prevention. Nutrition education is the process of instructing an individual or group in the science of nutrition. In a clinic, the community, or a long-term care facility, the role of health professionals in educating an individual is distinct. In these settings, the dietician, nutritionist, or nurse assists or enables individuals to incorporate dietary and behavioral adjustments into their lives.

Instead of knowledge and facts, this form of nutrition emphasizes the development of permanent behavioral modifications. This is the art of nutrition education – tearing

down a large body of knowledge into small, individual components that are presented to a patient or client at a rate and level at which they are able to absorb and apply the information; consequently, nutrition education is required to explain the concept of nutritional knowledge. Effective education makes nutrition information consumable and applicable in everyday life[9].

Nutrition Education Methods leading to Nutrition Knowledge

Methodology of presentation is the manner in which nutrition education is presented to individuals or groups, and it has a significant impact on outcomes. To influence older adolescents and adults, not only is a learner-centered strategy necessary, but also the application of adult learning principles. The adult learning principles, which are based on the premise that the learner contributes a lifetime of experience to the learning session, are generally disregarded or given only lip service. Many nutrition education programs face difficulties and issues. The adult learning principles emphasize dialogue, drawing on the learners' life experiences, active learning including problem-solving in small groups, practical application, intellectual and emotional engagement, and affirmation. Other methodological issues that impede the efficacy of nutrition education for groups include the convening of excessively large (more than ten) groups, which do not foster an environment conducive to people expressing their ideas or concerns or hearing and seeing well. In Outdoor environments, visual aids are frequently too small or of colors that do not stand out well. Individual counseling can be more easily tailored to the needs and circumstances of each learner, but there is the challenge of ensuring that the counselor has good interpersonal skills and communicates not only accurate information but also engages

in dialogue with the learner to identify issues or barriers and assists in strategizing effective solutions.

Developing effective counseling skills requires extensive practice with constructive feedback in order to develop. Typically, in-service training consists of one-time sessions with minimal follow-up. The difficulty of developing counseling capacity among health and nutrition professionals has a significant impact on government program implementation. As an instrument for nutrition education, mass media have become increasingly sophisticated. In addition to broadcast and print media, the scope of mass media has expanded to include the Internet and other technologies such as mobile phones[10]. How to go beyond information transfer and motivational appeals to action to help people develop healthful eating skills is a limitation of the use of mass media. The dissemination of alleged nutrition information from unreliable sources is a significant difficulty posed by the media. Advertisers and commercial interests also disseminate false nutrition information.

Training of health professionals on Nutrition Education

The Food and Agriculture Organization (FAO) professional training needs assessment found that, despite the fact that the majority of nutrition efforts and nutrition education fall under the health sector, many pre-service health professionals, including nurses and physicians, have minimal training in nutrition or nutrition education. Typically, the in-service training they receive pertains to a particular intervention, such as nutrition, HIV, and IYCF. The FAO needs assessment, as well as previous assessments conducted by USAID-funded programs such as LINKAGES and FANTA, have consistently identified the need to enhance counseling skills and

technical nutrition fundamentals. A recent Lancet article emphasizes the importance of incorporating nutrition into health professional education[11].

For health professionals to promote healthful eating and related behaviors to patients or as part of preventive care, they require the following:

- Basic nutrition knowledge.
- Understanding of the relationship of food security and nutrition, particularly diet diversity.
- Skills in essential formative research and use of findings.
- Elements of behavior change concepts – that more than knowledge transfer is needed.
- Counseling skills.
- Adult learning principles.
- Ability to evaluate behavioral outcomes.

Increasing the nutrition knowledge and nutrition education skills of health professionals in academic institutions is difficult due to the already heavy course burden and the lack of faculty to teach these subjects; however, this would be a more cost-effective strategy than repeated in-service training. Despite obstacles, the LINKAGES Project was successful in integrating Essential Nutrition Actions (ENA) training into all pre-service medical curricula at seven universities in Ethiopia.

The academic training must be supplemented with sufficient practical experience for learners to acquire proficiency in indispensable skills such as counseling and adult learning. The majority of funding for in-service training comes from NGOs and benefactors. The effectiveness of in-service training is maximized when adequate

supportive supervision is provided as a follow-up to ensure that trainees effectively implement the acquired skills. According to UNICEF's evaluation of IYCF training, the absence of supportive supervision is a significant barrier to the employment of trained health workers[12].

Organization of a Nutrition Education at the community:

First step: Learning about the students we instruct and diagnosing the community: To persuade mothers to adopt improved nutritional practices, nutrition educators must first comprehend why individuals adhere to a particular feeding pattern. There may be a correlation between a family's eating habits and factors such as poverty, cost and availability of food, deeply held beliefs and superstitions regarding food, and the amount of time mothers have to prepare meals. It is essential to identify individuals who require specialized nutrition education advice.

To improve the health and nutrition status of the community in general and infants and young children, pregnant and lactating mothers in particular, it is necessary to first identify the community target groups. To have a thorough comprehension of the individuals who will be instructed, it is necessary to learn specifics, such as where they reside. How much money do they make? Is their diet healthy or unhealthy? - What dietary adjustments, if any, should they make? — What are their culinary traditions, including hot and cold foods, special diets for pregnant and nursing mothers, etc.? - Can they afford the modifications we deem necessary?

Second Step: After gathering as much information as possible about the individuals we are educating, the next step is to determine which of their nutrition issues are amenable to behavior modification. A nutrition education plan is a list of necessary behavior changes so that we can teach families to implement them. Each of our

lessons must address one of the desired behavioral changes in our families. Each lecture must also have a succinct name for easy recording.

Third Step: Making friends with the people we teach: Once our nutrition education plan has been developed, we can consider how to alter the behavior of our families. People will find it easier to learn from you if they view you as a comrade. Therefore, greet mothers before the session begins. Be cordial, courteous, and deferential to them. Do not be arrogant or irritable. Do not hold any expectant woman up as an example to the others. If she has performed well, compliment her immediately. Say "Good bye" to your class when class is over and express your hope to see them again.

Fourth Step: Identifying people's desires and ensuring they are sincere: Determine an expectant woman's desires. Does she want her offspring to be healthy, hardworking, and successful? If her infant is ill, she will want him to recover as soon as possible. Mothers must also recognize the seriousness of their desires. They must be informed that their underweight pregnant offspring may contract a fatal disease. A mother must be made aware of how severe it is if her child does not develop into a healthy, intelligent, and hardworking adult. If you tell mothers that an unintelligent child will not be able to earn as much money and will not be able to assist them, they will likely view this as a serious matter.

Fifth Step: Demonstrating to individuals that there is a solution to their problems and that they can abandon what they do not want: Help mothers realize that changing their conduct is a viable solution to their problem. If mothers are concerned that their infant is not growing up strong and intelligent, convince them that the solution is to give him more protein-rich foods and to feed him frequently. Never propose things that a mother cannot accomplish. In the first step, it is therefore essential to determine what

is feasible. Never tell a mother with no money to consume egg and milk every day. Do not discuss refrigerators, electric stoves, etc. when instructing a group of relatively impoverished individuals. The main duty of nutrition is to 'create a desire' in the learner to apply the information.

Sixth Step: Recording health education: When providing recurrent nutrition education, it is essential to be able to determine what was taught on previous visits. The only method to determine this is to record what is taught; for instance, it is useful to record the lessons taught to mothers when they return to an MCH center multiple times. Each lesson's abbreviated name from the education plan can be written at the top of the child's development chart, opposite the month in which the lesson was taught.

Seventh Step: Evaluating health education entails determining whether or not our health education is effective. Are individuals practicing what they have been taught? One method is to visit them in their residences and ask them the questions you compiled when creating your nutrition education plan. The best method for evaluating nutrition education is to visit people's residences and observe what they are doing. If your nutrition education is effective and families follow your advice, this is a positive sign. Your efforts are bearing fruit, and you will undoubtedly be satisfied. What if they are not, however? Consider attentively what you are doing. Perhaps you should alter your method of instruction. But do not become too impatient; people's conduct changes slowly.

Example of a Nutrition Education Lesson Plan for a Health Centre: Pregnant women must take special precautions to avoid diarrhoea.

Name of lesson: 'Diarrhoea'.

Want to be used: Families wanting their women and children to stay healthy and not to die from diarrhoea.

Things needed: Cups, spoons, sugar, boiled water, salt

Lesson: I am delighted to see you this afternoon. Have any of your kids experienced diarrhea? Do you know of any infants who have passed away due to diarrhea? Do you want your children to experience diarrhoea less frequently, less severely, and with a lower mortality risk? Your child will be substantially less susceptible to gastroenteritis if you follow the steps I'm about to outline.

Typically, a child's diarrhea is caused by ingesting pathogens. Germs inhabit soil. A infant who drinks contaminated water may consume diarrhoea-causing bacteria. How can we purify the water? By simmering it. Always boil water for infants and young children.

Use boiled water when preparing food for yourself and your infant, and sterilize the bottle and nipple by placing them in a pot of boiling water for a few minutes. A mother and child may consume diarrhea-causing bacteria because he ate food that had been touched by dirty hands, placed on dirty ground, or walked on by flies. On their legs, flies transport diarrhea-causing germs.

Diarrhea is severe because a child loses significant amounts of food and water through his stools. So much water is lost that a child starts to become parched. A infant with diarrhoea requires water, salt, and sugar to replenish what he has lost due to the condition. As soon as your child develops diarrhea, begin giving him fluids as follows:

Demonstration: This is how to create salt and sugar water (it is demonstrated to the mothers). Give this to your child steadily, a small amount at a time, at least once

every half-hour. Give him as much as he will drink each day, at least four large cups. Give him both sustenance and breast milk. A infant with diarrhea is prone to death. Take him to a health center or hospital if any of the following apply: If he has a fever, a large number of watery stools, or blood in the stools; if he appears thin and his eyes are sunken; if he vomits or is extremely feeble. Take some salt-and-sugar water with you when you take your child with diarrhea to the clinic, so he can consume it on the way.

Things mothers can do: Let some mothers prepare salt and sugar water for themselves, and let their children sample it.

Evaluation after the lesson: Here are some questions to find out if the group has understood what they have been taught: Q. what usually causes diarrhea? A. Eating dirty food or drinking dirty water. Germs live in dirt. Q. Why is diarrhoea serious for a young child? A. Because it causes him to lose so much water that his body dries up, and he may die. Q. How can water from the river be made safe for drinking? A. By boiling it to kill germs. Q. What must you give a child with diarrhoea? A. A lot to drink. Q. How can you make a special drink for a child with diarrhoea? (Mothers should be able to describe how to make OR fluid) Q. How often should you give this drink? A. At least every half-hour. Q. How much should the child get in a day? A. At least 4 cups.

Evaluation later and on home visiting: Children with diarrhoea who have already been given salt-sugar water at home visit the clinic? When you visit a mother's house, can she prepare salt-and-sugar water? Are they able to respond to the mentioned questions?

Malnutrition in Nigeria

Malnutrition during pregnancy is characterized by difficult labor, premature delivery, and the birth of babies with low birth weight. A child delivered to an undernourished mother is susceptible to infections, growth retardation, and cognitive impairment. Pregnancy is a crucial period in a woman's life, during which she requires optimal nutrients of superior quality to support the growing embryo. Naturally, virtually all pregnant women experience an increased appetite. However, one should be aware of the consequences of nutrient deficiency during pregnancy and the effects of malnutrition during this period. Clearly, it would negatively impact the welfare of both the mother and the child [13].

Nutritional Deficiency and Pregnancy Malnutrition is defined as the deficiency of essential nutrients for the body's normal functioning. It affects the body's organs and causes moderate to severe medical complications over time. One of the facts about malnutrition is that there are more hungry individuals in developing nations. As a result, Asia and Africa have a higher incidence of malnutrition during pregnancy.

According to medical data, expectant women, nursing mothers, and children under the age of three are more susceptible to malnutrition than others. As soon as a woman conceives, she is responsible for consuming a healthy diet in significant quantities to support the development of a new life within her womb. A pregnant woman should recognize that her daily diet is not only essential for her own health, but also for the lifelong wellbeing of her unborn child [13].

Considering this, malnutrition during this phase is the primary cause of negative pregnancy outcomes. If an expectant woman is malnourished, it is reasonable to assume that the fetus is not receiving sufficient nutrients. In other terms, essential

nutrients and trace minerals. Insufficient resources exist for the development of a complete existence. As a result, the infant will have a slow growth rate and be underweight. The general effects of malnutrition on the body are a weakened immune system, an increased susceptibility to illness, low stamina, and a shorter stature. Some effects of maternal malnutrition are carried throughout the lifetime of the infant. A malnourished infant is susceptible to infections not only during the early stages of development, but also during maturity. Additionally, it is asserted that cognitive impairment and low IQ are directly related to malnutrition symptoms, particularly during pregnancy and infancy.

Women who have experienced privation during pregnancy deliver infants with low birth weight. These children are susceptible to growth retardation, decreased coordination, poor vision, learning difficulties, and numerous other maladies. Anemia is one of the malnutrition-related conditions that affect numerous pregnant women around the globe[14]. It increases the risk of maternal and infant mortality during childbirth. Other severe side effects include preterm birth, labor obstruction, postpartum hemorrhage, and birth defects. The negative impacts of malnutrition on child development are a result of inadequate nutrient intake during pregnancy and lactation. A well-planned pregnancy diet and diet for breastfeeding mothers are essential for the health of the infant during both stages. Indeed, a person's health and well-being are primarily dependent on the nutrition provided during the three stages of gestation, lactation, and early childhood 40. In order to mitigate these side effects, a woman who is attempting to conceive should develop healthy eating habits and make dietary adjustments. Pre-pregnancy fitness is also essential because the

developing embryo relies on the mother's stored nutrients for rapid growth during the first few months.

Dietary recommendations

The Nutrition Recommendations are intended for the general public and serve as the foundation for national recommendations[15]. A diet rich in vegetables, fruit and berries, nuts and seeds, peas and beans, whole grain, seafood, certain types of salmon, vegetable oils, and low-fat dairy products is recommended. This Mediterranean diet is rich in the majority of micronutrients, including a relatively high folate, zinc, and vitamin content. Even if a healthy diet reduces the need for supplements, there are still nutrients that require consideration and may necessitate supplementation. Iron, iodine, folate, vitamin B12, calcium, and vitamin D are nutrients with widespread deficiency.

Iron is essential for all organs, as it forms the oxygen-binding portion of haemoglobin, which carries oxygen from the lungs to the tissues. Due to haemoglobin synthesis and transport to the fetus, as well as iron losses during labor, a pregnant woman's iron requirements increase as the pregnancy progresses. A concentration of Hb below 110 g/L is the threshold for anemia during pregnancy[16]. Deficiency has been linked to premature birth and low birth weight. Obese pregnant women are at a greater risk for iron deficiency than normal-weight pregnant women, who have reduced maternal iron stores. Depending on deposits and current iron levels, the NNR recommends 15–18 milligrams; during breastfeeding, 15 mg is suggested.

\Pregnant women frequently take supplements. Postpartum hemorrhage is one of the risks posed to mothers by anemia, which is a widespread concern in a number of nations. Blood-based foods, meat, fish, whole grain cereals, spinach, and some fruits are dietary sources of iron. Due to the low concentration and high bioavailability of iron in human milk, a full-term, healthy, breastfed or formula-fed neonate does not require supplemental iron during the first 4–6 months[17].

Folate (vitamin B9) is a water-soluble vitamin found in liver, vegetables, particularly legumes, green leafy vegetables, berries, and root vegetables. The vitamin is sensitive to heat and losses are prevalent during cooking. Folic acid, the synthetic form of folate, is more stable and is found in supplements and fortified foods. Folate is required for the formation of new cells, particularly rapidly dividing cells and red blood cells. The vitamin is also required for ribonucleic acid (RNA) and protein synthesis. Introduction synthesis of 5 deoxyribonucleic acid (DNA). Some drugs (Folic Acid Antagonists) inhibit the body's capacity to absorb or metabolize folic acid, thereby increasing the risk of having a child with neural tube defects[17]. Due to the fact that the neural tube closes very early in pregnancy, between weeks 3 and 4, adequate folate levels are required prior to conception in order to defend against neural tube defects. Additionally, this vitamin prevents megaloblastic anemia during pregnancy. Certain cereals are fortified with folic acid in several countries, but not in Sweden. Swedish National Food Agency (NFA) recommendations are applicable in Sweden, and recommendations during pregnancy and lactation are based on the National Nutrient Reference. NFA recommends that all women contemplating a pregnancy take 400 g of folic acid per day during the first trimester. Due to rapidly growing

tissues, the recommended daily consumption of folate during pregnancy and breastfeeding is 500 micrograms.

The maximum concentrations of folate in human milk occur between 3 and 6 months after birth. Folate concentrations in human milk vary during lactation. Midwives are the primary attendants in antenatal care and are referred to by NFA as the profession that provides women with specific dietary advice. The advice is consistent with that of the NNR, which recommends a diverse diet, at least 500 g of fruit and vegetables per day, and 500 mL of low-fat dairy products such as milk or yogurt per day. Good sources of unsaturated fat include fish, crustaceans (2–3 times per week), and vegetable oils. Due to dioxins, PCB, and mercury, there are restrictions on the consumption of certain fish species, with a maximum recommended consumption of 2–3 times per year. Meat, chicken, eggs, legumes, lentils, or peas are recommended, along with bread, potatoes, rice, pasta, and bulgur wheat, preferably made from whole grains. It is advised to drink water with meals and when famished. Also recommended is a reduction in the consumption of refined sugar products such as cakes, candies, and soft beverages[18].

Dietary supplementation

As mentioned previously, the NFA recommends that women who may become pregnant consume 400 micrograms of folic acid daily until week 12 of pregnancy to prevent neural tube defects. Vegans should consume vitamin B12 and vitamin D via supplements or fortified foods. Vitamin D supplements are recommended for women who do not consume fortified foods or who wear veils. In general, dietary

supplements and herbal products should be used with caution, and certain products, such as ginseng, should be wholly avoided[19].

Exposures to avoid or reduce

Alcohol: Although studies indicate that moderate alcohol consumption during pregnancy is not linked with mid-childhood developmental issues, the Swedish recommendation is to abstain entirely. Alcohol exposure has been linked to spontaneous abortion, prenatal and postnatal growth restriction, and neurological birth defects. The restrictions during lactation permit the consumption of tiny amounts of alcohol, despite the fact that alcohol has no beneficial effects on lactation. A moderate amount of alcohol during lactation, such as 1–2 glasses of wine (1 standard glass of wine=12 g alcohol=12–15 ml) or its equivalent 1–2 times per week, poses no medical risk, according to current research. The quantity of alcohol transferred to infants through breast milk is negligible and not considered harmful (44–46).

Caffeine: Contradictory findings in research make it difficult for health professionals to provide expectant women with caffeine advice. Caffeine consumption is limited to 300 mg per day. This is the equivalent of three cups of coffee (1.5 dL per cup) or six glasses of black tea. Studies have highlighted the risk of adverse birth outcomes, but the most recent Cochrane Review found insufficient evidence to affirm or refute the effectiveness of caffeine avoidance on birthweight or other pregnancy outcomes due to the quality of the included studies[20].

Mercury: can cause injury to the brain and nervous system in large quantities. Mercury can be transmitted to the infant through the placenta and breast milk of the mother. It is a metal that builds up in fish like perch, pike, walleye, and burbot. Fresh

tuna, swordfish, large halibut, shark, and ray should be avoided because they contain higher concentrations of mercury per gram. Canned tuna is a distinct species than fresh tuna and does not contain elevated levels of mercury[21].

Dioxin and PCBs: This can lead to behavioral disorders. Additionally, they can affect the immune and endocrine systems, as well as reproduction. These have become ubiquitous organic pollutants in the environment. It is advised to avoid eating herring, wild salmon, and trout from the Baltic Sea and the Gulf of Bothnia. This also applies to native Vanern and Vattern salmon, trout, and whitefish. As these toxins are transferred to the fetus and breastfed infants through the placenta and breast milk, it is particularly essential for women of childbearing age to minimize their exposure.

The bacterium Listeria monocytogenes is ubiquitous in nature. Listeriosis is also found in foods that have been refrigerated for an extended period of time and then consumed without being heated, such as vacuum-packaged smoked and pickled salmon, soft cheeses, and sliced cold cuts. When foods are heated to over +70 °C, the Listeriosis bacteria perish. Pregnant women may get flu-like symptoms or be symptom-free. In the worst instances, transmission to the fetus during the infection may result in miscarriage or a severely ill child. The pathogen Toxoplasma gondii's host is the cat, which excretes the parasite in defecation[22]. As with cat feces, other animals, such as sheep or hogs, can become infected and a source of infection for humans. Additionally, contaminated soil, produce, and fruit are potential sources of infection. Through the placenta, the parasite can infect the fetus and cause miscarriage, birth defects, or congenital infection. When elevated to at least 65 °C or frozen at –18 °C for at least three days, the parasite dies.

Weight gain and obesity

Women's weight gain during pregnancy varies significantly. The percentage of Swedish women enrolled in antenatal care who were overweight or obese (BMI 25) increased from 25% in 1992 to 38% in 2012. 25% of expectant women receiving maternal care in 2013 were overweight, and 13% were obese[22]. The Institute of Medicine's recommendations are the most widely used in Europe, including in Sweden. The guidelines recommend an 11.5–16.0 kg gestational weight gain for women with a normal BMI at enrollment (BMI 18.5–25); a lower weight gain (7.5–11.5 kg) for women with an overweight BMI (BMI 25–30); and a weight gain of 5–9 kg for obese women (BMI 30)[121]. Overeating occurs when energy consumption exceeds energy expenditure, resulting in excess body weight and obesity over the long term[122]. Increasing meal size and skipping meals throughout the day are also associated with obesity[123].

There is a risk of complications for both mother and infant associated with excessive weight gain during pregnancy. There are reports on metabolic complications such as gestational diabetes, hypertension, thromboembolism, as well as their effects on infant growth and adiposity. Increasing rates of caesarean delivery and higher birth and placenta weight are additional complications. There are outcomes associated with asphyxia in term infants, as well as extended hospital stays. Furthermore, lactation rates appear to be reduced among obese women, which is neither beneficial to the mother nor the child[23].

Behavioral changes; physical activity and diet

Pregnancy is a significant life event that strongly motivates women to adopt a healthier lifestyle. Motivational interviewing (MI) is a technique used in Swedish antenatal care to promote lifestyle-related motivation and behavioral change. The objective is to aid patients in their efforts to kick a harmful habit. The method was devised by Miller and Rollnick with Prochaska and DiClemente's theoretical model128 as an influence. The National Board of Health and Welfare has outlined the educational requirements and guidelines for MI[130]. Physical activity is advantageous and secure for pregnant women, and it has been linked to less weight gain. A meta-analysis revealed that the effect of physical exercise was less than that of dietary intervention[24].

Recent reports indicate that women with a high gestational weight gain are more likely to struggle with weight retention and return to their pre-pregnancy weight during the postpartum period. At least 30 minutes of daily physical activity is recommended to attain and maintain a healthy weight. The NNR for individuals, including pregnant women, depends on the type and intensity of physical activity. At least 150 minutes per week of moderate-intensity physical activity is required. Silva-del Valle et al. observed a correlation between the Mediterranean diet and a smaller increase in BMI during pregnancy. Women with greater adherence to the diet acquired less weight and were more likely to fall within the Institute of Medicine's recommended BMI range. It has also been suggested that a Mediterranean-style diet is beneficial for fetal growth. Low adherence during pregnancy was associated with reduced birth and placenta weight and an increased risk of hyperinsulinemia at birth[24]. According to a review by Nielsen et al., both under- and overnutrition can contribute

to the development of gestational diabetes and epigenetic alterations that may contribute to future type 1 and type 2 diabetes.

In a Swedish study, weight interventions and education substantially reduced mean gestational weight gain by 1 kg (p= 0.029) compared to standard care. Phelan et al. demonstrated that behavioral lifestyle interventions decreased gestational weight gain in normal-weight women. The interventions also prevented postpartum weight retention in women of normal, overweight, and obese weight. It has also been observed that minor changes in women's dietary intake have little effect on their eating habits. Even though women believed they had a healthy diet, they were unable to satisfy the recommendations for fruit, dairy products, and other essential foods, according to a study conducted in Australia[25].

Vitamin D physiology and synthesis

During pregnancy, vitamin D receptors are present in the organs, tissues, and cells of the body, as well as in the placenta-decidua. Vitamin D is essential for calcium and phosphorus homeostasis regulation and is involved in numerous biological processes, including cell proliferation and differentiation in target tissue. Vitamin D comes in two forms: cholecalciferol (vitamin D3) and ergocalciferol (vitamin D2). One source is sunlight exposure. 7-dehydrocholesterol in the epidermis is converted to vitamin D3 with the aid of the sun's UVB (ultraviolet B radiation; wavelengths 290–315 nm) rays.

Dietary sources of vitamin D3 include oily fish, eggs, enriched dairy products, and vitamin D3 supplements. Vitamin D2 is also present in mushrooms and certain dietary supplements. The liver converts vitamin D3 and vitamin D2 into calcidiol 25(OH)D2

and 25(OH)D2. Renal processing continues the regulated conversion of 1,25(OH)2D3 into the biologically active steroid hormone calcitriol. Calcitriol synthesis is affected by calcium, phosphate, and parathyroid hormone levels, and it functions with parathyroid hormone to maintain calcium and phosphorus homeostasis. The quantity of vitamin D synthesized in the skin is influenced by a number of factors, including the amount and duration of exposure to sunlight, skin type, latitude, and season[26]. In the Ume region (latitude 63.8°N), UV exposure is sufficient for vitamin D3 synthesis from approximately the middle of April to the middle of September, with the majority of this period occurring during the midday hours. In the remaining seven months, it is impossible to synthesize[26].

Vitamin D in relation to pregnancy and after birth

In recent years, the significance of vitamin D during pregnancy has been highlighted. The need for calcium and vitamin D increases during pregnancy and lactation due to fetal growth and development and neonatal growth, particularly skeletal growth and mineralization. During pregnancy, the body adapts by altering its metabolism with an increase in calcitriol (1,25(OH)2D) synthesis concurrent with changes in hormones, such as prolactin, placental lactogen, calcitonin, and estrogen. About 30 g of calcium is accumulated by the neonate, primarily in late pregnancy. The maternal intestine and kidneys maximize calcium and phosphate absorption and excretion to meet this need[143]. Numerous studies, meta-analyses, and reviews have linked vitamin D deficiency to adverse health outcomes in pregnant women and infants around the globe. Vitamin D deficiency has been linked to an increased risk of gestational diabetes, pre-eclampsia, preterm birth, small-for-gestational-age infants, and decreased bone mineral density[27].

Also reported are contradictory results showing no association with preterm birth. The definition of deficiency is contested, and there appears to be no consensus regarding the optimal level. Serum or plasma levels of 25(OH)D, which is the sum of D2 and D3, are measured to determine vitamin D status. The level of 25(OH)D is affected by alterations in vitamin D synthesis or intake; otherwise, levels are stable. The Institute of Medicine published recommendations with a serum concentration decision limit of at least 50 nmol/L; this thesis adopts these recommendations. Regarding lactation, the vitamin D content of human milk is minimal, and infant vitamin D stores are limited and depleted by 8 weeks of age[28]. However, lactation contributes approximately 200 mg of calcium per day to the infant via breast milk.

Basic regulation of food intake

A complex control system rigorously regulates food intake and appetite. In the human body, the gut, brain, and adipose tissue interact with the primary organs to regulate food intake for the maintenance of the body's energy metabolism. Several appetite-stimulating and appetite-suppressing hormones, peptides, and neurosteroids are conveyed by the nervous system in conjunction with the interaction of several cellular components. Several nuclei in the hypothalamus influence food intake by modulating circulating hormones and neuronal activity to brainstem nuclei. Two complementary systems regulate food intake: the homeostatic and pleasure (hedonic) systems.

The homeostatic system regulates energy consumption when energy reserves are depleted. The pleasure signals can enhance the desire for palatable foods or drugs, for example, by regulating reward. Cognitive and emotional factors can trump the homeostatic metabolic system and lead to an unbalanced energy state. During

pregnancy, the levels of steroid hormones that modulate Gamma-butyric-acid-A (GABA-A) receptors, particularly allopregnanolone, rise significantly[29].

Steroid hormones and neuroactive steroids like allopregnanolone

The placenta produces significant amounts of progesterone during pregnancy. Allopregnanolone, a progesterone metabolite, is also produced by the placenta and accumulates in serum at the same time as progesterone. Allopregnanolone is also produced by the fetus, and the fetus has higher concentrations than the mother. During pregnancy, allopregnanolone levels are up to 100 times higher than in women who are not expectant. In addition to being synthesized in the placenta, allopregnanolone is also synthesized in the maternal brain, adrenal glands, and ovaries, and is present in high concentrations in the neonate circulation and brain.

Progesterone is one of the primary forms of steroids that are synthesized and metabolized from cholesterol. Small lipid-soluble molecules that are active in the central nervous system are neuroactive steroids. They readily traverse cell membranes and the blood-brain barrier, binding to receptors to exert their effect. Allopregnanolone binds to the GABA-A receptor and functions as a potent positive modulator. It is now understood that the GABA system and, by extension, allopregnanolone are essential for regulating satiety and appetite. The activation of GABA-A receptors in the centres that regulate food intake results in excess and, eventually, weight gain and obesity. Allopregnanolone levels fluctuate during the menstrual cycle in nonpregnant women, with mean physiological values of 0.3–1.9 nmol/L in the follicular phase and 1.1–3.7 in the luteal phase in healthy women [30].

Several studies have demonstrated an increase in energy consumption during the luteal phase of the menstrual cycle, as well as an increase in appetite.

Pregnancy and Allopregnanolone

Allopregnanolone has multiple functions related to neuroendocrine stress responses in the mother. During pregnancy, the levels of the steroid hormones' estradiol, progesterone, and allopregnanolone rise. During pregnancy, progesterone secretion is established and maintained. Allopregnanolone is essential for maintaining many of the necessary adaptations in the pregnant woman's body. The first is to safeguard the fetus from maternal stress hormones and adverse birth outcomes; the second is to ensure fetal growth and cerebral development.

Allopregnanolone and food intake

As mentioned previously, steroid hormones such as allopregnanolone play a significant role in food regulation and satiety, among other bodily functions. Hunger, satiety hormones (e.g., ghrelin, leptin), and steroids modulate the nutritional signals associated with meal initiation, frequency, and size. Allopregnanolone has been extensively studied, and greater levels have been measured in overweight and obese humans as opposed to girls, men, and women of normal weight. Turkmen et al. discovered a significant correlation between unrestrained consumption and allopregnanolone levels in women with polycystic ovary syndrome[31].

According to the findings of a new thesis, allopregnanolone can act at various levels of feeding and is therefore implicated in weight gain. Under the influence of allopregnanolone, the energy intake of rodents increased; both the volume and

duration of eating increased with increasing allopregnanolone. In addition, whenever there was a choice of food, calorie-dense foods are preferred. The increased weight gain was associated with consumption of high-calorie diets[32].

The GABA system and allopregnanolone

The primary inhibitory neurotransmitter in the central nervous system is GABA. The subunits of GABA-A receptors form a chloride channel. When GABA is activated, chloride ions travel through the cell membrane, resulting in hyperpolarization. Allopregnanolone modifies and influences the entrance time of the channel[179]. Consequently, depending on the concentration of allopregnanolone, the receptor either activates for a longer opening time or the GABA inhibitory effect is amplified191. GABA activates distinct subtypes of receptors (A, B, and C). GABA-A is influenced by modulators such as allopregnanolone, as well as barbiturates and benzodiazepines[33]. The subtypes of GABA-A receptors involved in regulating food intake are located in the hypothalamus, near the arcuate nucleus, the important node for energy regulation.

The rationale: A well-balanced diet and healthful weight gain in the mother promote the health of both the mother and the developing child. An unhealthy diet and sedentary lifestyle may contribute to illness. Particularly obesity and excessive weight gain pose a risk for pregnancy, delivery, and infant complications.

It is advantageous to adopt and maintain healthy eating practices prior to pregnancy, but to begin antenatal care as soon as possible during pregnancy. In light of the preceding information, it is intriguing to investigate further the complexity of pregnancy in terms of nutritional aspects; to adapt daily lives to restrictions in areas

such as food consumption and weight gain while physical and psychological changes occur. Swedish research on dietary intakes, including vitamin consumption, during pregnancy is limited[34].

Allopregnanolone levels and their relationship to weight gain are studied primarily in rodents. In sub-Arctic regions, there are also few longitudinal studies on vitamin D levels in expectant women. In spite of this, it is crucial to increase knowledge and comprehension of women's nutrition in the context of pregnancy and motherhood.

Factors associated with nutritional status of pregnant women

Early age at marriage

In the GCC countries, young age at marriage is still one of the factors associated with a number of pregnancy-related health issues among women. This is especially true in rural and urban regions. Several investigations revealed that many women married before the age of sixteen. Teenage pregnancy can result in maternal mortality and infants with low birth weight (LBW 2.5 kg), which has a negative impact on infant survival. In Bahrain, it was determined that mothers aged 15 to 19 were more likely to give birth to infants with a low birth weight (2% versus 7%) 11. In addition to adolescent pregnancy, the risk of LBW increased with each successive pregnancy[35]. It was discovered that the incidence of LBW was 10.6% among first-time mothers in Bahrain, compared to 6.3% among mothers with one or more children.

Multiple pregnancies

Multiple pregnancies without sufficient spacing between them may result in a variety of health and nutritional issues for both the mother and the embryo. According to statistics, the fertility rate of Gulf mothers is comparatively high (ranging from 4.6 per

1000 women aged 15-44 in Bahrain to 7.1 per 1000 women in Oman and Saudi Arabia). Multiple births tend to reduce a mother's hemoglobin level because closely spaced pregnancies deplete her iron stores, particularly if she does not take iron supplements during pregnancy[36].

Unsound food habits

There are numerous unhealthy eating practices during pregnancy that can affect the weight of the infant. Few pregnant mothers are engaged in improving their diet. Only 31% of Bahraini mothers reportedly consumed more fresh fruit during pregnancy. Consequently, the consumption of certain nutrients may be affected. In Kuwait, Prakash et al. discovered that the intake of calcium, iron, and vitamin C by expectant mothers was below 75% of the US recommended daily allowance (RDA), while all nutrients (except protein) were below the RDA among lactating mothers.

Traditional beliefs and attitudes

Traditional beliefs regarding nutrition are a significant pregnancy risk factor. In some regions of the Gulf, for instance, pregnant mothers believe that extra food will result in an overly large child, while others believe they should consume for two. Many expectant women believe that iron supplementation may cause fetal enlargement, resulting in a difficult delivery or even an abortion.

Social change and lifestyle

In most countries, the majority of women are unemployed, and few of them engage in physical activity. These factors contribute significantly to the risk of overweight and obesity. The availability of housemaids, automobiles, television, and high-tech home appliances has reduced women's physical activity, and sedentary living has become

the norm. In addition, the consumption of fast food and other fatty foods has increased dramatically. These factors cause a substantial weight gain in pregnant women[37].

Family income

The family's income and economic situation is a significant personal factor that influences dietary habits during pregnancy. A woman with a solid financial background will be able to pursue the benefits of health care, obtain high-quality food and service, as well as locate the appropriate products and equipment for health promotion behavior. A person with a lower income will have fewer options for enhancing health. In the first trimester of pregnancy, lower family income is associated with inferior health behaviors[38].

Numerous studies have found that low-income women have more disturbed dietary patterns. During pregnancy, financial instability hinders the development of healthful eating habits. In such cases, mothers have a high risk of giving birth to infants with low birth weight. Lee et al. believed that family income was related to nutritional deficiency. Low income is associated with unhealthy diet, and mothers with low income are linked to low birth weight. Due to a lack of funds to purchase nutrient-rich foods, the dietary quality of low-income women may decline. Low-income women may recognize the need for a nutritious diet, but they cannot afford to purchase the necessary foods[39]. Women with limited financial resources are unable to engage in healthful dietary practices during early pregnancy, putting them at risk for perinatal complications. Low-income expectant women typically consume fewer fruits and

vegetables, lean protein sources, and whole grains, which are all relatively expensive foods.

Perceived benefits of healthy eating

Perceived benefits are anticipated favorable outcomes or reinforcing consequences of health behavior. The belief that altering one's conduct will diminish a threat. A person's perception of the value or usefulness of a new behavior in reducing the risk of developing a disease is the perceived benefit. Individuals are motivated to choose foods that are rich in nutrients, low in animal fat and refined carbohydrates, high in fiber, and low in sodium and food additives due to their perception of the benefits of healthy eating habits. In mothers experiencing preterm delivery, perceived advantages of health-promoting behaviors were found to predict actual health-promoting behaviors[40].

There are benefits associated with healthful eating for pregnant women. Eating healthily entails consuming a variety of nutritious, energizing, and better-tasting foods that provide nutrition for pregnancy as well as boosts one's mood. A healthy diet is associated with greater weight gain in mothers and a healthy birth outcome. Benefits of healthy eating include weight control, disease prevention, physical fitness, higher energy level, remaining healthy, appearing and feeling better, and living longer. Prevention of disease (73.6%), staying healthy (69.4%), high quality of life (49.7%), weight control (47.0%), fitness (39.4%), living longer (28.8%), and an abundance of energy (28.2%) were the benefits of healthy eating that were selected most frequently in a study survey[41]. Perceived benefits associated with positive outcomes of healthy eating for mothers included looking and feeling better, preventing excessive weight gain, and decreasing the likelihood of having an infant that is too large.

Perceived barriers to healthy eating

Perceived barriers are defined as factors that impede health-promoting behavior and include perceptions of the potential drawbacks of behavior change. Perceived barriers are (real or imagined) perceptions of the obstacles to altering one's behavior, taking action, or inhibiting commitment to a behavior. Time, cost, inconvenience, access, and actual performance can be obstacles. In the HPM, barriers are modifying factors that directly interfere with the performance of the health-promoting behavior (such as healthy eating) or indirectly interfere by reducing commitment to the plan of action for altering behavior. For instance, if the obstacles to increasing fruit and vegetable consumption are lack of time and lack of access to affordable produce, then the inability to acquire affordable produce reduces the likelihood of eating more fruits and vegetables[42]. A lack of time would impede commitment to a plan, as additional time would be required to procure fresh, inexpensive produce.

A study found that time constraints (24%), giving up foods that participants enjoy (23%), a busy lifestyle (17%), resistance to change (21%), food preparation (19%), cost (15%), preferences of others (13%), dining out (11%) and unwillingness to change (15%) were barriers to healthy eating. In contrast, a study in Bangladesh88 found that discriminatory food allocation (90%), lack of decision-making power (85%), lack of family support (67%), economic/access constraints (50%), illness (46%), not wanting the baby to be too large (s20%), large family size (7%) and not feeling comfortable increasing (7%) were barriers to increasing dietary intake during pregnancy[43].

Perceived dietary self-efficacy

Perceived self-efficacy is a personal evaluation of one's capacity to plan and carry out a particular health behavior or one's self-confidence in executing the behavior successfully. Regarding health functioning, "efficacy beliefs largely determine whether people consider changing their health habits and whether they succeed in making and maintaining the change". A person's confidence in his or her capacity to maintain a healthy diet is his or her self-efficacy. Dietary self-efficacy refers specifically to the confidence one has in eating a healthy, balanced diet under challenging conditions, such as adhering to a diet or selecting healthier food options at social functions. Self-efficacy is a competence-based, prospective, and operational construct that can be used to predict, explain, and alter health behaviors[44]. Therefore, an individual who feels competent and effective in managing their health is more likely to engage in health-promoting behaviors more frequently than an individual who feels incompetent. Greater perceived self-efficacy increases the likelihood of committing to and engaging in health-promoting behavior. Therefore, perceived dietary self-efficacy is an essential construct that enhances the behavioral outcome associated with healthy eating commitment among pregnant women.

2.2 Theoretical Review

Theory of reasoned action

The theory of reasoned action is a paradigm for predicting behavioral intention, encompassing both attitude and behavior predictions. The subsequent separation of behavioral intention from behavior permits the explanation of factors that limit the influence of attitudes. Martin Fishbein and Icek Ajzen devised the Theory of Reasoned Action, which was derived from previous research that began with the theory of attitude and led to the study of attitude and behavior. The theory was "born

largely out of frustration with traditional attitude–behavior research, the majority of which discovered weak correlations between attitude measures and performance of volitional behaviors" [1].

Ajzen and Fishbein presented the theory of reasoned action (TRA), which was derived from social psychology. There are three general constructs that comprise the TRA: behavioral intention *(BI)*, attitude *(A)*, and subjective norm *(SN)*. TRA suggests that a person's behavioral intention is dependent on his or her attitude and subjective norms *(BI = A + SN)*. If a person intends to perform a behavior, it is likely that they will carry it out[2].

Behavioral intention assesses the relative intensity of an individual's intent to perform a behavior. Attitude consists of beliefs about the outcomes of the behavior multiplied by the individual's evaluation of these outcomes. Subjective norm is viewed as a combination of perceived expectations from pertinent individuals or groups and compliance intentions with these expectations. In other words, "the person's perception that the majority of significant others believe he should or should not engage in the behavior in question" [1].

To put the definition into simple terms: a person's volitional (voluntary) behavior can be anticipated by his attitude toward that behavior and how he believes others would perceive him if he engaged in that behavior. Together with subjective conventions, a person's attitude determines his behavioral intention.

However, Fishbein and Ajzen suggest that attitudes and norms are not equally influential in predicting behavior. Indeed, depending on the individual and the circumstance, these factors may have very different effects on behavioral intention;

therefore, each factor is assigned a weight in the theory's predictive formula. You may be the type of person who cares little about what others believe, for instance. Subjective norms would possess little predictive power over an individual's behavior if this were the case. The same author defines each of the three components of the theory and uses the example of beginning a typical training program to illustrate the theory [3]:

Attitudes: the sum of beliefs about a specific behavior, weighted by their evaluations. One may believe that exercise is beneficial to health, that it improves one's appearance, that it requires too much time, and that it is uncomfortable. Each of these beliefs can be weighted (e.g., health concerns may be more significant to an individual than concerns regarding time and comfort).

Subjective norms: Examines the influence of one's social milieu on his behavior intentions; the beliefs of people, weighed by the importance one attributes to each of their opinions, will influence one's behavior. A person may have a number of friends who are avid exercisers and who continually urge them to join them. However, one's partner may favor a sedentary lifestyle and mock those who exercise. The beliefs of these individuals, weighted by the importance attributed to each of their opinions, will influence an individual's behavioral intention to exercise, which will determine whether the individual exercises or not.

Behavioral intention: It has been discovered that a function of both attitudes and subjective norms toward a behavior can predict actual behavior. Your exercise-related attitudes and subjective norms, each with their own weight, will determine your intention to exercise (or not), which will then determine your actual behavior.

2.3 Empirical Review

A study of 17,196 British births compared the neonatal death rate in each of the five social classes and found that the infant mortality rate from 20 weeks of gestation to the first week of life increases as the family's socioeconomic status declines[45]. Consequently, not only is the fetus at an increased risk for developmental delay, but it is also at an increased risk for mortality. The prognosis of the fetus will be influenced by nutritional education about the proper diet during pregnancy [46]. A woman cannot be expected to consume an adequate diet if she lacks knowledge about her nutritional requirements and the necessary dietary changes during pregnancy.

A California study of 683 subjects instructed low-income pregnant women on 20 improved eating practices, how to shop and cook on a budget, and essential information on nutrition, food storage, sanitation, and food handling [47]. This study found that the nutritional status of women who received these instructions improved. This study allows us to hypothesize that where essential knowledge is deficient, nutritional status is poor, whereas when dietary knowledge is enhanced, nutritional status also improves. This change in nutritional status is evidence of information processing, learning, and enhanced judgment, all of which are components of Roij's cognator mechanism.

Early teachings and beliefs about what foods should be ingested shape eating patterns. The foods consumed during infancy and childhood will significantly influence adult food preferences[48]. In addition, negative food experiences, such as nausea and regurgitation after eating, have a significant impact on food aversions. Pregnancy is a time period that is influenced by dietary beliefs. In addition to being affected by the previously mentioned Factors, eating habits will also be influenced by particular

beliefs regarding consuming during pregnancy. Some factors influencing a woman's diet during pregnancy are prevalent beliefs, such as the notion that a woman's appetite should increase during pregnancy or that she should restrict her food intake to prevent giving birth to a large child[24]. Another prevalent myth is that a pregnant woman will desire calcium- and energy-rich foods while avoiding protein-rich foods. Certain cravings, such as watermelon, pickles, and ice cream, are founded on the belief that pregnant women "should" crave these foods. Others believe that excessive consumption of a desired food will have a negative influence on the infant. For example, excessive consumption of strawberries during pregnancy will result in the development of a strawberry birthmark. Pica is another form of craving that will affect the diet. Pica is the consumption of non-nutritive items such as soil, clay, and laundry starch. Pica's etiology is poorly understood, but when asked, women report that they "had to have it" and that it "felt like when you run out of cigarettes". A study by Lackey (2008) discovered that 23% of black pregnant women and 27% of white pregnant women engaged in pica.

According to a study of respondents' nutritional knowledge, 81.1% of respondents were aware that inadequate and unbalanced nutrition during pregnancy impacts both mother and child[49]. Fewer than two-fifths (38.9%) were aware that iron requirements increase during pregnancy, and even fewer knew about calcium and zinc. The majority (75,4%) indicated that pregnant women should increase their daily consumption of fruits and vegetables. Sixty-six percent of health care personnel were aware that insufficient folate/folic acid was the leading cause of birth defects of the neural tube. There was a statistically significant relationship between socio-

demographic characteristics, such as age, marital status, religion, and ethnicity, and level of nutrition knowledge among healthcare providers.

Nutrition knowledge was also substantially associated with the cadre, duration of practice, and involvement in treating severely malnourished children among health care providers. Respondents with BNSc and MSc/Postgraduate degrees possessed significantly greater knowledge than those without university degrees (p0.001)[50]. Those under 40 years of age are significantly less likely to have excellent nutrition knowledge than those older than 40. Single respondents were nearly nine times more likely than married respondents to have adequate nutrition knowledge (CI = 8.791, 95% CI: 3.125–24.732). Using more than ten years of work experience as a benchmark, respondents with less than ten years of experience had substantially lower odds of possessing adequate nutrition knowledge. Respondents in the professional cadres DDNS/ADNS/CNO were approximately two times more likely than those in the lower cadre to have excellent nutrition knowledge. Christians were nearly six times more likely than Muslims to have adequate nutrition knowledge (OR = 5.810, 95% CI: 3.321–10.164).

It was observed that all 41 (100%) of the centers had permanent seats in the education venue, were organized for sessions, and utilized some form of teaching materials to educate expectant women about nutrition. Even though they all had videos/TV screens, posters, and charts for nutrition education, very few (22%) used visual aids during the sessions, had audio aides available (22%), and demonstrated food preparation with fresh foods (19%). In terms of message delivery, the health professionals all stood in front of the mothers and imparted information, with the majority of expectant women (85.4%) participating actively. When necessary, the

nurses/midwives met with expectant women individually in 61% of the centres[51]. Regarding nutrition topics, all the health care professionals discussed food and hand hygiene, the significance of a balanced diet, and specific nutrients including Folic Acid, Iron, and Calcium. Sixty-one percent (61%) addressed maternal nutrition in the presence of hypertension and diabetes.

In a 2018 study examining the effect of nutritional education based on the health belief model on the nutritional knowledge and dietary practices of pregnant women, there was no significant difference (P=0.26) between the mean nutritional knowledge rating of intervention and control groups at baseline, but the variation was highly significant (p0.001) at the conclusion of nutrition education. The paired t-test revealed that the mean nutritional knowledge score increased from 6.9 to 13.4 (p0.001) in the intervention group. At the conclusion of nutrition education, all participants in the intervention group knew the sources of macronutrient- and micronutrient-rich foods and the consequences of micronutrient deficiency during pregnancy for both mother and fetus. At baseline, the nutritional knowledge-related variable of the two groups did not differ significantly (p0.005), but the difference was significant (p0.005) at post test[52].

According to Lutter, maternal knowledge influences dietary practices among expectant women[53]. It is probable that mothers with greater nutrition knowledge will make healthier food choices than those with less knowledge. A study on the correlation of nutrition knowledge and attitude with dietary practices and the nutritional status of females in Nairobi City found that nutrition knowledge has a significant relationship with nutrition status[54]. High Mid Upper Arm Circumference (MUAC) was associated with increased knowledge. Similarly, expectant mothers in a

study conducted in South Sumatera demonstrated that an increase in knowledge led to an improvement in nutritional status, with the increase in knowledge being associated with a high MUAC[55].

Low adolescent age has been related to a lack of nutrition knowledge and understanding of contemporary social issues[56]. It was discovered that a lack of nutrition knowledge contributed to poor dietary practices. Significant correlation between nutrition knowledge and nutrition status. Pregnant women with extensive nutrition knowledge consumed a wide variety of foods. In a study conducted in Sudan, nutrition knowledge, attitude, and dietary practices of adolescents were correlated. Mothers with greater nutrition knowledge demonstrated superior food selection and dietary diversity[57].

Respondents to a study of expectant adolescents were asked a number of questions about nutrition during pregnancy[58]. The majority of respondents (73.8%) were aware of what constitutes a balanced diet, while 65.6% knew which food groups best safeguard the body from illness. However, only a minority (36.1% and 36.1%, respectively) understood the significance of increasing energy intake and other nutrients during pregnancy. Only 33.6% were aware of the relationship between poor dietary habits and birth weight.

Figure 4.2 depicts the calculated nutrition knowledge score as low (40), moderate (41-69), and high (>70). The mean score for knowledge was 46,4 6,8. Figure 4.3 displays that slightly less than half of the mothers (47.5%) had moderate nutrition knowledge. Only 13.5% possessed a high level of knowledge[59]. The following FGD statements corroborate that the majority of women had limited nutrition knowledge. "I have never heard of a nutritional requirement prior to pregnancy"[60]. A expectant woman

should consume a great deal of food to sustain herself and her unborn child. According to FGD, pregnant women should consume a great deal of milk. "If the mother does not practice good nutrition, she will have a premature baby." "If the mother does not practice good nutrition, she will have a premature baby." "A sick mother will make her child sick" A ill mother can give birth to a sick child. The cultural belief that if a mother overfeeds her infant, the child will become too large for a normal delivery, necessitating a caesarean section. "Insufficient food intake can result in poor nutrition status". Another study involving expectant adolescents revealed that 44.9% of the adolescents had high nutritional knowledge, while 31.9% had moderate knowledge and 23.2% had low knowledge.

Another study on nutritional knowledge as a determinant of vitamin and mineral supplementation during pregnancy found that the prevalence of folic acid supplementation was 48%, iron supplementation was 45.3%, and multivitamin supplementation was 68%[61]. Above-average nutritional knowledge was independently associated with the use of folic acid (aOR, 4.7; 95% confidence interval [CI], 1.6-13.8), iron (aOR, 2.6; 95% CI, 1.2-5.7), and multivitamins (aOR, 2.8; 95% CI, 1.2-6.8). The use of folic acid was independently associated with a higher level of formal education (aOR = 5.2%; 95% CI = 2.1% to 12.8%) and an early start to prenatal care (aOR = 3.4%; 95% CI = 1.0% to 11.0%). Women with a higher education (aOR, 2.3; 95% CI, 1.1-4.9), more than 10 prenatal visits (aOR, 7.2; 95% CI, 3.4-15.0), and those who received advice on lactation were more likely to use iron during pregnancy. Similar results were found when analyzing the contributing factors for multivitamin use: more than 12 years of education (aOR, 3.4; 95% CI, 1.4-7.9) and adequate prenatal care (aOR, 9.4; 95% CI, 4.5-19.5). Another study on the nutritional knowledge, attitude, and practices of expectant women based on the food guide

pyramid revealed that 26% of the subjects had a high level of knowledge, 46% had a moderate level of knowledge, and 28% had a low level of knowledge regarding nutrition during pregnancy[62].

Another study on the nutritional knowledge, attitude, and practices of expectant women living with HIV revealed a mean score of 67% (8/12 points) for nutritional knowledge. 58% (n=190) of 324 respondents correctly responded 'false' to the statement "high-fibre diet is dangerous for HIV-infected individuals"; 24% (n=79) of 324 respondents correctly responded that "antioxidants are dangerous for PLWHA" is false; and 67% (n=216) of 324 respondents correctly identified the statement "eating vegetables prevents HIV" as false. The level of education (p = 0.003), mode of transportation (p = 0.044), and body mass index (p = 0.002) were significantly associated with nutritional knowledge, as determined by bivariate analysis. There were significant positive correlations between nutritional Knowledge and Attitude (r=0.155, p=0.005), nutritional Knowledge and Practice (r=0.456, p=0.001), and nutritional Attitude and Practice (r=0.230, p=0.001). Positively correlated with monthly income (r = 0.177, p = 0.001) were dietary practices. A significant negative correlation was found between the size of a household and its nutritional habits (r=-0.124, p=0.027).

Before educational intervention, levels of nutritional awareness among pregnant women were estimated to be low (31%), moderate (66%) and excellent (3%), according to a study on the effects of nutrition on nutritional awareness. After educational intervention, the corresponding rates were feeble (6%), moderate (63%), and good (31%). Regardless of age or literacy level, the nutritional education

intervention increased pregnant women's awareness of optimal nutrition from 3% before the intervention to 31% after it (P 0.01).

A study examining the influence of maternal education and socioeconomic status on maternal nutritional knowledge and practices regarding iron-rich foods and iron supplements revealed that 44% of women were aged 21 to 25[63]. 22% of the subjects were illiterate, compared to 7.3% of the spouses. 25% of respondents had completed the eleventh grade. Master's degrees were earned by 12 percent of respondents in the sample under consideration. 45% of respondents earned between 5,000 and 10,000 rupees per month, while 38% earned between 10,000 and 20,000 rupees per month. Only 17% of the population earned more than 20,000 rupees per month. The majority of women attending the clinic were in their last trimester of pregnancy[63]. 29% of respondents were experiencing their first pregnancy, 18% had one child, and 22% had two. In terms of anemia knowledge, the majority of respondents (66%) had heard of anemia as a health issue, while 34% were unaware of the condition.

When queried about the causes of anemia, 42% of respondents were unable to identify any. Pregnancy itself was cited as the leading cause by 36% of respondents. Only 22% ascribed it to a deficiency in iron-rich foods. It was evident that as educational attainment increased, so did awareness of the causes (P.001). Overall, knowledge of iron-rich diets was limited. Only 24% were conscious of beef and a similar proportion were aware of green leafy vegetables as iron-rich foods. 18% were unaware of the iron-rich dietary sources. However, a significant correlation (P .001) was observed between educational level and knowledge of iron-rich diets. In comparison to illiterate women, subjects with a higher educational background had a greater understanding of iron-rich diets. More than half (51%) of respondents were

unaware of Vitamin C's beneficial influence on iron absorption. Although knowledge was inadequate, it was strongly correlated with educational attainment ($p<.003$). An investigation into the influence of nutrition education on maternal hemoglobin levels demonstrated that nutrition education and an iron-rich food-based diet plan during pregnancy led to an increase in maternal weight gain and iron-rich food consumption[64]. At the endpoint, there was a significant improvement in the hemoglobin concentration of expectant women in the intervention group compared to the control group[218].

In a study assessing expectant mothers' knowledge of maternal nutrition, respondents' knowledge was evaluated using the following questions: What constitutes sustenance, A well-balanced diet, The significance of diet or proper nutrition during pregnancy, Diet during pregnancy differs from other diets. Protein, carbohydrate, iron, iodine, and vitamin A sources, Negative effects of malnutrition on the mother and child, In the current pregnancy, the husband or other family members influence the type and frequency of food consumption.

The quantitative focus group discussion data analysis revealed that only two respondents mentioned the major food groups and common sources of protein, carbohydrates, iron, iodine, and vitamin A, despite the fact that the majority of respondents described the importance of foods during pregnancy in various ways[221]. The majority of respondents believed that family members did not influence or determine the type and frequency of their food consumption. "Pregnant women of 27 years of age reported that food is essential not only during pregnancy but also during non-pregnancy for a variety of reasons, including healthy living. However, I am unfamiliar with the definitions and common sources of protein, carbohydrates, iron,

iodine, and vitamin A. "A 35-year-old expectant woman stated that the quantity and frequency of foods during pregnancy and prior to pregnancy in my home and the surrounding area are identical. Because they are always at work, I worry about the family's food supply, particularly for those who are engaged in agricultural activities[65].

Out of 419 respondents who participated in the quantitative study, 52.5%, 50.6%, 72.3%, and 71.8% were aware that food during pregnancy is essential for energy and body temperature, proper body function, fetal growth and development, and infection prevention, respectively. However, 47.5%, 49.4%, 27.7%, and 28.2% of respondents were unaware of the significance of food. During pregnancy, iron is required for body energy and heat, proper body function, fetal growth and development, and infection combat. Regarding respondents' knowledge of the meaning of food, only 42.2% knew and correctly responded the meaning of foods, while 57.8% did not know the meaning of food. Regarding the main food group or balanced diet question posed to respondents to assess their nutritional knowledge, the majority of respondents (74%) did not know the main food groups or the balanced diet, whereas a minority of respondents (26%) did[66].

The majority of respondents lacked nutritional knowledge regarding prevalent food sources of protein, carbohydrates, iron, vitamin A, and iodine (70.6%, 79.0%, 80.7%, 78.3%, and 88.1%, respectively). However, the remaining 29.4%, 21%, 19.3%, 21.7%, and 11.9% correctly identified common food sources of protein, carbohydrates, iron, vitamin A, and iodine. Regarding inadequate nutrition during pregnancy, only 34.8% of respondents indicated that inadequate nutrition during pregnancy can cause miscarriage or preterm birth, while 65.2% of respondents were unsure. On the basis of

their responses to the knowledge-evaluation questions, 64.4% of respondents were found to be knowledgeable about nutrition during pregnancy[66].

In this study, a bivariate analysis revealed a significant relationship between husband educational level and nutrition knowledge during pregnancy (p0.05). In addition, in bivariate analysis, age, educational status of mothers, family income, information about nutrition during pregnancy, number of pregnancies prior to the current pregnancy, and interval between pregnancies had strong statistical associations with mothers' knowledge of nutrition during pregnancy (p0.001), whereas family size and respondents' place of residence had no association (p>0.05). After bivariate analysis, the statistically significant predictors were used to conduct multivariate analysis. Those with an estimated monthly income of greater than 1000 birr were 5.7 times more likely to be knowledgeable about nutrition during pregnancy than those with an estimated monthly income of less than 1000 birr (AOR=5.67, 95% CI: 2.08-15.44), and those with an estimated monthly income of greater than 2000 birr were 6.0 times more likely to be knowledgeable than those with an estimated monthly income of less than 2000 birr[67].

In addition, a multivariate analysis revealed significant positive relationships between a woman's level of education and her likelihood of having nutrition knowledge during pregnancy (p0.01). Women with a primary education had substantially greater odds of nutrition knowledge during pregnancy than women with no education (AOR=3.09, 95% CI: 1.65-5.3). On further multivariate analysis, the respondent's age, her husband's educational level, the number of pregnancies preceding the current pregnancy, and the intervals between pregnancies were not significantly associated

with mothers' knowledge of nutrition during pregnancy. This study found that there is a substantial statistical correlation between information about nutrition during pregnancy and nutrition knowledge of mothers during pregnancy (p0.001). In a multivariate analysis, expectant women with nutrition information were 3.59 times more likely to be knowledgeable about nutrition than pregnant women with no nutrition information (AOR = 3.59, 95% CI = 2.03-6.35)[68].

According to a study, 230 (60.9%) of participants were knowledgeable, while 148 (39.1%) were not[69]. One-third of the mothers surveyed believed that inadequate food supplies were the cause of malnutrition. More than one-third (34%) of participants were unaware of the health dangers associated with an iron-deficient diet during pregnancy. The results of logistic regression revealed that the likelihood of knowledge was 2.5 times greater among secondary school participants than among those who did not attend school at all (adjusted odds ratio (AOR) = 2.5, 95% confidence interval (CI): 1.22, 7.75). In terms of occupation, merchant women were seven times more likely to be knowledgeable than caregivers (AOR = 7.02; 95% CI: 2.80, 17.09). In addition, multiparous women were 4.8 (AOR = 4.77; 95% CI: 1.15–8.2) times more likely to be knowledgeable than primigravida women.

In another study, an expectant woman was classified as knowledgeable if her knowledge score was 6 or higher out of 9 and as uninformed if her score was less than 6[70]. The components of pregnant women's knowledge included consuming a variety of foods, increasing the amount eaten during pregnancy, using iodized salt, iron supplement duration and food sources of iron, the need for supplements in addition to regular foods, and dietary restrictions during pregnancy. The aggregate mean score for pregnant women's knowledge of appropriate nutrition was 5,5 (SD 0.5). 53.9% of

the participants in the study have adequate knowledge about proper nutrition during pregnancy. Less than half of pregnant women (43.8%) consider it is important to consume a variety of foods during pregnancy, while 270 (66.5%) are aware of the need to consume more food than usual during pregnancy. 129 participants (31.8%) identified meat, liver, and fish as good sources of iron, while 145 participants (34.7%) identified vegetables as a good source of iron, and 132 participants (32.5%) did not know. 323 participants (79.6%) were aware of the use of iodized salt during pregnancy. Only 144 (35.5%) of the study participants reported that the duration of Iron tablet supplementation was six months, while 113 (27.8%) reported three months and the remainder did not know. One-third (275) of the expectant women in the study were aware of the need to supplement during pregnancy with essential minerals and vitamins. 335 (82.5%) and 263 (64.8%) study participants knew maternal malnutrition would cause fetal and maternal complications, respectively.

This study demonstrated a significant increase in the level of awareness among expectant women who received nutrition education[71]. After receiving nutrition education, the nutritional knowledge of expectant women increased from 53.9 (95% CI: 48.9, 58.8) to 97% (95% CI: 94.8, 97.0%). The knowledge of pregnant women increased markedly in all knowledge components except for the effect of maternal undernutrition leading to fatal complications (82.5%, 95% confidence interval [CI]: 78.4, 86.1 to 89.4%, 95% CI: 85.9, 92.4%). The percentage of expectant women who are knowledgeable about consuming a variety of foods rose from 43.8% to 85.5%. Similarly, knowledge regarding the use of iodized salt, maternal complications due to inadequate nutrition during pregnancy, duration of iron supplementation, and food sources of iron increased from 79.6% to 95.6%, 64.8% to 91.4%, 35.5% to 92.1%, and 31.6% to 86.9 respectively.

In an Australian study, pregnant women's comprehension of the Australian Guide to Healthy Eating (AGHE) was evaluated[72]. The respondents demonstrated the greatest levels of knowledge regarding "food safety practices during pregnancy" (84.22 % correct), "diet–health relationship" (71.16 % correct), and "nutrient sources" (66.8 % correct). The categories with the lowest scores were "multivitamins and supplements during pregnancy" (48.40% correct) and "importance of key nutrients during pregnancy" (46.5% correct).

Approximately two-thirds of respondents (65.2%, n=261) reported being unfamiliar with the AGHE for expectant women. Although 34.8% of respondents (n=139) indicated that they were familiar with the AGHE recommendations, there was no difference in their knowledge of the recommended intake of the five main food groups compared to those who were not aware of the AGHE (P0.63). Respondents were required to select, from a list of multiple-choice options, the correct number of daily servings for each of the five main food groups in the AGHE. The respondents demonstrated a high level of consciousness regarding the recommended intake of "extras" (86.5%, n=346) but a lower level of awareness regarding the recommended intake of dairy foods (56.5%, n=223). Less than half of respondents were aware of the recommended intakes for fruits and vegetables (45%, n=179), bread and cereals (34.5%, n=138), and meat and its alternatives (28.5%, n=114).

The consumption of these non-food items may induce a sense of fullness, thereby decreasing the consumption of nutritious foods. Previously disproven medical theories have reinforced food restriction beliefs. A woman with a petite pelvic was once prescribed the Prochownick diet, which consisted of fluid restriction, low carbohydrate consumption, and high protein intake. It was believed that this diet

would result in a tiny child. Over time, its use was expanded to include all women, not just those with pelvic deficiencies. This diet and other outdated information that is truly detrimental to fetal health are still prevalent today[51]. Other factors limiting food consumption include cultural and religious beliefs [40]. These restrictions are imposed because certain foods may result in "bad" outcomes during pregnancy and delivery [52]. Thus, it is evident that a woman's cultural and personal beliefs will have a significant impact on her dietary choices during pregnancy. Some desires might be innocuous. Self-imposed or cultural restrictions may have a significant impact on the adequacy of the food ingested, severely limiting the essential nutrients and vitamins for fetal growth and development. Because the fetus is directly impacted by the mother's nutritional state, nutritional status during pregnancy is an essential variable to measure. To compensate for the increase in metabolic rate that occurs during pregnancy, a woman's dietary habits must be altered. A higher basal metabolic rate necessitates an increase in caloric for optimal physical function[40]. In reality, a woman's caloric intake should exceed her expenditure during pregnancy. This imbalance will allow for the deposition of glycogen, fat, and protein, all of which are required for embryonic growth and development, while also maintaining the woman's own physical functioning.

Another study that examined the correlation between specific nutrients in expectant women's diets and the birth weight of their infants[72]. Women from varying socioeconomic groups provided the data. Each pregnant woman filled out a dietary intake questionnaire at multiple points during her pregnancy. There is a positive correlation between the infant's birth weight and the quality of the mother's diet, according to the data collected[53].

In a South African study titled Impact of nutrition education on the nutrition knowledge of public-school educators: The questionnaires for the baseline survey were completed by 90 educators and principals from 45 institutions in all nine provinces of South Africa. The results indicated that nutrition education was primarily taught as part of the Life Orientation curriculum (97.8%), with 2.2% of the curriculum also devoted to Natural Science. The majority of schools included nutrition education in all Grades (0-12), with percentages ranging from 68.9% in Grade 0 to 95.6% in Grade 8. A small percentage of schools (20%) spent more than two hours per week on nutrition education. The majority of schools (60%) spent less than one hour per week on nutrition education[54]. Results also revealed the nutrition education resources available to educators at the school. The majority of schools (95.6%) had nutrition education textbooks available, but only 24.4% of nutrition education was delivered through formal lectures. Although 44.8% of respondents indicated the use of food models and 26.7% of respondents indicated the use of food puzzles, these results are questionable because food models and puzzles are not readily available in South Africa and must be imported from the United States of America at an exorbitant cost (R6,800 for 50 food models in 2005). A limited number of schools (11.1% and 6.6%, respectively) use nutrition education games and cards[73].

The majority of the educators' nutrition knowledge was acquired from textbooks (88.9%), seminars (77.8%), and local television programs (73.0%). Even though nutrition education was offered in the majority of primary schools observed and to students in all Grades, the results of the baseline survey indicated that nutrition education received little time per week. This was consistent with studies conducted in the United States, where it was discovered that health and nutrition education is not

accorded the same importance as other subjects when planning the school curriculum[55]. Although respondents indicated that the nutrition curriculum was adequate in terms of the topics covered, there are still voids in the curriculum, such as food security and the identification of malnourished children. Educators did not, however, indicate a need to include these topics in the Life Orientation curriculum. The educators indicated that learners, their caregivers, educators, and NSNP volunteers require nutrition education. This was consistent with the findings that classroom NEP alone is insufficient to influence children's eating patterns and that all stakeholders, including educators and child care providers, should be involved[55]. There is a significant correlation between an educator's knowledge and training and their capacity to teach this subject. According to research, educators devote more time to subjects in which they have received adequate training[74]. The educators who participated in this pilot study had average to inadequate nutrition knowledge prior to the NEP and lacked the confidence to teach nutrition as part of the Life Orientation curriculum.

The majority of the educators in this study obtained their nutrition knowledge from textbooks (88.9%), seminars (77.8%), television (73.3%), and periodicals (68.9%), while only 33.3% and 26.7% received nutrition education during their studies and as part of their in-service training, respectively. According to additional studies, educators lack confidence when teaching topics in which they lack sufficient knowledge[56]. In this study, this was demonstrated by the fact that the majority of institutions offered Life Orientation for less than one hour per week. Nutrition is one of the many life skills included in the Life Orientation curriculum; however, it is significantly less prevalent in South African schools than the minimum number of 50

hours nutrition education recommended to facilitate behavioral change in children[57]. A lack of training and support for educators is just one of the many obstacles they face when implementing wellness programs and curricula in schools. Additional factors include appropriate guidelines, time constraints, other academic priorities, funding, and low educator participation rates.

In a separate study, the Effect of Nutrition Education on Pregnancy-Specific Nutrition Knowledge and Healthy Dietary Practice among Pregnant Women in Addis Ababa was investigated[75]. After receiving nutrition education, pregnant women's knowledge about nutrition during pregnancy increased substantially from 53.9% to 97.0%, while their pregnancy-specific dietary practices increased from 46.8% to 83.0%. 59% of expectant women in this study received their information from midwives and nurses[58]. Compared to a study conducted in Gambia, which found that 35% of study participants were informed on nutrition and diet by their ANC providers, this study found that 45% of participants were informed on nutrition and diet by their ANC providers. Although the result of this research was higher than that of the Gambia study, substantial effort was still required to improve nutrition education in order to provide the crucial information needed to prevent the intergenerational effects of malnutrition[76].

This study also determined that 53.9% of mothers have adequate knowledge regarding maternal nutrition during pregnancy. This study's results are comparable to those of a study conducted in the United States, in which more than half of the women surveyed possessed fundamental and essential knowledge regarding the importance of nutrition during pregnancy[59]. This outcome is inferior to the Malaysian study's: In Swaziland, between 65.7% and 67% of mothers were knowledgeable about maternal nutrition. While this investigation yields superior results to the Egyptian study: 46%

of mothers were knowledgeable about maternal nutrition. However, similar to the results of a study conducted in East Wollega, elsewhere in Ethiopia 52.5% of respondents were aware that sustenance during pregnancy is essential for energy and heat production[77].

This disparity may be attributable to socioeconomic and cultural differences between the study participants. In this study, 64.8% of expectant women were aware that maternal malnutrition can cause fetal complications. This study's findings exceeded those from East Wollega, Ethiopia: 34.8% of expectant women were aware that inadequate nutrition during pregnancy can lead to complications such as miscarriage and premature birth. Another cross-sectional study conducted in India found that 27.4% of mothers with knowledge regarding maternal nutrition during pregnancy were at risk for developing maternal complications[78].

This discrepancy may be the result of differing beliefs about the causes of disease in different regions, which are in turn affected by differences in knowledge, cultural, and spiritual influences. This study revealed that 66.5% of participants are aware of the need to consume more food during pregnancy compared to non-pregnant states. This is lower than the Pakistani study which found that 84% of mothers knew how to increase or add additional food items to their diet during pregnancy compared to non-pregnant states[79]. This discrepancy may be the result of differing beliefs about the causes of disease in different regions, which are in turn affected by differences in knowledge, cultural, and spiritual influences. This study revealed that 66.5% of participants are aware of the need to consume more food during pregnancy compared to non-pregnant states. This is lower than the Pakistani study which found that 84% of

mothers knew how to increase or add additional food items to their diet during pregnancy compared to non-pregnant states.

This study also revealed that only 35.5% of study participants reported that the duration of Iron supplementation during pregnancy was 6 months, while 27.8% reported that it was given for 3 months, and the rest did not know. Although iron supplementation during pregnancy was promoted via television and radio in Ethiopia, more than half of the study participants lacked the essential knowledge regarding iron supplementation, according to the findings of this study [80]. This can be attributed to the fact that women lack access to information; therefore, audience-specific education and promotion of iron supplementation during pregnancy should be emphasized through various information dissemination channels in the studied area in order to reach the target population.

In addition, 46.8% of pregnant women were found to have excellent nutrition practices during pregnancy, according to the findings of this study. Similarly, a study conducted in Swaziland found that 51% of pregnant women had excellent nutrition practices during pregnancy[81]. In contrast, another study conducted in Malaysia (74%) and Pakistan (65%) found a higher proportion of pregnant women with excellent nutrition practices. The differences in socioeconomic status, cultural beliefs, and access to nutrition and health services among the study participants may account for these differences. In this study, 69.7% of expectant women ate at least one additional meal compared to their pre-pregnancy diet. Another study conducted in Wondo Genet, Ethiopia found that 75.2 percent of expectant women did not consume any additional meals. Economic disparities and knowledge gaps may have contributed to this

disparity[82]. In accordance with the recommended servings of dairy products and green vegetables per day during pregnancy, 42.4% of expectant women ate dairy products and 46.0% ate green vegetables, according to this study. This study's findings were consistent with an American study in which 42.7% of participants had a daily milk consumption behavior. In contrast to this research, 58.9% of respondents in a study conducted in the United States reported a daily habit of consuming fresh vegetables. These disparities may be caused by dietary and knowledge differences between the two communities. The adherence to Iron supplements was 69% one week prior to this study's survey, which is comparable to the results from the United States (63.7%) and India (62%) for antenatal mothers consuming Iron folate tablets. The similarity of these outcomes may be attributable to the use of similar intervention strategies, including supplementation, one-on-one education, and iron supplementation. 27.3% of study participants avoided one or more food groups during their pregnancy.

According to a study conducted in Wondo Genet, Ethiopia, 21% of pregnant women were avoiding certain dietary groups[83]. In this study, the most common reasons for avoiding food groups were experiencing nausea and vomiting after consuming the food (39.6%), disliking the food (49.5%), and being told by others that it will impair pregnancy and food taboo (9.9%). In accordance with the findings of this research, a previous study conducted in Shashaman, Ethiopia, identified food taboo as one of the causes[84]. The differences between the two studies may be due to the differences between the study participants. The present study was conducted on urban communities (pregnant women), who may be better educated and have better access to nutrition information during pregnancy than rural mothers. Furthermore, cultural beliefs, whether right or wrong, tend to influence behavior. Nonetheless, this finding

offers a glimmer of optimism that such misconceptions and taboos may be gradually overcome as access to education and health services expands[70]. In this study, expectant women most frequently avoided meat, grains, dairy products, vegetables, and spicy foods. Almost identical to what expectant women in Shashamane, Ethiopia avoided[69].

In this study, after the implementation of nutrition education, the proportion of pregnant women with adequate knowledge of nutrition during pregnancy increased from 53.9% to 97.0%, corroborating the findings of a previous study conducted in Iran, in which the positive effect of nutrition education on knowledge change ranged from 3% to 31%. This is consistent with a study conducted in India, which found an increase in overall nutritional knowledge from a mean score of 22 to 32.7 between the pre- and post-assessment periods[71]. These findings suggest the efficacy of nutrition education in enhancing pregnant women's knowledge of nutrition during pregnancy. Higher change in nutrition knowledge among pregnant women in this study may also be attributable to the brief time period between the pre- and post-assessments and the fact that only one post-education assessment was administered. In this investigation, the percentage of pregnant women who followed a pregnancy-specific diet increased from 46.8% to 83.2%. According to a Dutch study, there was a significant increase in the amount of nearly all food groups consumed in the post-Nutrition Education group in comparison to the non-Nutrition Education and pre-Nutrition Education groups[85].

Another study on Dietary intake knowledge and reasons for food restriction during pregnancy among expectant Nigerian women visiting primary health care centers in Ile-Ife[86]. According to the respondents' sociodemographic characteristics, their ages

ranged from 14 to 53, with a mean of 27 5.3 years. In addition, the respondents had an average of 2.0 1.3 offspring. The majority of women are married (90.8%) and have monogamous families (91%). The majority of respondents (44.5%) had postsecondary education. Seventy-five percent of the respondents were Christians, and eighty-eight percent were Yoruba. Very few respondents (4.6%) had no income, and only 11.1% earned more than 50,000 (approximately $315). Participants had a mean knowledge score of 23.6 4.2 years and approximately three-quarters (75.5%) of them had excellent knowledge of dietary intake during pregnancy, based on their knowledge of dietary intake during pregnancy. 21.5% of respondents had adequate knowledge of dietary consumption, while 3.0% have inadequate knowledge.

The proportions of respondents with correct responses to food-related statements during pregnancy revealed that the majority of respondents (88.3%) were aware of the notion that food intake should increase during pregnancy. Nearly three-quarters (73.4%) of respondents were aware of the need to consume more protein during pregnancy. Nearly all respondents (96.2%) were aware that protein-rich foods, such as beef, fish, eggs, and legumes, are necessary for body growth and repair. The majority of respondents (88.5%) were aware that fat- and oil-rich foods, such as palm oil, groundnut oil, butter, and margarine, are necessary for tissue and organ preservation. Fruits and vegetables, which are rich in vitamins and minerals, are essential for excellent health, according to an overwhelming majority of respondents (87.7%). Many (44.7%) respondents incorrectly indicated that pregnant women should consume more carbohydrates. Slightly more than one-third (36.0%) of respondents specifically mentioned the need to consume additional minerals and micronutrients during pregnancy. Only 28.9% of respondents cited lipids and oils as pregnancy-required essential foods.

Pregnant women were found to have an association between dietary intake knowledge and socio-demographic characteristics. This association was significant at P = 0.012, with a higher proportion of respondents aged 35 or older having a solid grasp of dietary intake (86.5% vs. 77.5% and 68.8%, respectively) than those aged 25–34 (77.5%) and 14–24 (68%). Those with tertiary education had the best knowledge of dietary intake (81.7%), followed by those with primary (70.8%), secondary (70.4%), and no formal education (68%) education levels. Overall, there was a significant correlation between education level and dietary knowledge (P = 0.003). In comparison to other categories of women, such as civil servants and students, the proportion of unemployed and petty-trader respondents with a solid understanding of dietary consumption was lower.

Overall, there was a significant correlation between respondents' levels of education and their occupations (P = 0.024). This association was found to be significant (P = 0.006). The proportions of respondents with inadequate knowledge of dietary intake were lower among those with a higher monthly income compared to those with no monthly income. No significant association was found between knowledge of dietary intake and other socio-demographic factors, including marital status, parity, religion, ethnicity, and number of children. Cultural taboos (36.5%) topped the list of factors influencing diet during pregnancy cited by respondents, followed by restriction of certain foods because they cause large babies or make labor and delivery difficult (25.6%), belief regarding negative health effects of foods (13.7%), dislike of food taste during pregnancy (12.1%), and food forbidden for religious reasons (12.1%).

In a separate study conducted in Bangladesh on socioeconomic and demographic factors influencing the nutritional status of young mothers who had their first child

before the age of 20, it was determined that the mean age of the mothers was 20.49 2.37 years (95% CI: 20.40–20.58)[88]. This was determined by analyzing the data set of 2,743 young nonpregnant Bangladeshi mothers (age 24 or younger) who had their first child before the age of 20. 1.60 0.76 was the mean number of offspring per mother. More than half of them (53.8%) had one child, about a third (34.6%) had two, and the remainder (11.6%) had two or more. All mothers had a mean weight of 45.97 8.01 kg (95% CI: 45.67–46.27), ranging from 28.00 to 104.20 kg. The mothers' mean height was 150.87 5.48 cm (95% CI: 150.66–151.07), with a range of 112.10 to 197.20 cm. The BMI ranged from 13.09 kg/m2 to 38.13 kg/m2 with a mean value of 20.16 3.07 kg/m2 (95% CI: 20.04–20.27).

The age of these women at their first birth ranges from 12 to 19 years, with a mean of 16.54 1.67 years (95% CI: 16.48–16.56)[89]. Based on BMI categories, more than half of the mothers (60.5%) were of normal weight, while approximately one-third (32.1%) were underweight. There were comparatively few mothers who were overweight or obese (6.2% and 1.2%, respectively), and the majority of them lived in urban areas. 11.9% of mothers with CED (same criteria as underweight based on BMI categories: BMI 18.5 kg/m2) were severe, 25.1% were moderate, and 62.2% were minor (grade I). Women in rural areas were more likely to be underweight (38.8%) than their urban counterparts (25.8%). Those with a lesser education level (39.9%) were more likely to be underweight than those with a higher education level (30.3%). Similarly, the education level of the husband had an impact on the nutritional status of these women[90].

In addition to family income, the BMI was also influenced by income. Our study revealed that women from impoverished households were more likely to be

underweight (39%) than those from other socioeconomic backgrounds (26,1%). We also observed that non-working women (housewives) were less likely to be underweight than working women (32.4% vs. 49.0%)[91]. In contrast, women with unemployed spouses were more likely to be underweight than those with employed husbands (37.7 vs. 30.8%). The Chi-square test revealed that the association between all of these variables and a low BMI (underweight status) was statistically significant (p 0.001). When examining the method and location of childbirth, we found that mothers who delivered at home were more likely to be underweight than those who delivered in hospitals or clinics (36.4% vs. 28.2%). The association between birthplace and low birthweight was statistically significant (p 0.001). The majority of those who gave birth naturally (non-Cesarean section) at home were more likely to be underweight (35.3% vs. 27.7%). The relationship between mode of delivery and low birthweight was statistically significant (p 0.05). 35.2% of women who married before the age of 17 were underweight, compared to 31.0% of women who married later. In addition, more than one-third of women who gave birth to their first child before the age of 17 were underweight, a significantly higher proportion than those who gave birth to their first child at a later age (36.8% vs. 32.2%)[92].

We also observed that women with three or more children were more likely to be underweight than women with one or two children (41.4% vs. 33.3%)[93]. All of these factors were associated with underweight in a statistically significant way (p 0.05). We decided to exclude overweight and obese women from the 2 test and logistic regression model because there were so few of them in our sample population (6.2% and 1.2%, respectively). In this binary model, we used underweight as the dependent variable (reference case) and normal as the independent variable (non-reference case).

In this model, only variables with a significant association were deemed independent variables[94]. The logistic regression coefficient and hazards ratio indicated that women from rural areas had a 1.478% [95% CI: 1.23–1.78; p 0.01] greater likelihood of being underweight than women from urban areas. Those with only a secondary education were 2.997 times [95% CI: 1.57–5.72; p 0.01] more likely to be underweight than those with a higher level of education. Analyzing the risk of these women being underweight in relation to the education levels of their partners or husbands yielded similar results. employed mothers.

In another study on sociocultural and access barriers to nutrition for expectant women in Indonesia, sociocultural and access barriers were identified[95]. In settings with limited resources, females frequently experience malnutrition during childhood and adolescence, which worsens during pregnancy. Women are frequently responsible for meal preparation, yet they consume last and least, with no consideration for their nutritional needs if they become pregnant. A mother with malnutrition is more likely to give birth to infants with low birthweight and malnutrition. stunting and the development of noncommunicable diseases in adulthood, such as obesity, hypertension, heart disease, and diabetes, are associated with prenatal nutrition and inadequate nutrition in infancy and early childhood. Nearly half of expectant women in Indonesia are anemic. Anemia in expectant women has a negative impact on fetal development and increases the risk of mortality and morbidity for both mother and child. This has contributed to 27.67% of children in the country suffering from stunted growth[96].

The Indonesian government has been working to reduce stunting rates, including the August 2017 launch of its "Integrated Nutrition Interventions for Stunting Reduction and Prevention" national strategy. Despite this, the majority of communities have a limited understanding of nutrition and its impact on pregnancy and birth outcomes. A multi-stakeholder approach addressing gender norms and involving families and communities is necessary for the success of reduction efforts.

Compromised health and nutrition during pregnancy

In recent years, the number of public healthcare facilities and medical professionals in Indonesia has increased, but many women continue giving birth at home. Women who give birth at home may not have access to skilled delivery attendants or emergency care, which increases the risk of maternal and infant mortality and morbidity. In addition, women from lower socioeconomic families, those in high-risk groups, such as those who are too young or too elderly, anemic, or have poor nutritional status, and those with limited access to healthcare are at a higher risk of maternal and infant morbidity and mortality[97].

In a number of Indonesian communities, women face additional barriers to accessing antenatal care due to superstitious beliefs and practices. Some ethnicities prohibit women from accessing health services without a male or elderly female relative present, further delaying medical care. Some communities believe that if a woman dies during childbirth, she goes directly to heaven; these tragedies are known as'syahi.' This undermines the efforts undertaken to protect the mother's life[98].

Inequitable access to information

In many marginalized communities, community health centers (CHCs) are the primary source of health information dissemination. Due to the current pandemic, the

majority of CHCs are closed to prevent the spread of disease, and vital health information is instead disseminated via webinars, conference calls, WhatsApp, and text messages. While 39% of women now own a smartphone, not all of them use the device, and women's mobile phone and technology usage remains low. For those with access to a device, an increase in household responsibilities has left them with little time to peruse these messages. As a consequence, women do not receive vital health-related information[99].

Disproportionate impact of the pandemic

In a society where women and girls struggle to access fundamental needs such as a healthy diet, education, clean water, and sexual and reproductive health services, the restrictions imposed by COVID-19 make it more difficult for them to obtain these necessities. A rise in maternal, neonatal, and infant mortality is anticipated in low- and middle-income countries due to the direct and indirect effects of COVID-19, according to studies[100]. Women are on the frontlines of the pandemic both at home and in the healthcare industry, and they are experiencing the effects most acutely. In addition, more than sixty percent of informal sector jobs in Indonesia are held by women, where adherence to social distance protocols may be problematic. Government responses to the pandemic must take into consideration the disproportionate effect of COVID-19 on women[101].

Improving women's health and nutrition

Numerous activists have fought for women's equal representation in decision-making. Involving women in household conversations about their own health and nutrition is a crucial first step in effecting change. Key health messages must be disseminated through the use of common media such as radio and television, as well as influencers

such as religious leaders and health personnel. Important measures also include enhancing the capabilities of women's self-help organizations in municipalities and recruiting adolescent girls with mobile phones to deliver nutrition messages to pregnant women[102]. In addition to increasing women's awareness of maternal and child health issues, it is essential to educate and engage males about women's health issues. Including men in Posyandu sessions is an effective method for describing the unique requirements of women during and after pregnancy[103].

Communication tools for behavior modification that rely on graphic and illustrative messaging have proven effective in reaching large populations, especially those with low literacy. Creating these tools not only for the healthcare personnel at CHCs, but also for the recipients to take home can aid in the dissemination of vital health messages and essential nutrition actions. This is illustrated by Nutrition International's Iron & Folic Acid (IFA) Compliance Card, which was designed to track expectant women's daily IFA supplementation[104]. Not only did it assist women in keeping track of their IFA supplements, but it also served as a reminder for them and their families to take them. In addition, the card was adopted by the Ministry of Health for national use in the Maternal and Child Health Handbook and became a valuable monitoring tool for facility and community health workers[105].

Pregnancy is a time of happiness and vulnerability for every woman. For her own health and survival, as well as that of her child, it is vital that she receives adequate nutrition and attention. The Indonesian government has made concerted efforts to improve maternal nutrition and reduce rates of stunting, but more work remains. As attention and resources are devoted to mitigating the damage caused by COVID-19, the world cannot ignore the impact on women who are already confronted with formidable obstacles to access essential services, which are exacerbated by the

coronavirus response[107]. Helping them overcome these obstacles now is vital to ensuring that they – and we – emerge from this global pandemic stronger, more resilient, and prepared to construct a better future for everyone.

In a separate investigation of the socioeconomic and nutritional status of expectant women in Palu. This study found a correlation between economic status and nutritional status among expectant women residing in temporary shelters in Talise, Palu, Central Sulawesi[108]. The Chi-Square test revealed a significant correlation between socioeconomic status and nutritional status at 0.05 and $p = 0.027$. Family ability to purchase sustenance is contingent on family income. Families with limited resources are unlikely to satisfy their nutritional needs. To effectively manage and reduce the high risk associated with pregnancy, precise data is required. When complications are not detected early, they continue to worsen, posing a threat to both the mother and embryo.

This increases the rates of morbidity and mortality. 60%–80% of the income of low-income households was spent on food. In addition, 70–80 percent of energy was derived from carbohydrates (rice and substitutes), while only 20 percent was derived from other sources of energy such as fat and protein. According to previous research, there is a correlation between socioeconomic status and the incidence of Chronic Energy Deficiency (CED) among expectant women in the Ngambon subdistrict of Bojonegoro[109]. In contrast, Hamzah (2017) found in Aceh that pregnant women with incomes below the provincial minimum wage are 3.155 times more likely to experience chronic energy deficiency than pregnant women with incomes above the provincial minimum wage[110]. Most importantly, a family's income is essential for meeting primary requirements that influence the family's health status. According to research, expectant women with a low monthly household income have an 8.72 times

greater risk of developing CED.Similarly, there is a significant correlation between monthly family income and the incidence of CED in expectant women, it was discovered[111].

In a separate study titled Relationship Between Socioeconomic Factors and Food Security among Pregnant Women in Iran, researchers discovered that[112]. The participants were between the ages of 16 and 48 (27.6 5.8), their gestational ages ranged from 14 to 42 weeks, and their average weight gain was 9.6 kilograms. High school completion was the most common level of education for both participants and their spouses (42.9% and 30.5%, respectively). Regarding income, the majority of participants (45.5%) earned less than 400 000 Rials per month. The majority of participants (62.6%) resided in urban areas, while the remainder (37.5%) lived in rural areas. The socioeconomic data revealed that the majority of participants were housewives (94.7%), while their spouses were self-employed (66.7%).

30.9% and 69.1% of expectant women had food insecurity and complete food security, respectively. The study shows that food insecurity was greater in families without a child younger than 18 than in those with a child older than 18 (10.4% food insecurity with moderate hunger versus 8% in families with a child younger than 18). Food security was significantly correlated with family socioeconomic status (gamma P = 0.000), house size (P = 0.000), husband's occupational status (P = 0.002), monthly income (gamma P = 0.000), and monthly food costs (P = 0.000), according to statistical tests[113]. The results of the regression analysis indicated that a worker spouse increased the likelihood of food insecurity by 28% compared to a self-employed husband. Families with a low socioeconomic status were 53% more likely to be food insecure than those with a high socioeconomic status.

In another study on determinants of Nutritional status

23.8% of pregnant women were acutely malnourished (MUAC 23 cm), 67.0% had modest gestational weight gain (10 kg), and 12.1% were anemic (hemoglobin level 11 g/dL). Age, ethnicity, education level, household income, and dietary diversity of expectant women were significantly associated with their MUAC, as determined by the Chi-square test. Similarly, household income, household food security, and dietary diversity were significantly related to the weight gain of expectant women[114].

Except for dietary diversity, none of the demographic, socioeconomic, cultural, or food security factors were substantially associated with the anemia status of pregnant women. Janajati pregnant women were 58.9% less probable than Brahmin/ Chhetri/Other pregnant women to be acutely malnourished (MUAC 23 cm) (AOR: 0.411, CI: 0.178 – 0.950, p=0.037). Similarly, food secure pregnant women were 60.2% less likely to have low gestational weight gain than food insecure pregnant women (AOR: 0.398, CI: 0.170–0.928, p=0.033), and pregnant women with high dietary diversity were 63.6% less likely to have low gestational weight gain than their counterparts (AOR: 0.364, CI: 0.159–0.856, p=0.016). Compared to pregnant women with the least dietary diversity, those with a medium dietary diversity were 65.7% less likely to be anemic (OR: 0.343, CI: 0.138–0.880, p=0.021)[115].

2.4 Appraisal of Reviewed Literature

This chapter focused on the review of relevant literature for this research, which was conducted primarily through conceptual and empirical review. The conceptual review considered pertinent topics and themes related to nutrition, malnutrition, and nutrition

education; nutrition education was considered because it determines nutritional knowledge among pregnant women; only then can the nutritional status of pregnant women be improved; and the majority of studies considered in the empirical review section of this study exhibited varying levels of response in relation to pregnant women's nutritional knowledge and nutritional status.

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Chapter Three

Methodology

3.1 Research Design

This study makes use of a descriptive survey research design. This design was chosen due to its clear problem definition, collection of pertinent and sufficient data, interpretation of the data, and skillful reporting of the results.

3.2 Study Location

The origins of Ona–Ara Local Government can be traced back to the agitation of its founding fathers following the establishment of Oluyole Local Government, which was deemed too large for efficient and effective administration. The argument of these founding fathers was predicated on the notion that metropolitan areas were given too much attention at the expense of the predominantly agricultural rural areas. In fact, the founding fathers believed that the rural areas were entirely cut off from contributing to the system of governance, as they lacked good roads, potable water, and electricity, and were plagued by periodic outbreaks of disease. In other terms, the government at the headquarters, i.e. Idi–Ayunre, had no positive impact on their lives. The tide however turned in 1989 when the then Military Administration of President Ibrahim Babangida established the Ona–Ara Local Government from the Old Oluyole Local Government with its headquarters in Akanran. Prior to the creation of Local Council Development Areas LCDA by His Excellency Senator Dr. Ishaq Abiola Ajimobi, Akanran was strategically selected as the headquarters because of its central location and road networks connecting other communities in the eleven wards of the Local Government.

According to the 2006 population census, Ona–Ara Local Government has a total population of 265,059. The male population is 131,471 and the female population is

131,588. The total land area is approximately 3,570 kilometers. Ona–Ara Local Government is partially bordered by Egbede Local Government to the north, Oluyole Local Government to the south, Ogun/Osun State to the east, and the Lagos/Ibadan expressway to the west, with Ibadan South East Local Government area on the opposite side of the expressway. The Ona–Ara Local Government is divided into eleven constituencies. The majority of the inhabitants of Ona–Ara Local Government are cultivators who cultivate cocoa, kola, cashews, and citrus fruits such as orange, mango, etc. on fertile land. The farming population is dispersed throughout the diverse communities of the Local Government, which include, to name a few, Foworogun, Idi–Ogun, Elese–Erin, Olosunde, Ojebode, Akanran, and Gbada–Efon.

The Local Government council has a Traditional Council consisting of thirteen recognized Baales whose chairmanship rotates. The customary among the Olubadan - in the Council and among the other Senior Chiefs. High Chief Dr. O.O. Olaifa is the current Osi Balogun of Ibadanland. In addition, the members of the Ona-Ara Traditional Council include 32 part Baales and a number of other chiefs who assist in maintaining the cohesion and tranquil existence of the citizens of numerous communities.

Geographic Area: 3570 square kilometers According to the 2006 National Population Census, the total population was 265'059 individuals. Akanran Local Government Headquarters.

The Local Government now consists of 11 wards made up of:

1. Akanran ward
2. Araromi /Kajola ward

3. Badeku ward
4. Gbada-efon ward
5. Idi –ose ward
6. Idi-osan ward
7. Olunloyo ward
8. Ajia ward
9. Olorunsogo ward
10. Gbedun ward
11. Oremeji ward

3.3 Study Population

This study's demographic consists of all pregnant women who visited primary health care centers in Ona-ora local government, Oyo state.

3.4 Sample Size determination

Using Taro Yamane's formula for sample size determination of

$$n = \frac{N}{(1 + N^* (e)^2}$$

Where:

n signifies the estimated sample size of 884 based quarterly clinic based record of registered pregnant women at the local government secretariat PHC unit.

N signifies the population under study

e signifies the margin error

$n = 884 / (1 + 884 (0.05)^2)$

$n = 884/ (1 + 884 (0.0025)$

$n = 884 / (1+2.21)$

$n = 884/3.21$

$n = 275$

A total of 341 pregnant women were interviewed for this study in Ona ara Local Government Area

3.4.1 Sample and Sampling Technique

The sample for this study was comprised of341 pregnant women, and a multi-stage sampling technique was employed. In the first stage, simple random sampling was used to select five PHC centers in the Ona-Ara local government area. All government-owned health facilities were included in a simple random sample of fish bown with replacement.

At stage two, atleast 65 expectant women were randomly selected from five health centers.

3.5 Research Instrument

This study's data collection instrument will be a questionnaire devised by the researcher and divided into three sections: Section A requests information regarding the demographic characteristics of respondents: Section B will focus on cultural beliefs and taboos, Section C on dietary pattern, and Section D on physical activity among pregnant women in Ona ara Local Government Area.

3.5.1 Validity of the instrument

Validity is the process of ensuring that an instrument accurately measures what it is intended to measure. In order to guarantee the validity of the instrument's components in terms of lucidity, appropriateness of language expression, and word precision. The instrument's draft will be provided to the project manager. The supervisor's comments and recommendations will be used to enhance the instrument's face and content validity.

3.5.2 Reliability of the instrument

Reliability is the capacity of a measurement to consistently produce the same result over time.

3.6 Data Collection Procedure

On the days scheduled for data collection, the researcher approaches the Head of Primary Health Care units in the Local Government with a letter from the school in order to obtain permission to retrieve data from clients in the clinics. After obtaining approval from the Head of Centre, the researcher, accompanied by four trained research assistants, travels to the clinics chosen for the study to meet with potential respondents and administer the survey.

3.7 Data Analysis

The descriptive statistics of frequency count and percentage was used to analyze the demographic characteristics of the respondents and research questions formulated for the study. Tables was used to present the results of the analysis using Statistical

Package for the Social Sciences version 20, and chi-square will be used to test hypotheses at an alpha level of 0.05.

The prudent dietary pattern was characterized by a high intake of fruits, nuts, vegetables, pulses, cereals, fish, and poultry; a moderate intake of dairy products and cheese; and an especially low intake of red meat and cold cuts. In contrast, the Western dietary pattern was distinguished by a high intake of red meat and cold cuts, potatoes, cakes and pastries, chocolate, and sugary beverages, and a very low intake of pulses, fruits, and cereals. These dietary patterns were derived from the Mediterranean diet and the Spanish dietary guidelines for expectant women. As an aggregate measure of the participants' relative tendency toward prudent or Western dietary patterns, a new variable was employed. This variable was determined by subtracting the total recommended daily intake for each food group from the total daily intake score for all food groups. The obtained results were divided into three categories based on two percentile cutoffs: 33,3 and 66.6. Negative values were classified as "Western", intermediate or moderate values in the center of the frequency distribution were classified as "mixed", and the most positive values were classified as "prudent".

3.8 Ethical considerations

From the Public Health Department of Lead City University Ibadan, a formal letter describing the topic of the study was obtained; the letter was then delivered to the Medical Officer of Health in charge of one local government area, after which each Primary health care centre officer in charge was approached for the study. Each questionnaire stipulated the omission of the respondent's name and personal information as a means of maintaining the confidentiality of their information. Also, a

copy of this study proposal was presented to the university's ethical committee board and the state's ethical committee, which ethical approvals were collected.

Chapter Four

Result and Discussion of Findings

4.1 Demographic Characteristics of Respondents

Variables related to sociodemographics, lifestyle, and pregnancy (N = 341)

The socio-demographic characteristics of the respondents are displayed in Table 4.1. The average age of respondents was 27.21, with a standard deviation of 5.18 years. The participants in the study (68%) were married, while only 31.7% were single and 0.3% were divorced. Over half of the participants (52,2%) had completed secondary education, while 20.5% had higher or tertiary education, 25.8% had primary education, and 1.5% had no formal education. Others (3.5%), the Igbo (4.7%), and the Hausa (0.6%) followed the Yoruba (91.2%) as the next largest ethnic group.

No traditional or other religions were reported by participants. Majority of participants (62.8%) resided in urban areas, while 37.2% lived in rural locations. 73.3 percent of the participants were employed, while 26.7 percent were unemployed. Majority of employed individuals (57.5%) were engaged in commerce, followed by artisans (13.2%), housewives (10.3%), civil servants (15.5%), farmers (0.9%), and clergy (2.5%).

Also, majority of respondents reported having a nuclear family (86.8%) as opposed to a polygamous family (13.2%). 59.2% of participants married between the ages of 18-24, 35.2% between the ages of 25-29, and just 2.1% before the age of 18. The majority of participants (69.2%) reported having their first sexual encounter between the ages of 18-24, while 25.2% reported having their first sexual encounter between the ages of 25-29, and only 3.8% reported having sex before the age of 18.

Regarding pregnancy-related variables, 41.6% of participants reported having no children, 57.2% had one to four children, and 1.2% had more than five children. In addition, 43.7% of participants reported having no living children, 55.7% had between 1 and 4 living children, and only 1.2% reported having more than 5 live children. In terms of gestational age, 51.3% of participants reported giving birth in the second trimester, 39.3% in the third trimester, and 9.4% in the first.

In terms of health and lifestyle, 48.1% of participants had a healthy body mass index (BMI), while 30.8% were overweight and 11.1% were underweight. In addition, 92.7% of participants reported no or minimal physical activity, 6.2% reported moderate physical activity, and 1.5% reported intense physical activity.

Table 4.1 **Socio-Demographic Characteristics of Respondents**

Variables	Frequency	Percent(%)
Age as at last birthday		
Mean ±S.D	27.21± 5.18	
Age grouping		
Less than 18	2	0.6
19-24	110	32.3
25-29	133	39
30-34	67	19.6
35-39	24	7
40-44	5	1.5
Marital Status		
Single	108	31.7
Married	232	68
Divorced	1	0.3
Educational Level		
None	5	1.5
Primary level	88	25.8
Secondary level	178	52.2
Higher/ Tertiary level	70	20.5
Ethnicity		
Yoruba	311	91.2
Ibo	16	4.7
Hausa	2	0.6
Others	12	3.5
Religion		
Christain	172	50.4
Islam	169	49.6

Traditional	0	0
Others	0	0
Place of residence		
Urban	214	62.8
Rural	127	37.2
Employment Status		
Employed	250	73.3
Unemployed	91	26.7
Occupation		
Civil Servant	53	15.5
Trading	196	57.5
Farming	3	0.9
Clergy	9	2.6
House wife	35	10.3
Artisan	45	13.2
Family type		
Nuclear	296	86.8
Polygamous	45	13.2
Age of first marriage		
Less than 18	7	2.1
18-24	202	59.2
25-29	120	35.2
>30	12	3.5
Age of first sexual intercourse		
Less than 18	13	3.8
18-24	236	69.2
25-29	86	25.2

>30	6	1.8
Number of child(ren) born		
None	142	41.6
1-4	195	57.2
>5	4	1.2
Number of chil(ren) alive		
None	147	43.7
1-4	190	55.7
>5	4	1.2
Gestation age		
1st Trimester	32	9.4
2nd Trimester	175	51.3
3rd Trimester	134	39.3
Body Mass Index		
Underweight	38	11.1
Normal	164	48.1
Overweight	105	30.8
Obese	34	10
Level of Physical Activity		
None/Low	316	92.7
Moderate	21	6.2
Intense	4	1.2

Source: Field Survey 2023

4.2 **Presentation of Data**

Research Question Two: Cultural Belief and Food Taboos among pregnant women in Ona Ara Local Governement area.

Table 4.2 summarizes the findings of a survey investigating food taboos and cultural beliefs among a sample of respondents. The first variable in the table questions respondents if they have food taboos and cultural beliefs, to which 165 (48.0%) responded affirmatively and 176 (51.6%) responded negatively.

The table then provides the frequencies and percentages of respondents who have taboos or cultural beliefs regarding five categories of food and beverages. For instance, 48.5% of respondents reported having taboos or cultural beliefs regarding snail, while 33.3% said they did not and 18.2% were uncertain.

Similarly, 98 respondents (59.4%) reported having taboos or cultural beliefs regarding plantain or banana, while 56 (33.9%) said they do not and 11 (6.7%) were uncertain. 112 respondents (67.9%) reported having taboos or cultural beliefs regarding eggs, while 45 (27.3%) said they do not and 8 (4.8%) were hesitant.

61 (37%) respondents reported having taboos or cultural beliefs regarding okra, while 67 (40%) said they do not and 37 (22.4%) were uncertain. Regarding beverages like Milo, Bournvita, and milk, 123 (74.5%) respondents reported having taboos or cultural beliefs, while 25 (15.2%) said they do not and 17 (10%) were uncertain.

Table 4.2: **Cultural Beliefs and Food Taboos among the respondents**

Variables	Frequency	Percent (%)
Do you have food taboos and cultural belief		
Yes	165	48.4
No	176	51.6
Which food		
Snail		
Yes	80	48.5
No	55	33.3
I don't know	30	18.2
Plantain or Banana		
Yes	98	59.4
No	56	33.9
I don't know	11	6.7
Eggs		
Yes	112	67.9
No	45	27.3
I don't know	8	4.8
Okra		
Yes	61	37
No	67	40.6
I don't know	37	22.4
Beverages such as milo, bournvita, milk		
Yes	123	74.5
No	25	15.2
I don't know	17	10.3

Source: Field Survey 2023

Beliefs of pregnant women in Ona Ara LGA

Table 4.2.1 below shows that about 34.3% of respondents attend Traditional Birth Attendants (TBAs) or Formal Birth Attendants (FBAs) during pregnancy, while 65.7% do not. Regarding the frequency of attendance, the majority (70.9%) attend weekly, with smaller percentages attending twice in three weeks (13.7%), monthly (7.7%), or occasionally (6.0%). In terms of belief in TBAs/FBAs over health facilities, 32.6% affirmatively responded, while 67.4% did not. Among those who believe, 100% express a very strong belief. Additionally, 40.2% believe that attending TBAs/FBAs will help reduce complications during pregnancy/delivery, while 59.8% do not share this belief.

Table 4.2.1 Beliefs of pregnant women in Ona ara LGA

Variables	Frequency	Percent (%)
Do you attend TBA/FBA during pregnancy		
Yes	117	34.3
No	224	65.7
How often		
I don't know	2	1.7
Weekly	83	70.9
Twice in 3 weeks	16	13.7
Monthly	9	7.7
Occasionally	7	6.0
Do you believe in TBAs/FBAs than health facilities		
Yes	111	32.6
No	230	67.4
If yes, how strongly do you believe		
Very Strong	111	100
Strong	0	0
Not Strong	0	0
Do you believe attending TBAs/FBAs will help in reducing certian level of complication during pregnancy/delivery		
Yes	137	40.2
No	204	59.8

Source: Field Survey 2023

Research Question Three: To investigate the food diversity of pregnant women in Ona Ara Local Government

Diet during Pregnancy

The table 4.3 below displays the prevalence and percentage of responses to various nutrition and eating habits variables among pregnant women.

Approximately 48.4% of respondents reported having cultural cuisine taboos and beliefs. In terms of specific dietary items, 48.5% of respondents reported taboos regarding snails, while 59.4% reported taboos regarding plantains or bananas. 69% of respondents reported having egg-related taboos, while 37% reported having okra-related taboos. 74.5% of respondents reported consuming beverages such as Milo, Bournvita, and milk, while 15.2% reported not consuming them.

Approximately 41.1% of respondents reported eating three meals a day, while 65.1% said they did not miss meals. Breakfast was the most frequently omitted meal among individuals who reported skipping meals (48.3%). Time constraints were the leading cause of meal avoidance (44.5%).

Approximately 66.3% of respondents reported consuming more than previously, while 17.3% reported eating less.

Approximately 96.2% of respondents reported receiving nutrition education at the clinic, with 79.3% indicating they received it daily. About 71.6% of respondents said they did not receive nutrition education elsewhere, while health workers were the most common source (9.8%) for those who did.

Table 4.3 Description of the Food Group

Food Group	No of Items	Foods
Grains and Cereals	7	Maize and maize products (pap, golden morn, corn flakes)
		Rice and rice products (tuwoshinkafa)
		Wheat and wheat products (bread, spaghetti, semovita, noodles etc)
		Sorghum
		Oats
		Guinea corn
		Millet
Starchy Roots and Tubers	4	Cassava and products (garri, eba, fufu, lafun)
		Yam and products
		Potatoes (Sweet/Irish) and products
		Plantain and products
Legumes	3	Beans and products (moinmoin,akara,gbegiri,baked beans)
		Locust beans
		Soy beans and products (tofu/wara, soy milk)
Nuts and Seeds	7	Peanuts/Groundnuts and products (Groundnut soup, peanut butter)
		Cashew nuts
		Coconut
		Melon
		Dika nut/ Bush mango (Ogbono)
		Kola nut
		Tiger nut and dates

Vegetables	6	Green leafy vegetables (ugwu,soko,ewedu,tete,greenetc)
		Okro
		Cabbage
		Cucumber
		Tomatoes, pepper, onions
		Carrots
Fruits	9	Citrus (orange,tangerine)
		Mango
		Pawpaw
		Pineapple
		Apple (local, green, red)
		Banana
		Water melon
		Avocado
		Agbalumo
Meat, Poultry and Fish	9	Beef
		Poultry (chicken, turkey, duck)
		Fish
		Pork
		Snail
		Offals (inueran)
		Eggs and products
		Goat meat
		Bush meat
Milk and Products	4	Evaporated milk

		Powdered milk
		Yoghurt
		Fresh milk
Fats and Oil	4	Butter/Margarine/Mayonnaise
		Vegetable oil
		Palm oil
		Groundnut oil
Non-Alcoholic Beverages	4	Tea (Lipton, top tea etc)
		Cocoa (milo, bournvita, ovaltineetc)
		Ginger drink
		Soft drinks (cocacola, pepsietc)
Alcoholic Beverages	3	Beer
		Wines and spirit
		Local wines (palm wine, ogogoro etc)
Sweets and Desserts	5	Sugar
		Honey
		Ice cream
		Chocolate
		Jam
Spices and Condiments	4	Salt
		Maggi
		Curry, thyme etc

Source: Field Survey 2023

Consumption of Food Groups

Table 4.3.2 below presents data on dietary habits across various food groups, with responses categorized into "Daily," "Occasionally," and "Never." Noteworthy patterns include a high daily consumption of grains and cereals (85.6%) and starchy roots and tubers (59.5%). Legumes are frequently consumed daily (83.9%), while nuts and seeds show a more balanced distribution across the categories. Vegetables are consumed daily by 46.6% of respondents, and fruits exhibit a lower daily intake at 28.4%. Meat, poultry, and fish are regularly consumed by 55.1% on a daily basis. Milk and milk products have a daily consumption rate of 56.3%. Fats and oils are commonly used daily (68%), while non-alcoholic beverages are consumed daily by 51.9%. Conversely, alcoholic beverages are consumed daily by only 5.3%. Sweets and desserts are frequently consumed daily (69.5%), and spices and condiments are used daily by 84.5% of respondents

Table 4.3.2 also provides insights into the dietary habits and nutritional awareness of the surveyed population. Regarding the number of meals taken per day, the majority have three meals (51.9%), with 41.1% having meals thrice daily. Skipping meals is reported by 34.9% of respondents, and among those who do, breakfast is mostly skipped (48.3%), followed by lunch (42.9%) and dinner (8.4%). Reasons for meal skipping include time constraints (44.5%), lack of physical access (12.6%), financial constraints (12.6%), habitual reasons (9.2%), religious activities (10.1%), being pregnant (4.2%), bowel irritation (0.8%), and fear of having a macrocosmic baby (3.4%).

Concerning the quantity of food intake during pregnancy compared to before, the majority (66.3%) report consuming more food during pregnancy. Nutrition education is prevalent, with 96.2% receiving it in the clinic, and among those, the majority (79.3%) receive it every clinic day. Additionally, 71.6% receive nutrition education elsewhere.

Table 4.3.2 Consumption of food groups (frequencies and percentages).

Food Group	Daily	Occasionally	Never
Grains and Cereals	292(85.6)	31(9.1)	18(5.3)
Starchy Roots and Tubers	203(59.5)	80(23.5)	58(17)
Legumes	286(83.9)	44(12.9)	11(3.2)
Nuts and Seeds	136(39.9)	90(26.4)	115(33.7)
Vegetables	159(46.6)	81(23.8)	101(29.6)
Fruits	97(28.4)	80(23.5)	164(48.1)
Meat, Poultry and Fish	188(55.1)	77(22.6)	76(22.3)
Milk and Products	192(56.3)	57(16.7)	92(27)
Fats and Oil	232(68)	63(18.5)	46(13.5)
Non-Alcoholic Beverages	177(51.9)	121(35.5)	43(12.6)
Alcoholic Beverages	18(5.3)	11(3.2)	312(91.5)
Sweets and Desserts	237(69.5)	60(17.6)	44(12.9)
Spices and Condiments	288(84.5)	28(8.2)	25(7.3)

Source: Field Survey 2023

Table 4.3.2 Consumption of food groups

Variables	Frequency	Percent (%)
Number of meal taken per day		
Once		
Twice	3	0.9
Thrice	21	6.2
>3 times	140	41.1
	177	51.9
Do you skip meals per day		
Yes	119	34.9
No	222	65.1
If yes; which meal(s) is/are mostly skipped		
Breakfast	58	48.3
Lunch	51	42.9
Dinner	10	8.4
Reason(s) for meal skpping		
None	3	2.5
Time constrain	53	44.5
Lack of physical access	15	12.6
Financial contrain	15	12.6
Habitual	11	9.2
Religious activities	12	10.1
Pregnant induce	5	4.2
Bowel irritation	1	0.8
Fear of macrocosmic baby	4	3.4
Quantity of food intake during pregnancy as compared to before pregnancy		
Less than before	59	17.3
Same as before		

More than before	56	16.4
	226	66.3
Do you receive nutrition education in this clinic		
Yes		
No	328	96.2
	13	3.8
If yes, how often		
Once a while	36	11
Once a month	32	9.8
Every clinic day	260	79.3
Do you receive nutrition education elsewhere		
Yes	244	71.6
No	97	28.4

Source: Field Survey 2023

Dietary Pattern of the Respondents

Table 4.4 displays the prevalence and percentage of study participants categorized into three nutritional statuses: conservative, mixed, and Western.One hundred ten participants, or 32.3% of the total sample, were categorized as having a healthy diet. The prudent dietary pattern was characterized by a high intake of fruits, nuts, vegetables, pulses, cereals, fish, and poultry; a moderate intake of dairy products and cheese; and an especially low intake of red meat and cold cuts. A total of 116 individuals, or 34% of the sample, were classified as having a diverse dietary pattern. This group consumed a mixture of nutritious and unhealthy meals. One hundred fifty-eight participants, or 33.7% of the total sample, were categorized as having a western dietary pattern. The Western dietary pattern was distinguished by a high intake of red meat and cold cuts, potatoes, cakes and pastries, chocolate, and sugary beverages, and a very low intake of legumes, fruits, and cereals.

Table 4.4 Dietary pattern of the respondents

Variables	Frequency	Percent (%)
Prudent	110	32.3
Mixed	116	34
Western	115	33.7

Source: Field Survey 2023

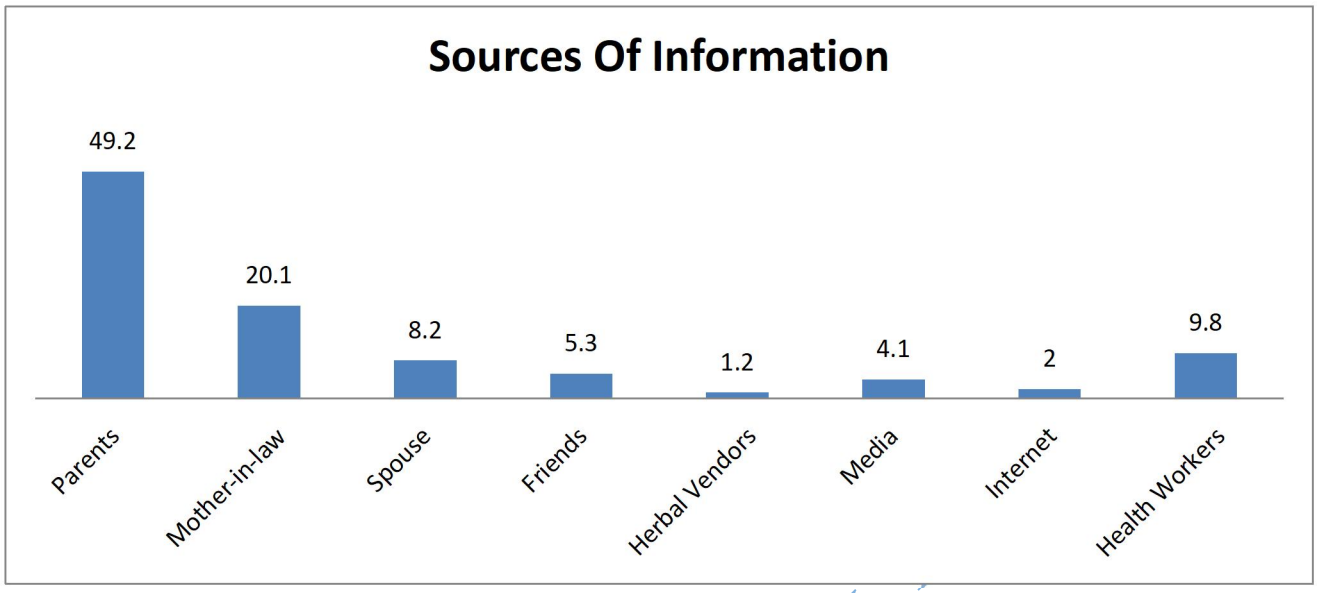

Fig 4.1 Sources of nutrition education among respondents

Source: Field Survey 2023

Sociodemographic, Lifestyle-Related, and Pregnancy-Related Determinants of dietary pattern

No significant difference was observed in dietary patterns across different age groups (p-value = 0.23). A significant association was found between educational level and dietary patterns (p-value = 0.019). Higher educational levels were associated with the "Prudent" dietary pattern. Marital status showed a significant association with dietary patterns (p-value = 0.000). The "Mixed" dietary pattern was more prevalent among single individuals, while the "Prudent" pattern was more common among married respondents.

Also, there was a significant association between ethnicity and dietary patterns (p-value = 0.021). The "Prudent" pattern was more prevalent among the Yoruba ethnic group. No significant difference in dietary patterns was observed across different religious groups (p-value = 0.848). There was no significant association between place of residence (urban or rural) and dietary patterns (p-value = 0.431). Employment status did not show a significant association with dietary patterns (p-value = 0.597). No significant difference in dietary patterns was observed based on occupation (p-value = 0.489).

Physical activity was significantly associated with dietary patterns (p-value = 0.000). The "Prudent" pattern was more prevalent among individuals with intense physical activity. Family size showed a significant association with dietary patterns (p-value = 0.001). Larger family sizes were associated with the "Mixed" dietary pattern. There was no significant association between the trimester of pregnancy and dietary patterns (p-value = 0.221). The frequency of meals per day was significantly associated with dietary patterns (p-value = 0.001). Those with the "Mixed" pattern tended to have meals twice a day, while the "Prudent" pattern was associated with thrice-daily meals.

Table 4.4.1 **Sociodemographic, Lifestyle-Related, and Pregnancy-Related Determinants of Dietary Pattern**

Variables	Mixed (%)	Western (%)	Prudent (%)	P-value
Age				0.23
>18	1(50)	0(0)	1(50)	
19-24	32(29.1)	35(31.8)	43(39.1)	
25-29	48(36.1)	48(36.1)	37(27.8)	
30-34	22(32.8)	24(35.8)	21(31.3)	
35-39	13(54.2)	3(12.5)	8(33.3)	
40-44	0(0)	5(100)	0(0)	
Educational level				0.019*
None	0(0)	4(3.5)	1(0.9)	
Primary level	39(33.6)	21(18.3)	28(25.5)	
Secondary level	57(49.1)	69(60)	52(47.3)	
Higher/Tertiary level	20(17.2)	21(18.3)	29(26.4)	
Marital status				0.000*
Single	41(36.3)	35(30.4)	32(29.1)	
Married	75(64.7)	80(69.6)	77(70)	
Divorced	0(0)	0(0)	1(0.9)	
Ethnicity				0.021*
Yoruba	99(85.3)	104(90.4)	108(98.2)	
Ibo	7(6)	7(6.1)	2(1.8)	
Hausa	1(0.9)	1(0.9)	0(0)	
Others	9(7.8)	3(2.6)	0(0)	
Religion				0.848
Christian	61(52.6)	57(49.6)	54(49.1)	

Islam	55(47.4)	58(50.4)	56(50.9)	
Traditional	0(0)	0(0)	0(0)	
Others	0(0)	0(0)	0(0)	
Place of residence				0.431
Urban	77(66.4)	67(58.3)	70(63.6)	
Rural	39(33.6)	48(41.7)	40(36.4)	
Employment Status				0.597
Employed	82(70.7)	88(76.5)	80(72.7)	
Unemployed	34(29.3)	27(23.5)	30(27.3)	
Occupation				0.489
Civil servant	18(34)	17(32.1)	18(34)	
Trading	60(30.6)	70(35.7)	66(33.7)	
Farming	3(100)	0(0)	0(0)	
Clergy	3(33.3)	3(33.3)	3(33.3)	
Housewife	12(34.3)	13(37.1)	10(28.6)	
Artisan	20(44.4)	12(26.7)	13(28.9)	
Physical activity				0.000*
None/Low	107(33.9)	100(31.6)	109(34.5)	
Intense	3(75)	0(0)	1(25)	
Moderate	6(28.6)	15(71.4)	0(0)	
Family size				0.001*
>10	1(33.3)	2(66.7)	0(0)	
1-5	101(34.7)	86(29.6)	104(35.7)	
6-10	14(29.8)	27(57.4)	6(12.8)	
Trimester				0.221
1st trimester	12(37.5)	15(46.9)	5(15.6)	

2nd trimester	60(34.3)	59(33.7)	56(32)	
3rd trimester	44(32.8)	41(30.6)	49(36.6)	
Meals per day				0.001*
>thrice	53(29.9)	73(41.2)	51(28.8)	
Once	3(100)	0(0)	0(0)	
Thrice	47(33.6)	38(27.1)	55(39.3)	
Twice	13(61.9)	4(19)	4(19)	

* p value >0.005

Source: Field Survey 2023

Research Question Four: Factors associated with dietary pattern of pregnant women in Ona Ara Local Government

Table 4.5 displays the factors associated with dietary patterns, along with their coefficients, confidence intervals, and p-values. Age, level of education, marital status, ethnicity, religion, place of residence, employment status, occupation, physical activity, BMI, family size, trimester, and daily meals are listed in the table.

For the age variable, the reference age range is 40 to 44 years. The coefficients for the other age categories are as follows: 0.549 for those older than 18, 0.436 for those aged 19-24, 0.24 for those aged 25-29, 0.046 for those aged 30-34, and -0.654 for those aged 35-39. However, the p-values for all age groups are greater than 0.05, indicating that there is no significant association between age and dietary pattern.

The reference group for the educational level variable is higher/tertiary level. Other educational levels have coefficients of 0.139 for none, -0.567 for primary level, and -0.24 for secondary level. The p-value for the primary level is less than 0.05, indicating that it is significantly associated with dietary pattern, whereas the p-values for the other levels of education are not.

Reference group for the marital status variable is divorced. The coefficients for single and married individuals are -15.152 and -14.987, respectively, and their p-values are both less than 0.05, indicating that they are significantly associated with dietary pattern.

The reference group for the ethnicity variable is the other group. Yoruba and Ibo have coefficients of 2,247 and 1,566, respectively, while Hausa has a coefficient of 0.78. Yoruba has a p-value less than 0.05, indicating that it is substantially associated with dietary pattern, whereas the other ethnic groups are not.

The reference group for the religion variable is Islam. Christianity has a -0.136 coefficient and a p-value greater than 0.05, indicating that it is not significantly associated with dietary pattern.

Reference group for the place of habitation variable is rural. The urban coefficient is 0.005 and its p-value is greater than 0.05, indicating that it is not significantly associated with dietary pattern.

The reference group for the employment status variable is unemployed. The coefficient for employed is 0.112, and its p-value is greater than 0.05, indicating that it is not significantly related to dietary pattern.

The reference group for the occupation variable is the artisan group. The coefficients for civil servant, commerce, farming, clergy, and housewife are respectively 0.641, 0.53, -15.068, 0.23, and 0.241. All occupations, with the exception of farming, have p-values greater than 0.05, indicating that they are not significantly associated with dietary pattern.

Regarding the variable of physical activity, the reference group is moderate. None/low and intense have coefficients of 0.74 and -0.486, respectively. None/low physical activity is significantly associated with dietary pattern, whereas other physical activity levels are not.

The reference group for the BMI variable is underweight. Normal, overweight, and obese have coefficients of -0.375, -0.334, and -0.866, respectively. All BMI categories have p-values greater than 0.05, indicating no significant association with dietary pattern.

The reference group for the family size variable is between 6 and 10. These are the coefficients.

The third trimester coefficient is the reference category, so the first and second trimester coefficients are relative to the third trimester coefficient.

The coefficient for the first trimester is -0.13, indicating a negative association with dietary pattern. This means that participants in the first trimester have a marginally lower score for dietary pattern than those in the third trimester. The p-value of 0.777, however, is greater than 0.05, indicating that this difference is not statistically significant.

The coefficient for the second trimester is -0.162, indicating a negative association with dietary pattern, but with a larger effect size than the first trimester. The p-value of 0.483, however, is greater than 0.05, indicating that this difference is not statistically significant. Overall, the results imply that there is no correlation between trimester and dietary pattern.

Finally, consuming more than thrice per day had a coefficient of 1.522 and a p-value of 0.002 in comparison to consuming twice per day, which had a reference coefficient. This suggests that people who consume more than three meals per day have a substantially different dietary pattern than those who consume two meals per day.

Age specifically, being between the ages of 30-34 is associated with a higher dietary pattern score than being between the ages of 40-44. Being married is associated with a higher score for dietary pattern than being unmarried or divorced. In particular, being Yoruba or Ibo is associated with a higher dietary pattern score than being from other ethnic groups. Being a civil servant or a trader is specifically associated with a higher dietary pattern score than being a farmer, clergyman, housewife, or artisan. Moderate or vigorous physical activity is associated with a higher dietary pattern score than inactivity or low physical activity. Obesity is associated with a reduced dietary pattern score in comparison to a normal BMI. Family size: having 1 to 5 family members is associated with a higher dietary pattern score than having more than 10 family members. Trimester: the third trimester of pregnancy is associated with a higher dietary pattern score than the first and second trimesters. Meals per day: consuming more than three times daily is associated with a higher dietary pattern score than eating once or twice daily

Table 4.5 **Factors associated with dietary pattern of pregnant women in Ona Ara Local Government**

Variables	COR95%CI	P-value	AOR95% CI	P-value
Educational level				
None	0.714(0.74,685)	0.000	-1.75,2.02	0.885
Primary level	0.513(0.228,1.153)	0.106	-1.29,0.143	0.118
Secondary level	1.153(0.569,2.335)	0.693	-0.821,0.341	0.418

Higher/Tertiary level	Ref		Ref	
Marital status				
Single	1.973(1.125,3.46)	0.000	-15.69,-14.61	0.000*
Married	2.6(2.59,2.95)	0.000	-14.98,-14.98	0.000*
Divorced	Ref		Ref	
Ethnicity				
Yoruba	3.15(0.83,11.97)	0.92	0.739,3.756	0.003*
Ibo	3.00(0.562,16.013)	0.119	-0.23,3.36	0.087
Hausa	3.00(0.140,64.262)	0.482	-2.461,4.034	0.635
Others	Ref		Ref	
Physical activity				
None/Low	0.374(0.140,1.001)	0.50	-0.147,1.63	0.102
Intense	284(0.000)		-2.89,1.92	0.692
Moderate	Ref		Ref	
Family size				
>10	1.037(0.86,12.455)	0.977	-3.3,1.68	0.524
1-5	0.442(0.218,0.895)	0.023	-0.267,1.116	0.229
6-10	Ref		Ref	Ref
Meals per day				
>thrice	3.127(0.96,10.23)	0.59	0.565,2.478	0.002
Once			-1910.3,1880.74	0.988
Thrice	3.803(1.16,12.406)	0.027	0.618,2.57	0.001*
Twice	Ref		Ref	Ref

Source: Field Survey 2023

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4.3 Discussion of the Findings

Regarding the sociocultural and economic characteristics of the participants, noncompliance with culinary taboos and cultural beliefs has been observed. A majority of 176 pregnant women (51.6%), as opposed to 165 pregnant women (48.4%), do not adhere to these taboos and beliefs. This finding is consistent with the findings of a study conducted in the Eastern Cape of South Africa, which found that 37% of women followed local cultural practices influenced by food taboos and beliefs,

with some of the restricted foods being highly nutritious and potentially influencing prenatal nutrition1. However, another study found that these taboos and beliefs influence the dietary decisions and practices of expectant women, which may affect their nutritional intake and health during pregnancy[2].

In the context of food diversity among pregnant women in selected Primary Health Care (PHC) centers in Ona Ara Local Government of Oyo State, it was discovered that certain foods, including snail, eggs, okra, and beverages such as milo, bournvita, and milk, which are essential for maternal health and child development, were commonly avoided during pregnancy. This pattern of food avoidance during pregnancy has also been observed in other African nations, where complete food groups are sometimes avoided [3]. However, the specific reasons why various communities avoided these foods varied. In Grand Popo, Benin, for instance, pregnant women are prohibited from ingesting foods rich in carbohydrates, animal proteins, and micronutrients, which contributes to high levels of protein and calorie malnutrition among children and pregnant women in the country[4].

The results of a study conducted at designated Primary Health Care (PHC) centers in Ona Ara Local Government of Oyo State indicate that pregnant women in the area have an unhealthy dietary pattern. Similar findings were found in a study conducted in Nigeria, which revealed that a significant proportion of pregnant women lacked adequate dietary diversity and inadequate ingestion of essential food groups, such as fruits, vegetables, and animal-source foods[5]. In addition, another study found a high prevalence of anemia among expectant women, which indicates an iron deficiency [6]. A comprehensive approach is required to address the nutritional requirements of expectant women in Nigeria. This includes enhancing access to nutritious foods,

promoting dietary diversity, enhancing antenatal care services, and educating and raising awareness about appropriate nutrition during pregnancy. To enhance the nutritional status of pregnant women in Nigeria, various interventions including iron and folic acid supplementation, nutritional counseling, and community-based nutrition programs have been recommended[7].

Higher levels of maternal education were associated with enhanced nutritional status, as determined by the study. Maternal education is essential for providing women with knowledge about balanced diets, appropriate food choices, and the significance of adequate nutrition during pregnancy[8]. In addition, the study revealed a statistically significant relationship between nutritional status and dietary patterns. It was discovered that inadequate dietary diversity, characterized by inadequate consumption of a variety of food categories, is associated with poor nutritional status. Consuming a wide variety of foods is essential for reaching the nutritional requirements of pregnant women and ensuring adequate intake of essential nutrients[9]. The study concluded by emphasizing the importance of physical activity in relation to the nutritional status of expectant women. Regular moderate-intensity physical activity during pregnancy has been linked to enhanced nutritional status. It increases appetite, optimizes weight gain, improves nutrient utilization, and contributes to the maintenance of muscle strength and cardiovascular fitness, all of which are essential for a healthy pregnancy[10].

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Chapter Five

Conclusion

5.1 Summary of Findings

The study encompassed a sample of 341 respondents and explored various aspects of sociodemographics, lifestyle, and pregnancy. The participants' average age was 27.21 years, with a standard deviation of 5.18 years. The majority (68%) were married, while 31.7% were single and only 0.3% were divorced. Educational levels varied, with 52.2% completing secondary education, 20.5% having higher or tertiary education, 25.8% having primary education, and 1.5% lacking formal education. The Yoruba ethnic group comprised the largest proportion (91.2%), followed by the Igbo (4.7%) and Hausa (0.6%).

Religiously, no traditional or other religions were reported; instead, the majority identified as either Christian or Muslim. Urban living was prevalent (62.8%), with 73.3% employed and 26.7% unemployed. The employed were engaged in various occupations, such as commerce (57.5%), artisans (13.2%), civil servants (15.5%), housewives (10.3%), farmers (0.9%), and clergy (2.5%). Nuclear families were more common (86.8%) than polygamous ones (13.2%).

Marriage ages varied, with 59.2% marrying between 18-24, 35.2% between 25-29, and a small 2.1% before 18. First sexual encounters occurred mostly between 18-24 (69.2%) and 25-29 (25.2%), with only 3.8% reporting sexual activity before 18. Pregnancy-related statistics showed 41.6% had no children, 57.2% had 1-4 children, and 1.2% had over 5 children. For living children, 43.7% had none, 55.7% had 1-4, and 1.2% had over 5. Most (51.3%) gave birth in the second trimester, 39.3% in the third, and 9.4% in the first.

Regarding health and lifestyle, 48.1% had a healthy BMI, 30.8% were overweight, and 11.1% were underweight. Physical activity levels were generally low, with 92.7% having no or minimal activity, 6.2% having moderate activity, and 1.5% engaging in intense activity.

The study examined food taboos and cultural beliefs among respondents. Approximately 48.4% reported adhering to such beliefs, with specific percentages for certain food categories: snails (48.5%), plantains/bananas (59.4%), eggs (69%), okra (37%), and beverages (74.5%). The participants' dietary habits during pregnancy were explored, with 41.1% eating three meals daily, while 65.1% avoided missing meals. Skipping breakfast was common (48.3%), often due to time constraints (44.5%). Additionally, 66.3% reported increased food consumption, and 17.3% ate less. Nutrition education mainly occurred at clinics (96.2%), often daily (79.3%), while other sources were less common (71.6%).

The study categorized participants' dietary patterns into conservative (32.3%), mixed (34%), and Western (33.7%). Multiple factors were analyzed for their association with dietary patterns, including age, education, marital status, ethnicity, religion, residence, employment, occupation, physical activity, BMI, family size, trimester, and daily meals. Notably, marital status, ethnicity (Yoruba/Ibo), and physical activity were significantly associated with dietary pattern scores. However, variables like age, education, residence, employment, occupation, BMI, trimester, and family size showed no significant correlation.

In discussing the findings, the study revealed that adherence to culinary taboos and cultural beliefs was not universal among pregnant women. While 48.4% adhered to these practices, others did not, reflecting the complex interplay of culture and

nutrition. Similar findings were noted in South Africa, where cultural practices influenced food choices but not uniformly. In the study's specific context, pregnant women commonly avoided nutritious foods, potentially impacting maternal and child health. Comparable patterns have been observed in other African regions, emphasizing the need for comprehensive interventions to improve prenatal nutrition.

Furthermore, the study highlighted an unhealthy dietary pattern among pregnant women in the region, as dietary diversity was lacking. These findings mirrored results from Nigeria, indicating a need for enhanced dietary education and access to nutritious foods. Maternal education emerged as a crucial factor influencing nutritional status, underscoring the importance of informed food choices during pregnancy.

The study concluded by stressing the significance of physical activity in pregnancy. Moderate physical activity was associated with better dietary patterns, highlighting the holistic approach needed for maternal health. The study's insights could inform strategies to promote balanced nutrition and healthy lifestyles among pregnant women, including nutritional supplementation and education programs.

5.2 Conclusion

Pregnancy is a crucial time in a woman's life in which adequate nutrition is essential for the growth and development of the fetus. Nonetheless, a variety of sociocultural and economic factors influence the nutritional status of expectant women. The purpose of the present study was to identify and analyze the factors that influence the nutritional status of expectant women.

The dietary patterns of pregnant women are significantly influenced by sociocultural factors such as traditional beliefs, cultural practices, and education. In many cultures, pregnant women are encouraged to eat more and acquire weight, resulting in overnutrition and obesity. In contrast, some cultures perceive pregnancy as a time when women should consume less food to avoid complications during childbirth. Therefore, it is crucial to address these cultural beliefs and educate pregnant women and their families about the importance of a balanced diet.

The socioeconomic status of pregnant women and their households is an additional important factor influencing their nutritional status. Oftentimes, low-income families struggle to satisfy their basic needs, such as food, which can lead to malnutrition during pregnancy. In addition, the cost of healthy foods, such as fresh fruits and vegetables, is frequently higher than that of processed and harmful foods, making it difficult for low-income families to maintain a healthy diet. It is essential to address poverty and income inequality if pregnant women are to have access to nutritious dietary options.

In addition, social support systems, such as family and community networks, can have a substantial effect on the nutritional status of expectant women. Therefore, interventions that promote community engagement and support are essential for improving the nutritional status of pregnant women.

In conclusion, sociocultural and economic factors substantially impact pregnant women's nutritional status. Addressing these factors calls for a multifaceted strategy that includes educating women and their families about the importance of appropriate nutrition during pregnancy, addressing poverty and income inequality, and encouraging community engagement and support. By addressing these factors, we can enhance both the mother's and fetus' health.

5.3 Recommendations

The following recommendations are proposed to enhance the dietary pattern of pregnant women based on the findings of this study:

1. Programs of education and awareness should be designed and implemented to educate pregnant women and their families about the importance of appropriate nutrition. These programs should address cultural beliefs and practices that influence pregnant women's dietary behaviors.

2. Policies and programs for public health should be developed to combat poverty and income inequality, which frequently result in malnutrition during pregnancy. To ensure that low-income families have access to nutritious food options, these policies may include food subsidies, financial assistance, and other support programs.

3. Through interventions such as community-based nutrition education programs, support groups for expectant women, and peer support networks, community engagement and support should be encouraged. These

interventions can provide pregnant women with emotional and practical support and promote healthy behavior.

4. Providers of health care should play a larger role in promoting appropriate nutrition during pregnancy. During prenatal care, providers should educate their patients on the importance of appropriate nutrition, provide resources for healthy eating, and monitor pregnant women's nutritional status.

5. Future research should concentrate on identifying and analyzing the efficacy of interventions designed to address sociocultural and economic factors influencing the nutritional status of expectant women. This research can inform the development of policies and programs based on empirical evidence that seek to improve the nutritional status of pregnant women.

6. Providing nutrition education and counseling services Health care providers should provide expectant women with individualized nutrition education and counseling services to help them make informed dietary decisions. Personalized nutrition counseling should take into account the sociocultural background, economic standing, and dietary preferences of each woman.

7. Efforts should be made to increase expectant women's access to nutrient-dense foods, particularly in low-income areas. Opening more supermarkets and grocery stores in underserved areas, providing financial incentives for food retailers to stock healthy food options, and increasing the availability of healthy food options in schools and workplaces are examples of possible strategies.

8. Pregnant women who are food insecure are at a greater risk of malnutrition. Providing food assistance programs such as food stamps, WIC, and SNAP and supporting community-based food programs that provide nutritious food to expectant women are strategies for addressing food insecurity.

9. Physical activity is crucial to maintaining a healthy weight and enhancing overall health. Providers of health care should encourage pregnant women to engage in physical activity that is secure and suitable for their gestational stage. Strategies may include the distribution of educational materials and referrals to local physical activity programs.

10. Involve fathers and partners: Fathers and partners can play a vital role in promoting the nutritional status of pregnant women. Fathers and companions should be encouraged to participate in prenatal care visits and to help plan and prepare nutritious meals.

5.4 Contributions to Knowledge

Sociocultural and economic factors influencing the dietary pattern of pregnant women is an important area of research that has significantly contributed to our understanding of the complex interaction between societal and individual factors in determining maternal and fetal health outcomes.

Numerous sociocultural and economic factors can influence the dietary habits and nutritional status of expectant women, according to research on this topic. These factors include cultural beliefs and practices concerning food and pregnancy, income

and level of education, food insecurity, access to nutritious food options, and social support.

One of the most significant contributions of research on this topic has been the identification of the need for an all-encompassing strategy to improve the nutritional status of expectant women. Individual dietary habits are shaped by a complex interaction of sociocultural and economic factors, and interventions must be tailored to the requirements of each woman.

Several effective strategies to improve the nutritional status of expectant women have also been identified through research on this topic. These strategies consist of education and counseling services, expanding access to nutritious foods, addressing food insecurity, encouraging physical activity, involving fathers and partners, and promoting breastfeeding.

Overall, research on the sociocultural and economic factors influencing the nutritional status of pregnant women has contributed to our comprehension of the intricate interaction between individual and societal factors in determining maternal and fetal health outcomes. This information can guide the development of interventions that enhance the health and well-being of pregnant women and their infants.

5.5 Suggestion for Future Research

Despite the fact that research on socio-cultural and economic factors affecting the nutritional status of expectant women has provided valuable insights into the complex interplay of factors that influence maternal and fetal health outcomes, there are still a number of areas that require additional study. Among the areas suggested for future research are:

1. While research has demonstrated that sociocultural and economic factors can affect the nutritional status of expectant women, there is a need for additional research into the long-term effects of these variables. How do these factors, for instance, affect the health of infants born to mothers who are malnourished during pregnancy?

2. efficacy of interventions: Although there are a number of effective interventions for enhancing the nutritional status of pregnant women, there is a need for additional research into their efficacy in various populations and settings. How effective are these interventions, for instance, among low-income, rural, and culturally diverse populations?

3. While cultural and social factors have been identified as significant determinants of maternal nutrition, there is a need for additional research into the specific cultural and social influences that shape dietary habits during pregnancy. How, for instance, do cultural norms regarding food and pregnancy vary across populations, and how do these norms influence dietary decisions?

4. While sociocultural and economic factors have been examined extensively, there is a need for additional research into the psychosocial factors that influence maternal nutrition. How, for instance, do stress, anxiety, and depression influence dietary choices during pregnancy, and how can these factors be addressed through interventions?

5. Implications for policy While research has identified a number of effective interventions for enhancing maternal nutrition, there is a need for additional research into these interventions' policy implications. For instance, what are

the costs and benefits of implementing population-level interventions, and how can policy modifications be implemented to promote optimal maternal nutrition?

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Appendix I

Faculty Of Public Health

Lead City University, Ibadan

Socio Cultural And Economic Factors Affecting The Dietary Pattern Of Pregnant Women.

Questionnaire

Dear Respondent

I am a Postgraduate student of the above named department and school. Conducting a study onSocio cultural and economic factors affecting the dietary pattern of pregnant women in Ona-ara local government of oyo state.

I humbly solicit for your consent and honest response in this questionnaire which is strictly for academic purpose, all information supplied will be treated with utmost confidentiality and you do not need to put your name on the instrument thank you.

Agboola Mrs.

SECTION A: DEMOGRAPHIC DATA

Instruction: Kindly tick (√) or fill in the space which best represent your response(s) to the questions

1. Age as at last birthday : _____
2. Educational level: None [ ] Primary level [ ] Secondary level [ ] Higher / Tertiary level [ ]
3. Marital status: Single [ ] Married [ ] Divorced [ ] Widowed [ ] Separated [ ]
4. Ethnicity : Yoruba [ ] Ibo [ ] Hausa [ ] Others [ ]
5. Religion: Christian [ ] Islam [ ] Traditionalist [ ] Others (specify)_____
6. Place of residence: Urban [ ] Rural [ ]
7. Gestational age in weeks:_____

8. . Height in meters:_____

9. Weight in kilogram (kg) _____

10. Body Mass Index (BMI) _____

11. Employment status : Employment [ ] Unemployment [ ]

12. Occupation: Civil Servant[ ] Trading[ ] Farming[ ] Clergy[ ] House wife[ ] Artisan [ ]

13. Age at first sex: _____

14. Age at first marriage:_____

15. Age at first birth:_____

16. Number of children ever born:_____

17. Number of children living:_____

18. Family type : Nuclear family[ ] polygamous family [ ]

19. Family size:_____

LEVEL OF INCOME;

20. Do you have Land of your own: Yes [ ] No [ ]

21. Do you have house of your own: Yes [ ] No [ ]

22. If yes , Flat [ ] Face to Face [ ] Self contain [ ] Duplex [ ]

23. Do you have farm (Large or Medium Scale) Yes [ ] No [ ]

24. Do you have cash crop farm Yes [ ] No [ ]

25. Do you have vehicle(s) Yes [ ] No [ ]

26. Do you have Television Yes [ ] No [ ]

27. Do you have mobile phone Yes [ ] No [ ]

SECTION B: CULTURAL FACTORS

28. Do you have any food taboos and Cultural beliefs : Yes [ ] No [ ]

29. If yes to question 28, tick as appropriate to you;

PREGNANT WOMEN SHOULD NOT EAT;

30. Snails: Yes [ ] No [ ] I don't know [ ]

31. Plantain/ Banana: Yes [ ] No [ ] I don't know [ ]

32. Eggs: Yes [ ] No [ ] I don't know [ ]

33. Okra: Yes [ ] No [ ] I don't know [ ]

34. Beverages: Yes [ ] No [ ] I don't know [ ]

35. Others (specify)_____

36. Other beliefs about food restrictions during pregnancy (kindly state)

37. Do you attend Traditional Birth Attendants (TBAs)/Faith Birth Attendant (FBAs) during pregnancy Yes [ ] No [ ]

If yes to question 37

38. How often do you attend; weekly ( ) twice in 3 weeks ( ) monthly ( ) occasionally ( )

39. Do you believe in TBAs/FBAs than health facilities Yes [ ] No [ ]

40. If yes, How strongly do you believe; very strong ( ) strong ( ) not strong ( )

41. Do you believe attending TBAs /FBAs will help in reducing certain level of complication during pregnancy/delivery; Yes [ ] No [ ]

SECTION C: ASSESSMENT OF DIETARY PATTERN

Please read the under listed statements carefully and indicate by ticking [ ] as appropriate to you

DIETARY PATTERN OF PREGNANT WOMEN:

42. Number of meal per day_____

43. Do you skip meal per day Yes [ ] No [ ]

44. If yes ; which meal(s) is /are mostly skipped (choose only one) : Breakfast [ ]

Lunch [ ] Dinner [ ]

45. Reason(s) for meal skipping: Time constrain [ ] Lack of physical access [ ]

Financial constrain [ ] Habitual [ ] Religion activities [ ] Pregnant Induced

46. Bowel Irritation [ ] Fear of macrocosmic baby [ ] other _____

47. Amount of food intake during pregnancy as compared to before pregnancy;

Less than before [ ] Same as before [ ] More than before [ ]

FOOD FREQUENCY QUESTIONNAIRE

48. In a typical week how often do you eat/ drink the following food / drink?

FOOD GROUP	DAILY	FREQUENTLY (4-6 times/week)	OCCASIONALLY (1-3 times/ week)	NEVER
GRAINS AND CEREALS				
Maize and maize products (pap, golden morn, corn flakes)				
Rice and rice products (tuwo shinkafa)				
Wheat and wheat products (bread, spaghetti, semovita, noodles etc)				
Sorghum				
Oats				
Guinea corn				
Millet				
Others (specify)				
STARCHY ROOTS AND TUBERS				
Cassava and products (garri, eba, fufu, lafun)				
Yam and products				
Potatoes (Sweet/Irish) and products				
Plantain and products				
Others (specify)				
LEGUMES				

Beans and products (moinmoin,akara,gbegiri,baked beans)				
Locust beans				
Soy beans and products (tofu/wara, soy milk)				
Others(specify)				
NUTS AND SEEDS				
Peanuts/Groundnuts and products (Groundnut soup, peanut butter)				
Cashew nuts				
Coconut				
Melon				
Dika nut/ Bush mango (Ogbono)				
Kola nut				
Tiger nut and dates				
Others (specify)				
VEGETABLES				
Green leafy vegetables (ugwu,soko,ewedu,tete,green etc)				
Okro				
Cabbage				
Cucumber				
Tomatoes, pepper, onions				
Carrots				

Others (specify)				
FRUITS				
Citrus (orange,tangerine)				
Mango				
Pawpaw				
Pineapple				
Apple (local, green, red)				
Banana				
Water melon				
Avocado				
Agbalumo				
Others(specify)				
MEAT, POULTRY AND FISH				
Beef				
Poultry (chicken, turkey, duck)				
Fish				
Pork				
Snail				
Offals (inu eran)				
Eggs and products				
Goat meat				
Bush meat				
Others (specify)				
MILK AND PRODUCTS				
Evaporated milk				

Powdered milk				
Yoghurt				
Fresh milk				
Others (specify)				
FATS AND OIL				
Butter/Margarine/Mayonnaise				
Vegetable oil				
Palm oil				
Groundnut oil				
Others (specify)				
NON-ALCOHOLIC BEVERAGES				
Tea (Lipton, top tea etc)				
Cocoa (milo, bournvita, ovaltine etc)				
Ginger drink				
Soft drinks (cocacola, pepsi etc)				
Others (specify)				
ALCOHOLIC BEVERAGES				
Beer				
Wines and spirit				
Local wines (palm wine, ogogoro etc)				
Others (specify)				
SWEETS AND DESSERTS				
Sugar				

Honey				
Ice cream				
Chocolate				
Jam				
Others (specify)				
SPICES AND CONDIMENTS				
Salt				
Maggi				
Curry, thyme etc				
Ginger, garlic, turmeric etc				
Others (specify)				

NOW, I WILL LIKE TO ASK ABOUT THE SOURCE OF NUTRITION INFORMATION:

49. How long have you started visiting this clinic?_____ weeks
50. Do you receive nutrition education in this clinic? Yes [ ] No [ ]
51. If Yes, how often: Once a while [ ] Once a month [ ] Every clinic day [ ]
52. Do you receive nutrition education elsewhere? Yes [ ] No [ ]
53. If yes, where/who? Parents [ ] Mother-in-law [ ] Spouse [ ] Friends [ ]

Herbal vendors [ ] Media [ ] Internet [ ] Health workers [ ] Books [ ] Others (specify)_____

SECTION D: QUESTIONS ON PHYSICAL ACTIVITIES

PHYSICAL ACTIVITIES	DAILY	FREQUENTLY (4-6 times/week)	OCCASIONALLY (1-3 times/ week)	RARELY (1-2 times/ month)	NEVER

Swimming					
Table tennis					
Basketball					
Football					
Jogging					
Gym workout					
Trekking					
Running					
Weight lifting					
Lawn tennis					
Dancing					
Snoker					

Bio-data

A. Personal Data

Full name: Abimbola, Ajoke, AGBOOLA

Address: Banana Estate no:8, Olorunda Abaa, Akobo Ojurin,Ibadan

E-mail: abimbolaagboola2000@gmail.com

Phone number: 08038379189

Date of birth: 01/02/1972

Place of birth: Ibadan

Nationality: Nigerian

Marital Status: Married

B. Educational Background

West African Examination Certificate (WAEC) 1989

Islamic High School Orita Basorun, Ibadan

Junior Community Health Extension Workers (JCHEW) 1996

School Of Health Technology, Ilesa

Community Health Extension WORKERS (CHEW) 2007

School Of Hygiene Eleyele, Ibadan

National Examinations Council (NECO) 2013

Ikereku Community Grammar School Ikereku Ibadan

Higher Diploma in Community Health 2014

Community Health Officer's Training Programe UCH Ibadan

Masters of Public Health *2018– current*

Lead City University, Ibadan, Ibadan, Oyo State.

C. Work Experience

- Clinical staff, Lagelu Local Government Iyana Offa 1998- 2013

- Iyana Church Primary Health Centre
- Ejioku Primary Health Centre
- Alegongo Primary Health Centre
- Olorunda Primary Health Centre
- Assistance Cold Chain Officer

- Clinical Staff Ona-Ara Local Government 2013-2021

- Gbaremu/oloba Model Primary Health Centre
- Awotunde\Olosunde Primary Health Centre

- Appointment as Local Cold Chain Officer (LCCO)for Ona Ara Local Governent

  Health Authority October 2nd,2020 till date

D. **Skills: -**

- A Capacity building of nurses and community Health Extension Workers in Primary Health Centre in Early Breast Cancer Detection, 17-22 July 2017
- Responding to the Challenges of Adolescent Per I natal Depression. 18-19 April 2018
- Others on Immunization, Family Planning, HIV, Malarial Focal Training etc.
- Associate member ; Institute of Personality Development and Customer Relationship Management Nigeria .
- Integrated yellow fever and menA vaccination Training November 2020

- Continous improvement training — 9th March, 2022
- OutBreak Response onpoliomyelitis (OBR) — 14th March 2022
- Training of the Trainers SCALE 3.0 of Covid 19. — 27th July 2022
- Integrated measles campaign program — 12th September 2022
- Open Logistics management Information Strategy (Openlmis) — 5th December 2022
- OutBreak Response on poliomyelitis (OBR) — 9th January 2023
- Comm Care Application — 18th January 2023

E. Other Activities Engaged In:

- Team member of Reaccreditation Exercise of Community Health Officers 'Training Programme, University College Hospital ,Ibadan.27th-30TH.
- Clinical Instructor for Community Health Officers' Training Program School
- School Invigilator /Examiner, Community Health Officers' Training Program UCH

F. **Hobbies:**

1.Counseling

2.Singing

3.House chore

4.Reading

Referees;

Dr. Ikuenne

M.O.H/PHC Coordinator Ibadan North East Local Government.

Dr. Akanni Olayinka Mudasiru

Onaara Local Govrnment Health Autority

Akanran, Ibadan, Oyo State.

The University Compliance Certification

This is to certify that this thesis by Abimbola Ajoke, AGBOOLA, with the Matriculation Number LCU/PG/002273 in the Department of Public Health, Faculty of Applied and Health Sciences, Lead City University, Ibadan is full compliance with the approved University format.

_____ _____

Signature Date