



**University of Kerbala**

**College of Nursing**

**Nutritional Knowledge and Dietary Intake Habits of  
Pregnant Women Attending Primary Health Care  
Centers**

**A thesis Submitted to the College of Nursing Council/University of  
Kerbala, in Partial Fulfillment of the Requirements for the Master's  
Degree of Science in Nursing**

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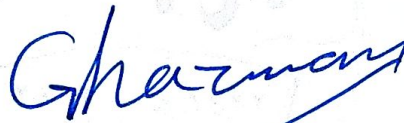
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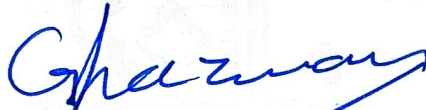
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# Dedication

*With a great love and respect I dedicate this  
work to my:*

*Parents for always being there for help and  
endless support.*

*My wife for his love .*

*Sisters and brothers for their love .*

*For every one help me*

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## Abstract

Nutritional knowledge and dietary intake habits during the pregnancy play an essential role in maintaining the overall wellness and mental health of both the pregnant woman and the growing baby. The nutrients that the fetus receives during pregnancy continue to affect it throughout its life, so the pregnant mother must pay attention to healthy nutrition in order to preserve her health and the health of her fetus in the future. The study aimed to assess the nutritional knowledge, dietary habits of pregnant women and funding out relationship between demographic characteristics.

A descriptive study was conducted at the primary health care centers in Hilla City through period from 15<sup>th</sup> October 2023 to 21<sup>th</sup> July 2024. The study sample consisted of 300 pregnant women who were selected according to a non- probability convenience sampling method. The questionnaire was validated by 12 experts and its reliability was achieved by a pilot study. The total number of items included 50 items. Data were collected through interview and analyzed by applying descriptive and inferential statistical analysis.

The study results demonstrated that the average age of the sample between 20 to 29 years (70.7%), (27.3%) with graduated from diploma and higher, living in extended family (58.7%), (70%) multipara, (26.3%), (75%), (49.7%) having two previous pregnancies and no history of abortion and with second trimester of pregnancy respectively. Also, more than half of women (66.3%) adhere to antenatal care for previous pregnancy. The nutritional knowledge and dietary habits showed (62.3%), (63%) with moderate level respectively, with moderate ( $3.20 \pm 1.403$ ) intake for red meat. The study indicates that there is a statistically significant positive relationship between nutritional knowledge, food frequency intake and nutritional habits at p-values= 0.001 and 0.001 respectively. The study concludes the nutritional knowledge about



pregnant women at moderate level while dietary habits at good level regarding foods frequency intake. The recommended of study that the Ministry of Health pay attention to education programs about the importance of food for pregnant women through health care providers and encourage pregnant women to increase the number of visits to primary health care centers to obtain cognitive information about the importance of nutrition during pregnancy.

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## List of Abbreviations

| Items | Meaning                                    |
|-------|--|
| &     | And  |
| AAP   | American Academy of Pediatrics             |
| ANC   | Antenatal Care                             |
| APP   | Application                                |
| BMI   | Body Mass Index                            |
| CDC   | Centers for Disease Control and Prevention |
| DACH  | Dietary Approaches to Stop Hypertension    |
| DBP   | Diastolic Blood Pressure                   |
| DNA   | Deoxyribonucleic Acid                      |

|          |   |
|----------|---|
| EI       | Energy Intake   |
| et al.   | et alias  |
| ex       | Example   |
| F        | Frequency   |
| FAO      | Food and Agriculture Organization                     |
| FDA      | Food and Drug Administration                          |
| Fig      | Figure  |
| FIGO     | International Federation of Gynecology and Obstetrics |
| GDM      | Gestational Diabetes Mellitus                         |
| Ht       | Height  |
| IDA      | Iron Deficiency Anemia                                |
| IUGR     | Intrauterine Growth Restriction                       |
| KAP      | Knowledge, Attitude, Practice                         |
| Kg       | Kilogram  |
| LBW      | Low Birth Weight                                      |
| LMIC     | Low- and Middle-Income Countries                      |
| <i>M</i> | Statistical Mean                                      |
| M.S      | Mean of Score   |
| MUAC     | Middle Upper Arm Circumference                        |
| NCDs     | Noncommunicable Diseases                              |



|         |  |
|---------|--|
| NISC    | Neonatal Intensive Special Care                        |
| NS      | Non-Significant  |
| NSF     | National Science Foundation                            |
| P value | Probability Value                                      |
| PCOS    | Polycystic Ovarian Syndrome                            |
| PHCCs   | Primary Health Care Centers                            |
| PLP     | Pyridoxal 5'-Phosphate                                 |
| RBC     | Red Blood Cell   |
| RDAs    | Recommended Dietary Allowances                         |
| SBP     | Systolic Blood Pressure                                |
| SD      | Standard Deviation                                     |
| SES     | SocioeconomicStatus                                    |
| Sig     | Level of Significance                                  |
| SPSS    | Statistical Package for Social Sciences                |
| T4      | Thyroxine Hormon                                       |
| UNICEF  | United Nations International Children's Emergency Fund |
| WFP     | World Food Program                                     |
| WHO     | World Health Organization                              |
| WT      | Weight   |

# **Chapter One**

## **Introduction**

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## **Chapter One**

### **1.1. Introduction**

Pregnancy is an transforming time in a woman's life, characterized by significant physiological changes and increased nutritional requirements. The health and nutrition of an pregnant women are not only vital for her own well-being but also profoundly influence the growth and development of the developing fetus (Nemutanzhela, 2020).

Globally, approximately 200 million women becomes pregnant per year, with a lot of these women suffering from ongoing nutritional deficiencies or a lack of nutrient understanding and dietary habits (Odiwuor, Kimiywe & Waudu, 2020).

Food insufficiency is a serious global public health issue that has an immediate affect on disease burden, it is related to nutritional intake and can be either insufficient or excessive, it can manifest as both malnutrition and obesity, as well as diet-related noncommunicable illnesses (Sabeeh et al., 2022).

Adequate nutrition during pregnancy is fundamental for the pregnant mother's health. It helps in preventing pregnancy complications such as diabetes, preeclampsia, and anemia, proper nutrition also ensures that the mother has the necessary energy, nutrients, and immunity to navigate the challenges of pregnancy and childbirth successfully. During pregnancy a woman's nutritional needs significantly increase to support the growing fetus and to meet her own heightened energy demands, the developing fetus is wholly reliant on the mother's nutritional intake for optimal growth and development (Teweldemedhin et al., 2021& Omachi, 2021).

Proper maternal nutrition has a direct connection to their wellness, inadequate nutrition during pregnancy can cause a number of health problems

such as diabetes, preeclampsia (high blood pressure throughout gestation), and anemia, these conditions may have serious consequences for both the mother and the developing fetus (Maneschi et al., 2023 ; Mayk ndo et al., 2022).

The women's nutritional status during pregnancy has a direct influence on the outcome of the birth, insufficient nourishment can cause adverse effects including premature delivery, a low birth weight, and developmental problems, research suggests that nutrition during pregnancy may have long-term implications for the child's health, potentially influencing the risk of chronic diseases like obesity and diabetes later in life (Omachi, 2021).

Nutrients like folic acid, iron, calcium, and a myriad of vitamins are essential for forming the fetal organs, central nervous system, and overall growth trajectory, suboptimal maternal nutrition during pregnancy can have enduring consequences, impacting the child's health and well-being not just during infancy but throughout their lifetime (Maneschi et al., 2023 ).

Despite the undisputed importance of maternal nutrition, there remains a notable gap in comprehensive data concerning the nutritional knowledge and dietary practices of pregnant women. This gap hinders the development of evidence-based strategies to promote healthy pregnancies and reduce the incidence of pregnancy-related complications (Ghirmai & Gebreyohannes, 2021).

The evaluation of nutrient awareness and eating patterns among pregnant women have significant health implications, providing insights that can help medical professionals and public health practitioners, these insights can guide the establishment of specific activities, educational initiatives, and policy recommendations to improve maternal and child health outcomes (Chehade et al. 2023).

Nutritional knowledge among pregnant women plays a pivotal role in ensuring a healthy pregnancy and the well-being of both the mother and the developing fetus, understanding the principles of proper nutrition empowers pregnant women to make informed dietary choices, which can have a significant impact on maternal health and birth outcomes (Papežová et al., 2023).

Furthermore, assessing nutritional knowledge among pregnant women is a vital aspect of maternal care. It empowers women to make informed dietary choices, prevent nutritional deficiencies, and reduce the risk of complications during pregnancy. Ultimately, enhanced nutritional knowledge contributes to healthier pregnancies and improved outcomes for both mothers and their newborns (Gezimu Bekele & Habte, 2022).

Dietary habits during the pregnancy play an essential role in maintaining the overall wellness and mental health of both the expecting woman and the growing baby. Pregnancy is a period of increased nutritional demands, and a balanced diet is essential to provide the necessary nutrients for fetal growth, maternal health, and overall pregnancy success (Fernández-Gómez et al., 2020).

Dietary habits of pregnant women can vary greatly, and influenced by cultural habits, income level, and availability to health care services. Understanding these variations is crucial for tailoring interventions to meet the specific needs of diverse populations of pregnant women (Agyei et al., 2021).

Hilla City has a varied population with a range of socioeconomic origins. access to healthcare services is mostly provided by Primary Health care Centers (PHCCs), which serve as the primary point of contact for pregnant women seeking treatment and assistance during pregnancy.

Therefore, Obtaining on pregnant women's nutritional knowledge at (PHCCs) visits is crucial.

## **1.2. Importance of the Study**

Nutrition is the process of assimilating food into the body in order to nourish it. Nutritional status refers to a person's health state as it is impacted by nutrient intake and use (Omachi, 2021).

High-risk pregnancies have been claimed to be as common as 20% globally. Furthermore, 50% of perinatal mortality occur during high-risk pregnancies. The prevalence of high-risk pregnancy differed by country, for example, 31.4% in north India, 59.3% in Tunisia, 40.1% in Nigeria, 39.8% in Iran, and 53.2% in Iraq (AlAbedi , Arar & Radhi, 2019).

Maternal mortality is far too high every day, complications from pregnancy and childbirth are the leading causes of maternal mortality in many underdeveloped nations. According to World Health Organization (WHO) data, nearly every day 800 women die as a result of avoidable pregnancy risk factors 99% of these mortality occur in poor countries (Serbesa, Iffa & Geleto 2019).

Pregnancy needs specific attention, such as enough nutrition during pregnancy, the quantities of nutrients in tissues and liquids undergo physiological and chemical changes, necessitating dietary modifications, since nutritional status can affect the outcome of the pregnancy, birth, and postpartum (Rodrigues, et al., 2023).

The nutritional health of a woman during pregnancy is critical since the fetus is directly impacted by the mother's nutritional status, to compensate the increase metabolic rate during pregnancy, the woman's dietary consumption must be altered, to sustain optimal physical performance, a greater basal metabolic rate necessitates an increase in calories (Omachi, 2021).

Pregnant women increase their usual and daily diet consumption from the four major food categories, according to the American College of Pregnancy and Obstetrics. During pregnancy, calorie consumption rise by around 300 kcal/day (Mazloomy Mahmoodabad et al., 2022).

According to the WHO pregnant women's diets be balanced, and should be rich in nutrients, as appropriate nutrition throughout fetal development is critical for the child's long-term physical health. Adequate food supply is crucial at this period for both the mother and her unborn child (Bukari et al., 2021).

Good nutrition is strongly advised during pregnancy as an essential strategy for maintaining a healthy body weight and preventing the occurrence of noncommunicable illnesses in the unborn child later in life ( Kanikwu, Jimmy & Emesowum, 2021).

Due to increased demands from the developing baby, pregnant women are at a higher risk of nutritional inadequacies. Maternal diet before and throughout pregnancy effects the foetus growth and potential development and adds to the maturation of a healthy infant (Hanior, Igbokwe & Dibia, 2022).

Inadequate maternal nutrition has been linked to an increased risk of short-term complications such as intrauterine growth restriction (IUGR), a low birth weight (LBW), premature deliveries, prenatal and infant mortality, the eating in excess during the pregnancy can result in pregnancy problems such as preeclampsia, gestational diabetes, macrosomia, and an increased likelihood of a cesarean delivery (Bayazid, Larouci, & Hammoulia, 2022 ; Dolin et al., 2020).

Evidence suggests that the global burden of malnutrition among pregnant women is considerable, it contributes to the deaths of 3.5 million women and children under the age of five, it is estimated that 13 million infants are born

each year with (IUGR) and 112 million are underweight as a result of prenatal malnutrition (Gelebo et al., 2021).

According to the World Food Program (WFP), nearly half of all pregnant women in underdeveloped countries are anemic, resulting in nearly 110,000 fatalities during delivery each year, the children born to malnourished mothers are 20% more likely to die before the age of five (Olatona et al., 2021).

Preventing nutrition-related issues during pregnancy requires knowledge of nutrition. a knowledge is awareness, or understanding of someone or something, such as facts, information, descriptions, or abilities, gained by experience or education through perception, discovery, or study. A theoretical or practical grasp of a subject is referred to as knowledge (Hanior, Igbokwe & Dibia, 2022).

Awareness of nutrition predicts beneficial changes in eating habits, and health recommendations urge pregnant women to increase their food consumption (Nankumbi, Ngabirano & Nalwadda, 2020).

The WHO accredited perinatal nutrition knowledge for women to minimizing the birth of underweight children and preventing maternal problems throughout delivery, the recommendation was context-specific and focussed on populations have poor nutrition, especially in low- and middle-income countries (Gezimu, Bekele & Habte, 2022).

A previous study has discovered that information is one of the first steps in altering behavior. As a result, nutrition education is a necessary foundation for healthy eating habits. A lack of information, on the other hand, is a risk factor for malnutrition. Nutrition education is a commonly used method that has been demonstrated to enhance nutritional knowledge and habits during



pregnancy, as well as perinatal outcomes, particularly in women with a history of malnutrition (Hanior, Igbokwe & Dibia, 2022).

However, it is well acknowledged that information alone may not result in behavioural change. Several studies report a variety of other factors influencing nutrition practices during pregnancy, such as healthcare providers' knowledge, parents' educational level, nutrition information provided, geographic location, mothers' and the community's beliefs and attitudes, a lack of family support, and limited access to foods (Mayk ndo et al., 2022).

Nutritional recommendations was to have solid evidence as a cornerstone intervention to enhance food intake in pregnancy, lowering the incidence of preterm delivery by 54%, a healthy food according to the WHO, contains adequate energy, protein, vitamins, and minerals obtained through the consumption of a variety of foods, including green and orange vegetables, meat, fish, beans, nuts, pasteurised dairy products, and fruit (Super, et al., 2021).

A result, having a good awareness of nutritional intake and dietary guidelines will assist women achieve a healthy fetal growth and weight increase throughout pregnancy. During the prenatal period, around 47% of women were unaware of the need of a well-balanced and diverse diet (Bayazid, Larouci & Hammoulia, 2022; Gezimu, Bekele & Habte, 2022).

The quality of a pregnant woman's food is crucial to her general health and the result of the pregnancy. The advantages of healthy maternal eating practices for the fetus continue throughout early childhood and even adulthood. Individuals whose mothers ate a healthy, balanced diet during pregnancy had a lower risk of noncommunicable diseases (NCDs) such as obesity, diabetes, and hypertension later in life, compared to those whose

mothers did not follow proper dietary guidelines (Nketia, Obeng & Asamoah 2022).

Food consumption during pregnancy is complicated, especially for low-income women, because numerous hurdles may exist, such as educational failures, unemployment, harmful behaviors, and a lack of social support, among others (Da Silva et al., 2020).

### **1.3. Problem Statement**

Pregnant women constitute a vulnerable population with unique nutritional requirements, and their dietary habits and nutritional knowledge during pregnancy significantly impact both maternal and fetal health outcomes, the nutritional needs during pregnancy are not uniform and vary based on factors such as the stage of pregnancy, maternal age, preexisting health conditions, and cultural backgrounds (Alkalash et al., 2021).

Many pregnant women, particularly those from underserved communities, lack access to comprehensive and up-to-date nutritional education. This knowledge gap can lead to misconceptions and potentially unhealthy dietary choices during pregnancy (Beulen et al., 2020).

The inadequate nutritional knowledge and suboptimal dietary habits of pregnant women can have profound public health implications. Adverse pregnancy outcomes, such as preterm birth and low birth weight, gestational diabetes, preeclampsia, and developmental issues in the baby can lead to increased healthcare costs and long-term health challenges for both mothers and children (Super & Wagemakers 2021).

Furthermore, these conditions not only affect the well-being of the mother during pregnancy but can also have long-term consequences for her health. Insufficient nutrition during pregnancy can impair the development of the fetus and increase the risk of complications at birth, babies born with low-

birth weight are more susceptible to health problems in infancy and later in life (Kaur et al., 2019).

Study is needed to understand how nutritional knowledge and dietary behaviors change over the course of pregnancy and how these changes impact maternal and fetal health outcomes, and as it is understanding how socioeconomic status and cultural factors affects nutritional knowledge and dietary intake habits is crucial (Girma et al., 2022).

#### **1.4. The Objective of the Study**

- 1- To assess the nutritional knowledge and dietary intake habits for pregnant women.
- 2- To assess the reproductive health for pregnant women.
- 3- To find out the relationship between nutritional knowledge, food frequency intake with dietary intake habits for pregnant women.
- 4- To find out the relationship between nutritional knowledge and dietary intake habits for pregnant women with their socio- demographic characteristics such as age, education level, occupation, type of the family and household monthly income.

#### **1.5. Research Question**

Is their nutritional knowledge and dietary intake habits effect on pregnant women?

#### **1.6. Definition of the Terms**

##### **1.6.1. Nutritional Knowledge**

###### **A. Theoretical Definition:**

Nutritional knowledge is the cognitive comprehension and awareness of nutritional information, including the nutritional composition of foods, dietary recommendations, the roles of essential nutrients in the body,

and the ability to apply this knowledge to make informed and health-conscious dietary choices ( Bayazid, Larouci & Hammoulia, 2022).

**B. Operational Definition:**

Nutritional knowledge can be operationally defined as the ability to accurately identify and describe the macronutrients (carbohydrates, proteins, fats) and micronutrients (vitamins and minerals) found in common foods, understand basic principles of balanced and healthy eating, and demonstrate the capability to make informed dietary choices that align with recommended nutritional guidelines.

**1.6.2. Dietary Intake Habits****A. Theoretical Definition:**

Dietary intake habits are the decisions and actions that people make about the types, quantity, frequency, and quality of food and drinks they consume as part of their regular eating routines. Food preferences, meal timing, portion sizes, dietary diversity, and overall dietary pattern are all examples of these behaviors. socio- demographic characteristic influence dietary consumption patterns, which can have a significant impact on an individual's nutritional and health condition (Komolafe, 2021).

**B. Operational Definition:**

Dietary intake habits can be operationally defined as the recurrent behaviors and choices that characterize an pregnant women daily food and beverage consumption patterns. This includes assessments of meal timing, portion control, food preferences, dietary restrictions, frequency of consumption of specific food groups, and adherence to dietary recommendations.

# **Chapter Two**

## **Review of Literature**

## Review of Literature

This chapter presents previous literature and studies which are related to procedure underlying the current research. It presents in related to nutritional knowledge and dietary intake habits' of pregnant women.

### 2.1. Overview about Pregnancy and Antenatal Care

#### 2.1.1. Pregnancy

Pregnancy is a significant life stage for women, and the health of the mother and her unborn child are impacted during this time. is one of the most critical periods that might affect the offspring's health for the rest of their lives. studies have shown that varied maternal dietary exposures, including both under- and over-nutrition during pregnancy, have a direct influence on birth size and body composition and produce long-term consequences on metabolic responses in adulthood (Okafor & Goon, 2020 ; Aoyama & Bay, 2022).

Pregnancy is frequently considered as an opportune time to improve nutritional intake, with the majority of possibilities occurring during prenatal care and heightened interest in nutrition. Pregnant women and breastfeeding women's are seen as vulnerable groups, particularly in developing countries (Beulen et al., 2020 ; Dhakad, 2019).

The body's food requirements have grown throughout pregnancy and breastfeeding , hence proper nutrition is critical during these times several studies have found that pregnant and breastfeeding women's nutrient and food consumption is much lower than the recommended dietary allowances (RDAs). The most important criterion for supporting good mother and child health, particularly during pregnancy and breastfeeding, is an appropriate amount of nutrition in the diet (Dhakad, & Kumar, 2019).

During pregnancy, women are more prone to make poor food choices, engage in less physical exercise, and sleep less. As a result, pregnancy has

been recognized as a key risk period during which the chance of severe health effects is increased. According to research, fewer than half of Australian women consume a sufficient diet during pregnancy in accordance with nutritional requirements (Cannon et al., 2020).

A number of studies support the notion that nutritional status during pregnancy is linked to fetal development, which is linked to the risk of the child having cardiovascular and metabolic diseases later in life. Inadequate gestational weight growth, for example, is linked to an increased risk of low birthweight and small for gestational age newborns. They are prone to development failure due to a number of risk factors for mothers, including their early age, poor income, and low socioeconomic standing. Early marriage increases mother and newborn mortality and is a risk factor for pregnancy and delivery difficulties (Aoyama & Bay, 2022 ; Halisah et al., 2022).

### **2.1.2. Importance of Antenatal Care (ANC)**

The importance of nutrition education and counseling services for Antenatal care (ANC) is emphasized in the WHO updated guidelines for undernourished populations. The goal is to increase daily energy and protein intake to lower the risk of low birth weight (LBW, birth weight less than 2,500 g) infants (Katenga-Kaunda et al., 2021).

Antenatal care refers to the routine medical and nursing attention that expectant mothers receive, which may include counseling and education on nutrition. ANC is frequently decentralized, making it possible to administer maternal nutrition interventions locally in low-resource environments (Katenga-Kaunda et al., 2021).

International organizations such as the WHO and the International Federation of Gynecology and Obstetrics (FIGO) both suggest that all pregnant women require diet and weight counseling, dietary counseling during and throughout pregnancy is shown to enhance maternal nutrition knowledge,

dietary intakes, and clinical outcomes such as anemia, gestational weight gain, and birth weight, with a lower risk of perinatal problems (Killeen et al., 2023).

Antenatal care visits provide unique opportunity to avoid, identify, relieve, and treat health concerns that may affect both women and newborns throughout pregnancy. However, the most recent figures reveal that only 65% of women in the world attended for recommended prenatal (Chehade et al., 2023).

Indicates that only 13% of women got visit 1 (between 8-12 weeks) on time, but 37% got visit 2 (between 24-26 weeks) on time, 8% got visit 3, and 25% got visit 4 on time. The figure also shows that only 8% of women got the first two timely visits (visits 1 and 2), and less than one percent of women (0.6%) got all four ANC visits (visits 1, 2, 3, and 4), as recommended by WHO, as the following figure:

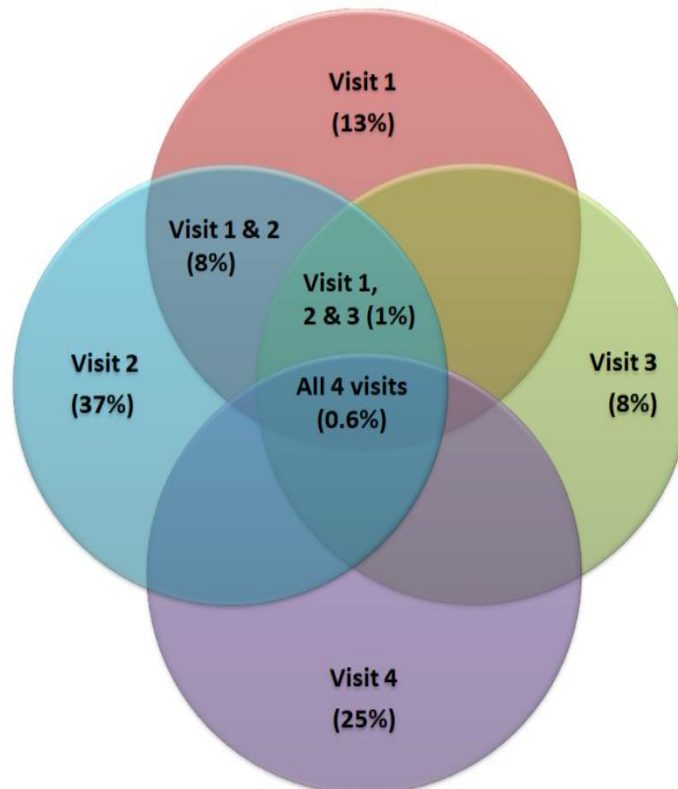


Figure 2.1. Distribution of all timely ANC visits pregnant women's ( Sarker et al., 2020).



## **2.2. Nutrition Overview**

### **2.2.1. Concept of Nutrition**

Nutritional knowledge is one of the foundations of health and nutrition literacy, which reflects the capacity to access, comprehend, and apply data, resulting in an increase in one's own impact on the quality of one's well-being. knowledge of good diet is critical in influencing the amount to which individuals will engage in health-related behavior, increasing pregnant women's dietary education will have a significant influence on their health and the health of the growing fetus (Koster & Niguse 2023).

Pregnant women's diet and health care are becoming increasingly essential, and nutritional education and counseling are frequently employed to promote the health and nutrition of mothers and children, many healthcare community centers have created their own nutrition teaching programs for pregnant mothers. However, program acceptance remains poor, and just a few studies have examined the benefits of nutrition education on maternal outcomes (Seo et al., 2020).

Nutritional knowledge and attitudes are crucial elements in dietary habits and therefore possible treatments for building adequate nutritional health programs for pregnant female, nutrition education increases nutrition knowledge, impacting attitudes and behaviors toward healthy eating, many numerous and complicated elements impact a woman's eating behavior during pregnancy, one of the most essential elements is dietary education, which if lacking, can be a barrier to adopting healthy behaviors and other postnatal weight control approaches, nutritional knowledge includes not just information and procedures, but also how to apply them in practice (Chehade, Yeretizian & Dano, 2023).

When a mother is pregnant, efforts to avoid fetal growth and development abnormalities begin. In addition to dietary measures, enhancing

pregnant women's awareness is useful in reducing stunting, in order to expand knowledge, information medium that may make pregnant women learn actively is required (Halisah et al., 2022).

Scientific data suggests that nutrition education during pregnancy has a considerable influence on pregnant women's knowledge and dietary habits, leading to improved mother and newborn outcomes, it was performed a quasi-experimental research with a nutritional education program on a sample of 100 pregnant women in Western Iran to determine the influence of prenatal nutrition education on nutritional knowledge. Pregnant women's knowledge of good prenatal nutrition rose considerably from 3-31% following antenatal nutrition instruction (Chehade, Yeretizian & Dano, 2023).

Because knowledge or cognition is a dominating domain that determines the activities of a person, especially pregnant women, pregnant women must have enough information regarding dietary demands throughout pregnancy. Pregnant women who have a strong understanding of nutrition throughout pregnancy are more likely to satisfy their nutritional demands adequately. However, if they lack awareness of dietary demands throughout pregnancy, they may satisfy their nutritional needs wrong, a research in Istanbul sought to assess the impact of nutrition education sessions on pregnant women's nutrition knowledge. Before and after the instructional sessions, participants completed a nutrition knowledge questionnaire. Following the session, knowledge scores climbed dramatically (Rusmita et al., 2022).

To investigate this further, a major descriptive, comprehensive study was conducted on both lifestyle and nutrition knowledge, as well as nutrition information-seeking behaviors, during the child-wishing stage and during the several trimesters of pregnancy. It was concentrated on nutrition in particular, this is a key factor in ensuring a safe pregnancy (Soylu, 2019).

Study investigated postpartum Syrian refugee women's prenatal nutrition knowledge, attitude, and practices in Lebanon. The findings revealed that 56% of participants lacked information about maternal nutrition during pregnancy, 25% had a negative attitude toward prenatal care services and nutrition throughout pregnancy, and 47% engaged in harmful eating behaviors while pregnant (Chehade, Yeretjian & Dano 2023).

Every individual has a varied degree of knowledge, which is impacted by both internal (age, experience, and education) and external (information, environment, socio-cultural, and economic) aspects. However, sociodemographic characteristics have been demonstrated to influence the adoption of healthy eating habits, as a result, study is required to determine the degree of knowledge, attitude, and practice among pregnant women, as the following figure:

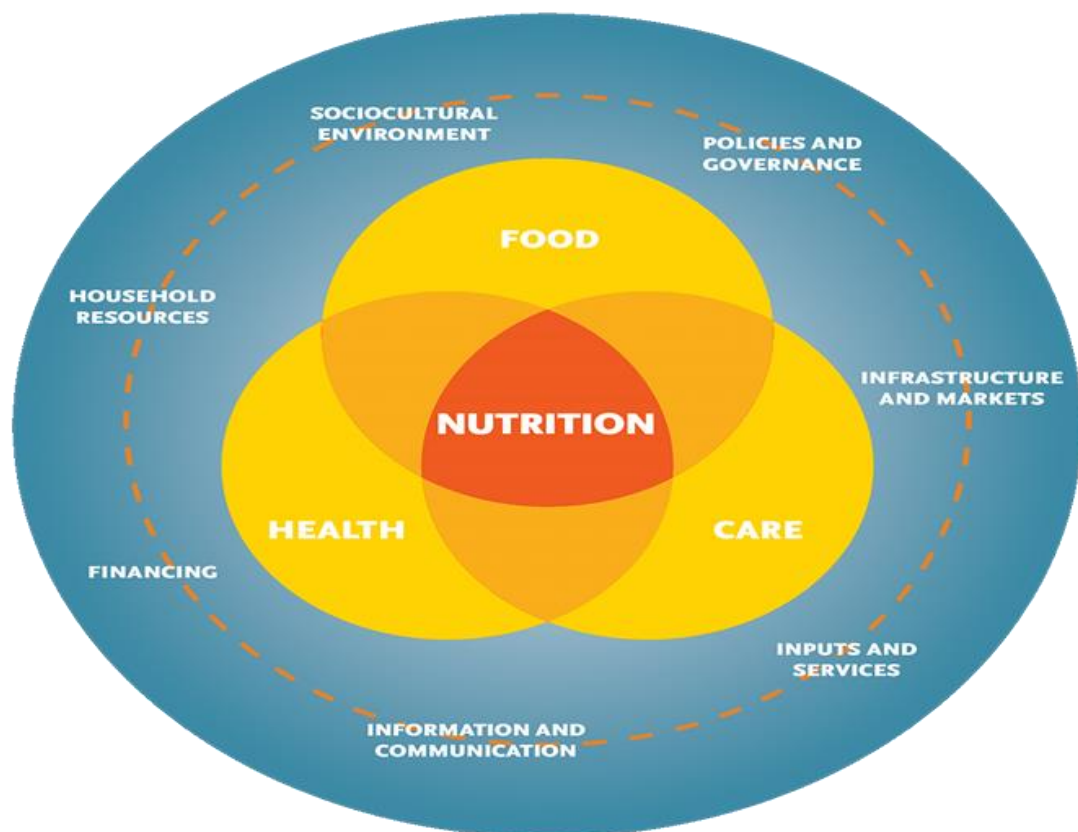


Figure 2.2. cross-cutting factors affecting and interacting with the causes of malnutrition ( Fanzo, 2015 & Seu et al., 2019).

### 2.2.2. Importance of Nutrients

Nutrition is a vital component of an individual's health and well-being, particularly during pregnancy. Inadequate maternal nutrition has been linked to an increased risk of short-term outcomes such as IUGR, LBW, preterm delivery, prenatal and newborn mortality and morbidity. Furthermore, excessive food consumption during pregnancy might result in pregnancy problems such as preeclampsia and gestational diabetes, macrosomia, distocia, and an increased risk of caesarean section (Osman et al., 2020).

Nutrition is a key component that influences the outcome of a pregnancy. Women's health has a strong connection to their social standing. The delivery of nutrients to the baby throughout pregnancy is an important process that can impact the infant's birth weight and development. A woman requires the greatest meals accessible within the household throughout this physiological period of life. Breast milk production is severely reduced when a woman is malnourished. As a result, appropriate diet is critical for the health of both mother and baby (Hothur & Patruni, 2020).

Nutrition has a huge impact on a person's health throughout their life, but especially during developmental stages such as fetal growth during pregnancy. An proper prenatal food regimen promotes normal fetal development and may aid in the prevention of issues such as congenital abnormalities, early delivery, LBW, and future chronic disease development. The prenatal diet should offer the essential energy and nutrients, including vitamins and minerals, to fulfill both the mother's and the fetus' nutritional demands (Chehade, Yeretziyan & Dano, 2023).

A good diet is crucial at all stages of life, but especially during pregnancy, because of the increased demand for most nutrients, consuming a variety of foods when pregnant is critical to supporting good mother and fetal nutrition. A varied diet during pregnancy assists in the prevention of

nutritional deficiencies and their serious consequences, such as an increased risk of maternal death, deformity, and low birth weight (Teweldemedhin et al., 2021).

Prenatal nutrition is essential for maternal health during pregnancy, delivery, and has an impact on the fetus growth and development. As a result, an adequate amount of nutrients is required to support fetus growth and development, as well as changes in maternal tissues and metabolism. Although nutrient requirements increase during pregnancy (Farhati, Resmana & Nurhadianti, 2019).

Early nutrition is one of the most important early exposures on the fetus', having the ability to impact the development and future operation of almost all bodily systems, including metabolic programming, immunological development, neurodevelopment, and a variety of other physiological processes. that early nutritional patterns for mother have long-term multisystem effects on health and risk of common noncommunicable diseases for example obesity, metabolic disease, immune diseases, degenerative diseases and a wide range of inflammatory during life (Appiah et al., 2021).

Some foods and beverages, such as vegetables, fruits, meat, seafood, and milk products, are high in important nutrients. Some meals and beverages, on the other hand, contain specific components or poisons that might have catastrophic implications. Furthermore, pregnant women are encouraged to increase certain nutrients such as protein, carbs, fat, and certain vitamins and minerals to satisfy the growing needs of physiological changes in maternal tissues and fetal development (Al Bahhawi et al., 2018).

### **2.3. Dietary intake habits**

During pregnancy, mothers go through a variety of physiological changes in order to ensure the fetus's appropriate growth and wellbeing. These modifications also prepare the mother and child for birth. Women's dietary

demands rise throughout the course of pregnancy and lactation to support all of these changes, prepare the body for birth and breastfeeding, and guarantee the fetus/baby's appropriate growth (Jouanne et al., 2021).

Adequate dietary intake during pregnancy has been identified as a critical element in achieving a healthy pregnancy and optimal delivery outcomes. Thus, paying attention to optimal dietary behavior and nutrient intake will provide necessary sustenance for both mother and child to attain maximum health. According to studies, nutritional knowledge influences the quality of food intake as well as healthy food choices. Individual nutrition knowledge advancement delivers new details that may inspire attitude change and, as a consequence, improve dietary behaviors (Mirsanjari et al., 2016).

Eating adequately during pregnancy entails more than merely increasing the mother's intake. The mother must also think about what she consumes. The mother's capacity to deliver nourishment and oxygen to her baby is crucial for fetal health and survival. Failure to provide appropriate nutrients to fulfill fetal demand might result in fetal malnutrition (Timothy, Felicia & Enosekhafoh 2019).

Several observational and intervention studies have found that the mediterranean diet can help prevent type 2 diabetes, metabolic syndrome, and obesity in people. The Mediterranean diet has also been linked to a lower risk of preterm birth, gestational diabetes, greater birth weight, and childhood obesity development. Measures to promote optimal nutrition during pregnancy are particularly critical, given that maternal eating patterns might be linked to socioeconomic, cultural, and lifestyle variables (Jardí et al., 2019).

Dietary consumption of pregnant mothers influences birth and child health outcomes. While other studies revealed that a western diet (rich in saturated fat and red meats but low in fruits and vegetables) increased the risk of low birth weight for gestational age. Other studies revealed that a mediterranean diet (low in saturated fat and high in olive oil, fruits, and

vegetables) reduced the risk of small for gestational age birth, and premature birth, particularly in women who were overweight or obese previous to pregnancy (Chang, Tan & Schaffir 2019).

Furthermore, most research have shown that pregnant women's behavior changes depending on characteristics such as their level of education, age, BMI, number of pregnancies, and sociocultural influences. The impact of socioeconomic factors, such as lower net household income, average educational attainment, and the availability of health insurance, is also frequently debated (Chehade, Yeretian & Dano 2023).

## **2.4. Nutritional consumption**

### **2.4.1. Adequate nutritional consumption**

Nutritional requirements differ depending on age and health condition. Pregnancy is one example of when nutritional requirements differ. Women who intend to become pregnant should consume an adequate amount of proteins, vitamins, and minerals both before and after conception. This is to ensure that the woman has adequate nutrition to support the rapid increase in cell number and development of the zygote during the first few weeks of pregnancy (Nnam, 2015).

The Nutrition Guidelines for Pregnant Women published by Health Canada recommended a varied diet with consumption from four food groups, two to three additional meals per day, and a multivitamin containing folic acid and iron (Grenier et al., 2021).

The average pregnancy has an estimated energy requirement of 350-450 kcals. This is required during the second and third trimesters, with the third trimester requiring the most. Adequate energy intake is simple to achieve and can be measured by weight gain throughout the pregnancy. Some micronutrient deficiencies, such as folic acid, iron, and iodine, affect the fetus

shortly after conception. Permanent damage has already been done by the time the pregnancy is discovered (Nnam, 2015).

A healthy diet that includes fish twice a week and whole grains for folate, vitamin B12, iron, and choline is recommended, as is 150 mg of iodine supplementation to ensure pregnant women get a total of 250 mg/day. Women planning to become pregnant should take a daily multivitamin with adequate amounts of folic acid and iron. Because only a small percentage of women consume a complete diet that includes all required nutrients, dietary supplementation with optimal levels of iron, folic acid, and other micronutrients is advised. Other supplementation regimens may be recommended by a dietitian for women who are at risk of micronutrient deficiency (Marshall et al., 2022).

Despite evidence supporting the significance of maternal nutrition, studies show that few women consume adequate amounts of food. Furthermore, there is a scarcity of current data on the disparities between nutritional intake during pregnancy and lactation and the dietary advice given to pregnant women in countries with high incomes. Consumption of cereals, legumes, fruit, and vegetables were found to be below the recommended range in a study conducted in Spain during the first trimester of pregnancy (Jardí et al., 2019).

#### **2.4.2. Suboptimal nutritional consumption**

Suboptimal nutritional consumption during the prenatal period is mostly connected with poor socioeconomic position, a lack of awareness about good eating patterns, suboptimal dietary intake, and improper food management and storage. Insufficient nutrition for mothers and poor prenatal care lead to maternal mortality during pregnancy and delivery, as well as baby health and survival (Akram et al., 2020 ; Muchima, Ngoma & Shitima 2023).



Dietary consumption is extremely important during pregnancy in terms of fetal growth and development, Pregnant women who consume a range of food categories lessen their chances of having low birth weight kids, recent study suggests that deficits or excesses of certain nutrients are linked to fetal growth and development issues, pregnancy difficulties, and changes in children's growth and development, Some adult disorders, as well as probable health changes encountered by women who had deficits during pregnancy, are thought to have fetal origins (Ballestín et al., 2021).

Furthermore, the WHO recommended nutritional consumption levels are not met by the majority of pregnant women. However, the frequency of poor dietary practice due to an unsuitable dietary habit is greater during pregnancy than at any other period in the life cycle (Alkalash et al., 2021).

### **2.4.3. Pregnancy malnutrition**

Pregnancy malnutrition, particularly in underdeveloped nations, lies at the heart of many women's health difficulties. Poor prenatal nutrition is linked to poor birth outcomes such as low birth weight infants, premature delivery, and intrauterine growth retardation. A high nutritional state also contributes to a favorable delivery result. As a result, pregnant women's diets should be varied and balanced (Abubakari, Asumah & Abdulai 2023).

Poor nutrition has the greatest impact on the foetus during pregnancy and its early two years of life, and the impacts on health, development of the brain, intellectual ability, learning, and productivity are permanent. Women in underdeveloped nations are at risk of malnutrition and nutritional deficiencies during pregnancy, which can lead to undesirable pregnancy outcomes such as impaired fetal growth and development, premature birth, low birth weight, and maternal anemia (Muchima, Ngoma & Shitima 2023).

Multiple studies on a food shortage from various geographical locations have found that babies exposed to malnutrition had a greater risk of coronary

heart disease, hypertension, and metabolic syndrome later in life than those who were not, Poor maternal nutrition has an adverse effect on fetal development, resulting in permanent alterations and growth retardation. To transfer the limited energy available for cardiac and neural development, the fetus employs adaptive responses (Verduci et al., 2021).

Unhealthy eating practices among expectant mothers are linked worldwide to detrimental health outcomes and a higher chance of nutritional deficits. For example, inadequate calcium intake impacts bone health, raises the risk of preeclampsia, and is linked to low birth weight and restricted fetal growth. Fiber and folic acid intake is inadequate when fruits, vegetables, nuts, legumes, and whole grains are not consumed in large quantities. Consuming enough fiber can lower blood cholesterol, improve and prevent constipation, and regulate blood sugar to help avoid gestational diabetes (Jardí et al., 2019).

In India, over one-third of women of reproductive age are malnourished, and more than 60% are anemic. Maternal nutrition is linked to a variety of biological and socio-cultural elements that are adapted in the living community and influence women's food patterns, habits, and practices. Maternal mortality is raised by many pregnancies and breastfeeding (Hothur & Patruni 2020).

Furthermore, weight-related chronic disorders die 4 million people each year. globally, up to 800 million people are undernourished, and at least 1 billion are micronutrient deficient. Investing in mother and child health, particularly nutrition, offers long-term advantages not just for population health, but also for the following generation's educational achievement and economic output (Killeen et al., 2023).

Normal birth weight is an essential beginning point since it reflects the baby's capacity to adjust to a new living environment; thus, newborns with LBW <2500 g are more likely to have issues. Intrauterine growth restriction occurs when a fetus does not receive adequate nourishment during pregnancy,

and LBW newborns are predictors of development failure and a risk factor for stunting (Halisah et al., 2022).

#### **2.4.4. Energy and Macronutrient**

Pregnancy increases the need for maternal energy and nutrition intake to meet the nutritional needs of the developing baby. Insufficient diets, which result in nutrient deficiencies and a lack of energy intake (EI), can have a significant impact on pregnancy outcomes and neonatal health. Energy and nutritional restrictions disrupt proper fetal development and may result in disease that lasts into adulthood, such as type 2 diabetes, high blood pressure, and cardiovascular disorders (Najpaverova et al., 2020).

For both the long-term health of the offspring and the growth and development of the fetus, the maternal nutritional status during pregnancy must be adequate. Macronutrient imbalances are relatively uncommon in high-income countries, but vitamin and mineral deficiencies are more prevalent (Baker, Hayes & Jones 2018).

Studies have shown that interventions involving the intake of macronutrients and micronutrients important for pregnant women (such as energy, protein, calcium, iron, folic acid, zinc, and magnesium) have had positive effects, including the prevention of pre-eclampsia, anemia, and deficiencies of nutrients in babies (Seo et al., 2020).

The amount of weight gain, the stage of pregnancy, and the level of physical activity all influence a woman's energy needs during pregnancy. It is estimated that a pregnant woman demands an additional 85,000 calories over the duration of 40 weeks of pregnancy, which amounts about 300 extra calories per day, the additional energy requirement at 20 weeks gestation is 340 kcal/day; at 34 weeks gestation, the additional energy requirement is 450 kcal/day (Uktamovich & Gafurovna 2022).

According to the European Food Safety Authority Scientific Committee, carbohydrates are basic components in the maternal diet and should represent between 45% and 60% of the calories in a healthy diet in the adult population as well as during pregnancy. The Spanish Society of Community Nutrition, suggests an intake of 4–5 portions of carbohydrates per day during pregnancy (Amezcu-Prieto et al., 2019).

Carbohydrate intake should be in the range of 45% to 65% of daily energy intake to meet energy, fiber, and micronutrient needs, which is the same as in nonpregnant, healthy women. Fiber, in particular, is essential during pregnancy, and the recommended daily allowance is 28 g (Tsakiridis et al., 2020).

Protein is consumed to support growth of the baby, placental development, amniotic fluid production, increased maternal blood volume, and the growth of other maternal tissues. Protein requirements rise in tandem with maternal and fetal growth rates; early in pregnancy, extra protein requirements are minimal, but gradually increase as pregnancy progresses. Over the last half of gestation, approximately 82% of the total demand for the 925 g of protein required for maternal and fetal needs is accumulated (Uktamovich & Gafurovna 2022).

Dietary Approaches to Stop Hypertension (DASH) recommends an average daily calorie consumption of 2355 kcal for 25 to 50-year-old pregnant women with moderate physical activity. Carbohydrates should account for over fifty percent of the overall diet energy intake during pregnancy, while fat should account for 30-35% (Najpaverova et al., 2020).

The DASH diet specifies nutritional goals for each day and week, number of servings is determined by your daily calorie requirements.

Here are the serving sizes from each food group for a 2,000-calorie-per-day DASH diet:

**A- carbohydrates and fibers:**

- 5 servings of sweets and added sugars per week or less. 1 tablespoon sugar, jelly or jam, 1/2 cup sorbet, or 1 cup lemonade equals one serving.
- Fruits: 4–5 servings per day. One medium fruit, 1/2 cup fresh, frozen, or canned fruit, or 1/2 cup fruit juice equals one serving.
- Grains: 6–8 servings per day. 1/2 cup cooked cereal, rice, or pasta, 1 slice bread, or 1 ounce dry cereal is one serving.
- 4 to 5 servings of vegetables per day. 1 cup raw leafy green vegetable, 1/2 cup cut-up raw or cooked vegetables, or 1/2 cup vegetable juice equals one serving (Feehally & Ostrowsk, 2023).

**B- proteins:**

- Six 1-ounce servings of lean meats, poultry, and fish per day. 1 ounce cooked meat, poultry, or fish, or 1 egg is one serving.
- 4 to 5 servings of nuts, seeds, or dry beans and peas per week. 1/3 cup nuts, 2 tablespoons peanut butter, 2 tablespoons seeds, or 1/2 cup cooked dried beans or peas, also known as legumes, make one serving.

**C- fats and essential fatty acids:**

- 2 to 3 servings of fat-free or low-fat dairy products per day. 1 cup milk or yogurt or 1 1/2 ounces cheese constitutes one serving.
- 2 to 3 servings of fats and oils per day. 1 teaspoon soft margarine, 1 teaspoon vegetable oil, 1 tablespoon mayonnaise, or 2 tablespoons salad dressing equals one serving (Feehally & Ostrowsk, 2023).

**2.4.5. Micronutrient Consumption****A. Vitamins****1. Vitamin B1 (thiamine)**

Vitamin B1 or thiamine, is a multidirectional vitamin that has long piqued the interest of doctors, nutritionists, and scientists. Thiamine has both direct and indirect effects on cell metabolism due to its high biological activity and role as an enzyme cofactor. Its lack in the human diet causes disruptions

in a variety of important biochemical and metabolic processes, including diminished glucose metabolism, impacted bioenergetic processes, dysfunctional mitochondria, and lactic acidosis (Mrowicka et al., 2023).

Lack of thiamine during pregnancy and lactation is a commonly reported condition. The common implicating factors have been maternal physiological changes such as increased energy needs, renal perfusion, and hyperemesis gravidarum, in conjunction with poor dietary habits and postpartum dietary limitations. Regardless of significant advances in scientific knowledge, many women around the world continue to suffer from the negative effects of low thiamine levels, especially in resource-poor Southeast Asia (Kareem et al., 2023).

Regional studies for women in kashmir found that eating polished rice and meat or chicken meals resulted in maternal thiamine deficiency, especially during stressful times like pregnancy and lactation, when levels are already depleted. A study conducted in kashmir in 2014-2015 found that infantile encephalopathy was caused by thiamine deficiency (Ali et al., 2022).

## **2. Vitamin B6 (pyridoxine)**

Vitamin B6 is found in three forms: pyridoxine, pyridoxal, and pyridoxamine. Vitamin B6, in the form of pyridoxal phosphate, influences protein (amino acid) metabolism. The other pyridoxine functions in the synthesis of nucleic acid and in the synthesis of heme for hemoglobin production. Vitamin B6 aids in the formation of neurotransmitters, which improves nerve cell transmission in the brain (Widasari et al., 2020).

Additionally, vitamin B6 requirements for adult females are 1.2 mg/day, 1.3 mg/day for pregnant women in the first trimester, 1.5 mg/day in the second and third trimesters, and 1.3 mg/day for lactating women, to maintain a plasma PLP (pyridoxal 5'-phosphate) concentration of 30 nmol/L. PLP (pyridoxal 5'-phosphate) is the most common form of vitamin B6 in animal tissue, accounting for 70 - 90% of total vitamin B6 in plasma and involved in

the metabolism of amino acids, carbohydrates, lipids, and neurotransmitters (Bjørke-Monsen et al., 2023).

Many enzymes involved in the metabolism of glucose, lipids, amino acids, deoxyribonucleic acid (DNA), and neurotransmitters use vitamin B6 as a coenzyme. Furthermore, as an antioxidant molecule, vitamin B6 may inhibit reactive oxygen species. It can be obtained from a variety of foods, including fish, meat, nuts, and fresh vegetables, with the Chinese dietary guidelines recommending 1.4 mg daily for adults and 2.2 mg daily for pregnant women (Wang et al., 2022).

### **3. Vitamin B9 (folic acid)**

Women of reproductive age should be to take a minimum of 0.4 mg folic acid daily (from fortified foods and/or supplements), and most over-the-counter prenatal multivitamins contain 1 mg folic acid. The Canadian Society of Obstetricians and Gynecologists now advises 5 mg folic acid for a larger range of conditions (Wilson & O'Connor 2021).

Folic acid deficiency in children raises the chance of neural tube abnormalities. As a result, given the high incidence of unexpected pregnancy globally, supplementation of 400 g per day, together with a well balanced diet, is suggested in many countries for women of reproductive age, regardless of their intention to conceive. The folic acid supplement can be taken all the way through pregnancy (Killeen et al., 2023).

It is difficult to optimize oral maternal folic acid supplementation since it is dependent on folic acid dose, type of folate supplement, bioavailability of folate from meals, timing of supplementing beginning, maternal metabolism/genetic variables, and other factors. There was continued deficiency in nutrients identified with folate food fortification/dietary intake 22% of women of childbearing age had folate concentration than the red blood cell (RBC) folate concentration regard level of 906 nmol/ L. and vitamin B12 status showed deficiency/marginal

rates of 17% and 35% during pregnancy 12-16 weeks (Markhus et al., 2018).

In a study of pregnant women taking prenatal multivitamins, found that adherence rates ranged from 0% to 100%, with a mean of just 55% even under ideal monitoring and motivation. Folic acid supplementation has been reported to be used by 40-60% of women of reproductive age during the periconceptional phase. Other studies, however, have shown that the usual consumption of folic acid before pregnancy is as low as 23% (Wilson & O'Connor 2021).

#### **4. Vitamin B12 (cobalamin)**

Vitamin B12 is critical for fetal and neonatal growth and development because it is required for DNA synthesis, methylation reactions, and neural myelination. Reduce maternal B12 status has been linked to negative birth outcomes such as small for gestational age, premature delivery, low birth weight . Pregnant women are at a higher risk of B12 deficiency due to increased B12 demands to support fetal growth and development. Furthermore, establishing adequate B12 stores in the fetus is dependent on maternal B12 status (Tan et al., 2021).

Pregnancy is a crucial phase in life that necessitates adequate micronutrient supplementation such as vitamin B12 functions as a coenzyme in the breakdown of odd-chain fatty acids and branched-chain amino acids (Wang et al., 2022 & Ali et al., 2022).

Vitamin B12 is a micronutrient that is required for carbon metabolism. B12 deficiency alters DNA methylation, which is essential for the majority of metabolic processes. B12 deficiency has been linked to obesity, insulin resistance, gestational diabetes, and obesity in child-bearing women (Adaikalakoteswari et al., 2020).

Recently, the effects of folate and vitamin B12 on gestational diabetes risk have been investigated. In several studies, vitamin B12



deficiency and folate were found to be common in early stages of pregnancy, and a higher serum folate/vitamin B12 ratio was linked to an increased risk of gestational diabetes mellitus (GDM). These findings highlight the negative effects of maternal vitamin imbalance (Wang et al., 2022).

Vitamin B12 deficiency can cause megaloblastic anemia, which can progress to funicular myelosis as an end-stage disease. The risk of developing such a deficiency increases exponentially during times of high demand, such as pregnancy and early childhood (Ali et al., 2022).

### **5. Vitamin C (ascorbic acid)**

Vitamin C is a water-soluble vitamin with antioxidant properties in the human body. It acts as an electron donor to reduce oxidizing agents and as a free radical neutralizer to protect DNA, proteins, and lipids from damage. Furthermore, because of their structural similarity, it replaces glucose in many biochemical reactions and plays an important role in disease prevention (Liu et al., 2020).

According to the available evidence, vitamin C hypovitaminosis and deficiency are common in low- and middle-income countries and are not uncommon in high-income settings. Many regulatory authorities have increased vitamin C recommendations in their respective countries. A daily intake of 100-200 mg of vitamin C will keep blood concentrations adequate to saturating, i.e., 50-75 mol/L. When blood concentrations fall into the hypovitaminosis C range (i.e., 23 mol/L), symptoms of vitamin C deficiency, such as fatigue, lethargy, and mood changes, such as irritability and depression, may become apparent (Rowe & Carr, 2020).

Because vitamin C is a water-soluble vitamin that cannot be produced endogenously, it is an essential dietary component. Furthermore, because vitamin C is required for iron absorption during pregnancy, low

intake has been linked to anemia as well as ischemic placental disease (Tsakiridis et al., 2020).

## 6. Vitamin A (retinol retinoic acid)

Vitamin A is essential for fetal growth and maternal metabolism during pregnancy, a unique period of the life cycle when cell differentiation occurs rapidly. According to the WHO, pregnant women are more vulnerable to vitamin A deficiency later in pregnancy because of the physiological increase in maternal blood volume and increased fetal development. Such clinically important hypovitaminosis A can also be observed in cystic fibrosis-complicated pregnancies or in people who have undergone restrictive type weight reduction surgery (Neves et al., 2020 & Mahle et al., 2021).

According to the WHO estimates the prevalence of vitamin A deficiency in pregnancy was 15.3% in low- and Middle-Income Countries (LMIC), affecting more than 19 million women. vitamin A deficiency of remains one of the most common nutritional deficiencies worldwide, affecting primarily pregnant and lactating women and pre-school children (Neves et al., 2020).

Furthermore, according to the WHO, People with active ocular manifestations of vitamin A deficiency are at extremely high risk of permanent corneal damage. To avoid permanent consequences, immediate treatment with high-dose vitamin A, consisting of 100000 IU daily for 3 days followed by 50000 IU daily for 2 weeks, is recommended. Excess vitamin A intake (equal to or exceeding doses of 10000 IU daily) in pregnant women during fetal organogenesis is teratogenic and is linked to craniofacial, cardiac, and central nervous malformations. Pregnant women at high risk of vitamin A deficiency should receive a maximum of 10000 IU

daily or 25000 IU weekly for a minimum of 12 weeks during pregnancy or until delivery (Mahle et al., 2021).

In particular, the WHO encourages vitamin A intake to be based on adequate nutrition and emphasizes the unpredictable nature of a single dose of a vitamin A supplement exceeding 25,000 IU. Vitamin A may be teratogenic, particularly if consumed between days 15 and 60 of pregnancy. Thus, the WHO recommends against prescribing vitamin A when every day vitamin A intake exceeds 8000 IU (Tsakiridis et al., 2020).

## **7. Vitamin D**

Vitamin D aids in the differentiation and proliferation of chondrocytes, resulting in improved bone growth plate growth and more body length addition when compared to the iron supplementation group. Several studies have been conducted to explain the effect of vitamin D on minimizing the risk of preeclampsia. During pregnancy, the mother's body undergoes changes and physiological adaptations, including changes in the immune response (Widasari et al., 2020).

Globally, vitamin D deficiency has been widely reported among pregnant women and infants. Women with low sun exposure, low vitamin D intakes, and lower socioeconomic status with inadequate diets are most at risk of vitamin D deficiency, resulting in very low vitamin D concentrations in their offspring and an increased risk of nutritional rickets. Many observational studies indicating that low vitamin D status in pregnancy may also contribute to the risk of adverse perinatal outcomes such as hypertensive disorders e.g., preeclampsia, fetal growth restriction, and preterm birth (Kiely, Wagner & Roth 2020).

Furthermore, vitamin D associated with an adequate immune response during pregnancy and plays an important role in calcium absorption by regulating calcium absorption in the small intestinal mucosa, vitamin D stimulates the synthesis of calcium binding proteins and

phosphorus binding proteins. Vitamin D deficiency reduces calcium absorption, causing calcium to be released from the bone to maintain circulating calcium concentration (Widasari et al., 2020).

The current dose of 500 IU per day is adequate to maintain optimal calcium and phosphorus metabolism. The main manifestations of its metabolite activity in the body are as follows: regulation of mineral metabolism, particularly calcium Ca and Phosphorus P; regulation of bone growth, remodeling, and repair; inhibition of the renin-angiotensin system; anti-inflammatory, regulation of cell growth and differentiation, angiogenesis; and regulation of neuromuscular conductivity (Sharipova, 2023).

## **B. Minerals**

Pregnancy is a dietary challenge since micronutrient consumption throughout the periconception and pregnancy periods affects the mother's health and the development of fetal organs. During pregnancy, a woman's body goes through a variety of physiological changes, primarily in her endocrine, digestive, circulatory, hematological, respiratory, and renal systems. This new circumstance needs a boost in calories, protein, vitamins, and minerals (Ballestín et al., 2021).

The most prevalent dietary characteristic during pregnancy in middle and low-income nations was an unbalanced macronutrient consumption, insufficient micronutrient intake, and a preponderance of plant-based food intake. Pregnant women who intake the recommended macronutrients and micronutrients can have improved pregnancy outcomes and overall health for themselves and their children (Nahrisah et al., 2020 ; Koster & Niguse 2023).

Females in underdeveloped nations are at risk of malnutrition and nutritional inadequacies during pregnancy, which can result in complications such as delayed fetal growth, early birth, low birth weight, and maternal

anemia, To ensure the health of the mother and the growing fetus, the need for energy, macronutrients, and micronutrients will be significantly raised (Grant et al., 2020).

Micronutrient deficiencies are more common in low- and middle-income countries; a systematic review of women's micronutrient intake in developing countries found that over half of the included studies had micronutrient intakes below the estimated average requirement, most commonly folate (Baker, Hayes & Jones 2018).

Pregnant women are at danger of several micronutrient deficiencies if they do not consume enough micronutrient-dense foods, such as animal-source foods, fruits, and vegetables. Micronutrient insufficiency is frequent during pregnancy and is a serious public health issue in countries with low and middle incomes, Multiple-micronutrient deficiency is widespread in low- and middle-income countries, and it may become worse during pregnancy, potentially leading to negative consequences for pregnant women (Komolafe, 2021; Abubakari, Asumah & Abdulai 2023).

Changing one's diet is one of the most long-term techniques of addressing micronutrient deficits at any age, including pregnancy. Dietary variety guarantees adequate intake of important nutrients for the woman's and fetus's health, Balanced diet is essential throughout the pregnancy and even during the periconceptional phase, because the time preceding pregnancy is significant for the health of a mother and her baby (Soylu, 2019).

Given that a lack of micronutrients plays a crucial role, pregnant women are urged to take iron/folate supplements or eat foods containing iron. To achieve iron needs, the WHO advises daily oral iron supplementation of 30-60 mg (Ningue, Galibois & Blaney 2020).

Micronutrient status varies widely throughout pregnancy and across populations. Women in low-income countries often enter pregnancy malnourished, and the demands of gestation can exacerbate micronutrient

deficiencies with health consequences for the fetus. Examples of efficacious single micronutrient interventions include folic acid to prevent neural tube defects, iodine to prevent cretinism, zinc to reduce risk of preterm birth, and iron to reduce the risk of low birth weight. Folic acid and vitamin D might also increase birth weight (Alison et al., 2016).

### **1. Iron**

The synthesis of hemoglobin, cellular metabolism, and immune system performance all depend on iron. Dietary sources of it include fortified cereal products and both haem (meat, fish, and eggs) and non-haem (grains, pulses, nuts, fruit, and vegetables). The situation of increased demands and a lack of iron consumption, which is included in nutritional needs, are the leading causes of anemia in pregnant women (Baker, Hayes & Jones, 2018 ; Rusmita et al., 2022).

Iron deficiency is seen as a serious nutritional problem in both developed and developing countries. Iron deficiency anemia affects more than two-thirds of pregnant women in developing countries. According to the World Health Organization, anemia, defined as a low blood hemoglobin concentration, is a public health concern that affects low, medium, and high-income nations and has serious health effects (Girma et al., 2022).

It is estimated that 80% of pregnant women in developing nations do not achieve their iron the recommended daily allowances ( RDAs ) and 25% of these women have severely low vitamin A consumption, leading in clinical and subclinical iron and vitamin A deficits. These deficits have an impact on maternal nutritional status and health, which may affect birth outcomes (Obwocha, Mbagaya & Were 2016).

Iron deficiency accounts for almost 50% of all instances of anemia, RDAs are the amounts of consumption of vital nutrients determined by scientific understanding and the food and nutrition board to be adequate for

meeting the recognized nutritional needs of virtually all healthy people (Girma et al., 2022).

## 2. Iodine

Iodine is required for the production of thyroid hormones. The recommended daily iodine intake in pregnancy has recently been increased to 250 g/day, implying that a urinary iodine clearance of 150-250 g/day is adequate. It is worth noting that even mild-moderate iodine deficiency in pregnant women is associated with adverse maternal effects such as goitre and lower intelligence quotient (IQ) in babies. Because the fetal thyroid does not function until 18-20 weeks gestation, extra maternal thyroid hormone is required for meeting this requirement (Taylor Peter & Lazarus John 2019).

The mother synthesizes approximately 50% more thyroxine hormone (T4) to maintain maternal euthyroidism and transfer thyroid hormones to the fetus prior to gestational week 20, and iodine is required for fetal thyroid hormone production after gestational week 20. Furthermore, during pregnancy, renal iodine clearance increases. As a result, pregnant women must consume enough iodine during their pregnancy, the average daily iodine intake was 141g from food and 166 g from food and supplements. Only 21.7% meet the (WHO/UNICEF) recommended daily intake of 250 g iodine/day (Markhus et al., 2018).

There is an overall lack of knowledge of the significance of iodine in pregnancy, so there is work to be done in terms of public-health awareness-raising, both among women of reproductive age and professionals such as caregivers and general practitioners. In the United Kingdom, for instance, study in Scotland and Northern Ireland has revealed that pregnant women are not given iodine advice, are unaware of its importance, and are unaware of the main sources found in food (Bath, 2019).

### 3. Calcium

Inadequate calcium intake threatens both the fetus and the mother. Intrauterine growth restriction, low birth weight, poor bone mineralization, and preterm birth are all risks for the fetus, while hypertension and preeclampsia are risks for the mother. Several trials have shown that calcium supplementation is beneficial in the prevention of preeclampsia. Calcium intake recommendations vary by country, ranging from 900 to 1200 mg/day. The WHO and the Food and Agriculture Organization (FAO) of the United Nations recommend that pregnant women consume 1200 mg of calcium per day and non-pregnant adults (19-50 years old) consume 1000 mg per day. In the Netherlands, the RDAs for all adults, regardless of pregnancy status, is 1000 mg/day (Willemse et al., 2020).

### 4. Magnesium

Magnesium is one of the ten vital metals in humans, the fourth natural cation in human tissues after calcium, potassium, and sodium, and the second most prevalent intracellular cation in human tissues. Magnesium is a multivalent ions that plays an important role in many biochemical and physiological processes, including protein synthesis and nucleotide metabolism. Magnesium plays an important role in biology. Magnesium ions are involved in over 600 enzymatic reactions, including energy metabolism, fatty acid and formation of proteins, neuromuscular excitability, and nerve impulse transmission (Fanni et al., 2021).

In additional, magnesium is found in grains, green vegetables, and seeds, but magnesium deficiency is common, particularly in low-income areas. Women should consume 280 mg of magnesium per day, with the amount increasing during pregnancy. Insufficient magnesium has been linked to poor maternal and fetal outcomes. Furthermore, a lack of magnesium has been linked to an increased risk of adverse perinatal outcomes such as



gestational hypertension, leg cramps, and premature delivery (de Araújo et al., 2020).

According to dietary surveys, magnesium consumption remains below recommended levels in Europe and the United States. The population of industrialized nations consumes magnesium-deficient modern fast-food diets. Several studies have found that these diets contain between 30% and 50% less magnesium than the daily recommended dosage, and magnesium intake in the United States to have declined over the last century, from around 500 mg/day to 175-225 mg/day (Citu et al., 2022).

### **5. Sodium**

Specialists have long advised limiting dietary salt intake to avoid sodium and water retention, which can lead to the occurrence of preeclampsia. Later, sodium restriction was thought to be a trigger of explicitly eclampsia in preeclamptic women, and additional sodium was thought to be essential for pregnant women's health. More recent studies have established over time cardiovascular risk in women with previous episodes of preeclampsia and those with hypertension during pregnancy (Asayama & Imai, 2018).

Whole body sodium is estimated to increase by 23 g during pregnancy, representing an additional daily requirement of 70-90 mg . However, the increase is not evenly distributed throughout pregnancy. The need arises from the expansion of the maternal Extracellular fluid volume approximately 3.0 L, which accounts for 60% of the extra requirement, with the remaining 40% meeting the compositional requirements of the fetus, placenta, and amniotic fluid. Changes in the volume and distribution of body water begin early in pregnancy and are associated with the initial endocrine response to pregnancy, which, raises the homeostasis retention of sodium (Turck et al., 2019).

### **6. Potassium**

Potassium is important for maintaining the balance of electrolytes and fluids in the body's cells. Furthermore, he is in charge of sending nerve

impulses, which aid muscle contraction. throughout pregnancy, blood volume raises by up to 50%, requiring additional electrolytes sodium, potassium, and chloride in combination to maintain the proper chemical balance in the fluids (Rían, Manville & Geoffrey).

Cramps in the legs through pregnancy may be caused by a lack of potassium. Hypokalemia can occur during pregnancy, mainly due to a woman's loss of fluid at morning sickness in the first few months. Hyperkalemia is also highly risky during pregnancy because it can result in serious heart problems (Mironenko & Eliseeva 2020).

**Table 2.1. Summary of micronutrient supplementation during pregnancy and risks of deficiency and overload ( Parisi et al., 2019).**

| Micro nutrient | Implications for deficiency  | Supplementation policy   | Risks of overload  |
|----------------|--|--|--|
| Iron           | Maternal Iron deficiency Anemia (IDA) with increased risks of preterm delivery, LBW, stillbirth and reduced iron stores in the newborn | 60 mg/day  | · Increased risk of hemoglobin concentrations at term higher than 130 g/l  |
| Folic acid     | · neural tube defects.<br>· Increased risks of LBW and noncommunicable diseases in adulthood   | 400-800 micrograms /day from two months before to three months after conception                                  | · Delay in vitamin B12 deficiency diagnosis, masking megaloblastic anemia with neurologic consequences<br>· Colorectal carcinogenesis. |
| Calcium        | · Impaired fetal skeletal development<br>· Increased risk of maternal hypertensive disorders   | 1.5-2.0 g/day of elemental calcium starting from 20 weeks of gestation onwards in case of risk for deficiency or | Maternal side effects (e.g. gastrointestinal disorders)  |

|           |  |   |  |
|-----------|--|---|--|
|           |  | hypertensive disorders  |  |
| Iodine    | Maternal and fetal/neonatal hypothyroidism, intellectual disability and long-term effects on neurocognitive development in the offspring   | Recommended intake of 250 µg/day for pregnant and lactating women | Fetal goiter   |
| Vitamin D | <ul style="list-style-type: none"> <li>· Impaired fetal bone formation</li> <li>· Controversial associations with risks of preeclampsia, LBW, gestational diabetes, caesarean section and preterm birth</li> </ul> | 600 IU/day  | Controversial small increase in kidney stones  |
| Magnesium | Controversial associations with fetal growth restriction and preeclampsia  | 240 mg/day  | Not reported   |
| Vitamin A | Maternal anemia, night blindness, congenital malformations   | (10,000 IU/day, or 25,000 IU/week)                                | <ul style="list-style-type: none"> <li>· Congenital malformations for intake higher than 10,000 IU daily</li> <li>· Maternal side effects</li> </ul> |

## 2.5. Pregnancy problems and nutrition

The global prevalence of GDM is growing, ranging from 1% to 20% depending on the screening process and demographic characteristics. There are several dietary intervention studies on the prevention of GDM, however there is no definitive data on what constitutes the ideal dietary pattern for the prevention of GDM. As a result, measures to avoid GDM are critical (Lisa Garnweidner-Holme et al., 2020).

Maternal osteomalacia, gestational hyperglycemia, and preeclampsia are among pregnancy problems that have been closely associated to vitamin D insufficiency in pregnant women (Baena-Antequera et al., 2022).

Maternal and newborn nutrition have long-term consequences on the development of metabolic syndrome, which is defined by insulin resistance, type II diabetes and have whether before or during pregnancy, affects up to 10% of pregnant women, For example, high caloric intake and sweetened beverages are linked to poor diet quality, and consuming too many free sugars has been linked to gestational diabetes (Odhiambo al., 2020 ; Biggio, 2020 ; Jardí et al., 2019).

It has been shown that insufficient nutrition during pregnancy and childhood predisposes offspring to type II diabetes. Furthermore, babies born to GDM mothers have a greater chance of getting T2DM at a younger age, as well as obesity and coronary artery disease later in life (Lisa Garnweidner-Holme al., 2020 ; Moreno-Fernandez al., 2020).

Furthermore, maternal and newborn nutrition have long-term consequences on the development of metabolic syndrome, which is defined by obesity, dyslipidemia, hypertension, and cardiovascular disease (Odhiambo et al., 2020).

In the United States, hypertension affects 10% to 20% of pregnancies and has been associated with maternal morbidity and death in the postpartum period (Hauspurg et al., 2020).

Studies have found an association between food habits and systolic blood pressure (SBP) and diastolic blood pressure (DBP) during pregnancy. Both dietary factors and nutritional status, which have been implicated in the development of preeclampsia, are regarded as possible risk factors (Nahla, Ibrahim & Bahaa-Eldin 2022).

Underlying chronic hypertension affects 5% to 10% of the maternal population, and diabetes, whether before or during pregnancy, affects up to 10% of pregnant women, because of the scarcity of knowledge on the hazards of pharmaceutical exposure during pregnancy, it is projected that

approximately 50% of all women will take an agent with limited information on its risk during pregnancy (Biggio, 2020).

Moreover, preeclampsia and fetal abnormalities are more likely to occur in cases where there is insufficient folic acid intake, which is crucial during the embryonic and fetal stages of pregnancy. However, consuming unhealthy food in excess can also have an adverse effect on one's health (Jardí et al., 2019).

Approximately one third of cases of severe maternal morbidity are thought to be caused by pre-eclampsia, and 5% of these women end up needing to be admitted to intensive care. Low birthweight <2500 g, is closely linked to pre-eclampsia, and has been shown to be a contributing factor in 19% of preterm births and 12% of infants born with intrauterine growth restriction (Kinshella et al., 2022).

A study was conducted in the United States between January 1, 2018, and December 31, 2019, with 1114 women participating. Women had one of the following hypertension diagnoses: pregnant hypertension, preeclampsia, eclampsia, or new-onset postpartum hypertension. 447 women 41.5% had gestational hypertension, and 630 women 58.5% had preeclampsia, with 315 29.2% having severe preeclampsia (Hauspurg et al., 2020).

The most serious of the hypertensive disorders of pregnancy (HDP), which account for over 46,000 maternal deaths, 416,000 stillbirths, and 1.5-2 million neonatal deaths annually, is pre-eclampsia. HDPs are the second most common direct cause of death for both mothers and infants. After 20 weeks of pregnancy, new-onset hypertension, proteinuria, and/or indications of organ damage most frequently to the kidneys and liver are the main signs of preeclampsia (Kinshella et al., 2022).

On the other hand, anemia during pregnancy is a common occurrence in low- and middle-income nations, and it is caused by a decrease in hemoglobin concentration despite an increase in red cell mass, anemia can lead to bleeding

difficulties in the mother during the pregnancy, during delivery, and after the baby is born, as well as reduced fetal growth (Seu et al., 2019).

According to the WHO 40% of pregnant women worldwide are anemic, with iron deficiency anemia being the most common type. Nearly 510,000 maternal deaths occur each year worldwide as a result of childbirth or early postpartum complications. Anemia is responsible for approximately 20% of maternal deaths, with the majority of these occurring in developing countries. During pregnancy anemia has a significant global impact, affecting 32.4 million pregnant women (38.2%). It is a significant public health issue in South East Asia (48.7%) and Africa (46.3%). According to global data, 56% of pregnant women in low- and middle-income countries have anemia (Osman et al., 2020).

Overweight, obesity, and associated disorders are becoming more common globally. According to the WHO, chronic noncommunicable diseases (NCDs) are the major cause of morbidity and death globally, 41 million people would die from these causes each year, accounting for 74% of all deaths globally. As a result, early prevention of certain NCDs, such as hypertension, overweight and obesity, hyperglycemia, and hyperlipidemia, is emphasized. However, it has become known that several illnesses may have their origins in someone's intrauterine development over time (Alim et al., 2020).

Obesity affects reproductive health as women approach reproductive age. Polycystic ovarian syndrome (PCOS) and higher rates of infertility are linked to obesity, and professionals have pointed out that maternal lifestyle during pregnancy is linked to serious health problems and illnesses in the baby that may develop later in life (Nicholas et al., 2016 ; Alim et al., 2020).

Historically, women have struggled to gain a healthy pregnancy weight owing to a lack of nutrients. However, during the last several centuries, extreme weight gain has grown common worldwide, affecting people of all

ages, including pregnant women. Obesity, a global epidemic, is thought to be more sensitive in women than in males. This is because there are special nutritional requirements for both the mother and the baby during pregnancy (Naspolini et al., 2021).

Obesity is a well-known severe health issue that presents a major threat to both personal and societal health. According to the WHO most recent data, 1.6 billion adults globally have a body mass index (BMI) of more than 25 kg/m<sup>2</sup>. At least 400 million of these adults have a BMI of 30 kg/m<sup>2</sup> or higher, making them obese. According to the most recent statistics on obesity prevalence in the European Union, more women than men are obese in the majority of these countries- up to a 2:1 ratio in some cases (Nicholas et al., 2016).

In Germany, around one-third of all women of reproductive age are overweight or obese. Obesity diminishes the chance of conception and is linked to an increased risk of pregnancy and birth difficulties, birth abnormalities, early births and miscarriages, a high baby birth weight, and later childhood obesity. A healthy lifestyle reduces the risk of pregnancy difficulties and promotes the health of both mother and baby (Koletzko et al., 2018).

Furthermore, pregnancy is an immunologically unusual condition because it requires the maternal immune system to be very active in order to combat the future intrauterine microbial threats, but it also requires it to be immunosuppressed in order to sustain fetal development (Firmal, Shah & Chattopadhyay 2020).

Nutritional variables, such as allergies, have an important influence in determining an individual's vulnerability to developing chronic noncommunicable illnesses in adulthood throughout pregnancy and the first thousand days of life. Thus, dietary variables during pregnancy and lactation might alter immunity through epigenetic pathways (Di Costanzo et al., 2022).

Moreover, poor food habits during pregnancy and increased the average age of delivery has progressively in recent years, it be has also raised the prevalence of maternal pregnancy problems, raise the risk of intrauterine growth restriction, low birth weight, preterm delivery, anemia, infection, congenital impairment (Abubakari, Asumah & Abdulai 2023; Seo et al., 2020).

Some women, particularly those who are obese, are at a higher risk of neural tube defects and may require a larger dose from folic acid up to 5 mg/day for at least the first 12 weeks of pregnancy. Over 40 countries have mandated folic acid fortification programs to avoid neural tube abnormalities, which may have an impact on maternal levels, anemia can also be caused by a lack of folate and vitamin B12 (Killeen et al., 2023).

In Canada, the frequency of congenital abnormalities per 10,000 total births is 6 (anencephaly 2; spina bifida 3; encephalocele 1), congenital heart problems 21, oral facial cleft 17, and 11 urinary tract anomalies (Wilson & O'Connor 2021).

## 2.6. Previous Studies

**First study:** study to determine the relationship between nutritional knowledge, attitude, practice (KAP) during pregnancy, performed by (Mirsanjari et al., 2016) In Malaysia. A sample of 400 pregnant women participated in this study, aimed to determine whether there is an association between different levels of nutritional knowledge of pregnant women and healthy attitude and practice.

The results of this study showed that nutrition knowledge of pregnant women was significantly associated with healthier choice of foods for their daily meal (lunch and dinner) and type of drinks, rare consumption of fast foods, and frequent consumption of chicken and healthy use of vitamin and mineral supplements.



Conclusion: The current study tried to reveal the association of nutrition knowledge to healthy lifestyle of one group of Malay pregnant women during gestation. Realizing this relationship may help to investigate to what extent personal information influenced behavior.

**Second study:** study to assessment of knowledge for pregnant women toward risk of pregnancy performed by (AlAbedi , Arar & Radhi, 2019) at Southern of Iraq on the purposive sample (150) pregnant women visiting PHCs for therapeutic or preventive reasons. The aim of the study was to assessment of knowledge for pregnant women toward risk of pregnancy and to identify the association between level of awareness and demographic data.

Results of this study showed that quarter the sample have low knowledge, while less than half of the sample had a moderate knowledge about risks of pregnancy. In regarding to associations between level of knowledge and the socio-demographic characteristics the result shows there were no significant association between age and level of knowledge, but there were high significant between level of education, occupation, monthly income and level of knowledge toward risk of pregnancy.

**Third study:** Study to identify risk factors for anemia among pregnant women attending the antenatal care unit in Ethiopia, conducted by (Osman et al., 2019). The sample size of 228 study participants. The aimed of this study to determine the factors associated with anemia among pregnant women attending antenatal care in Ethiopia.

The results of this study: The majority of the study participants were considered malnourished, with a MUAC of less than 23 cm; 108 (94.7%) in the anemic group and 79 (62.3%) of the control group. Conclusion: This study revealed three key factors to be associated with anemia among pregnant women in Jigjiga Town, namely reduced intake of red meat and green vegetables, and low MUAC. Interventions including nutrition counselling and enrolling pregnant women with low nutritional status in nutritional programs

should be the core components of anemia control strategies, needed to address the high prevalence of anemia during pregnancy in developing countries.

**Fourth study:** Study about factors influencing dietary patterns during Pregnancy in a culturally diverse society conducted by (Fernández-Gómez et al., 2020). Involving 306 pregnant women in Spain. The aim of this study was to identify dietary patterns in pregnant women and to assess the relationships between sociodemographic, lifestyle-related, and pregnancy-related factors. This study provides evidence on the factors influencing dietary patterns during pregnancy and suggests that more specific nutrition programmes should be developed to improve the nutritional status of pregnant women.

Results of this study most analyses determining dietary patterns indicate that whole grains, fruits, vegetables, pulses, and fish correspond to health-promoting dietary patterns, while refined grains, processed meats, and cakes and pastries are characteristic of a less healthy diet. Other dietary patterns display regional and cultural influences on dietary intake. Dietary patterns are specific to different populations, although they may vary with age, socioeconomic status, ethnicity, culture, and the availability of different foods. There are marked differences in the dietary profiles of different countries in Eastern and Western Europe. The different dietary patterns identified in pregnant women have been found to be associated with sociodemographic determinants. Indeed, higher socioeconomic status is associated with a healthier diet in this group of women.

This study corroborates these results inversely, as unemployed pregnant women exhibit an unhealthier, less recommended dietary profile.

No significant associations with dietary patterns were found regarding the remaining variables, i.e., age, level of education, and the rest of the lifestyle-related variables.

**Five study:** Study about the impact of nutrition education on antenatal nutrition knowledge of women conducted by (Chehade, Yeretian & Dano, 2023). In Lebanon of 100 pregnant women, the aim of this study was to assessment the effect of nutrition education on antenatal nutrition knowledge of women.

Results of this study knowledge of pregnant women on antenatal nutrition improving significantly, from 53.9%–91% after the provision of nutrition education sessions. where baseline knowledge of pregnant women on nutrition during pregnancy was 53.9%.

# **Chapter Three**

## **Methodology**

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## **Methodology**

The present chapter focuses on the method of the study included the design which is used in this study, administrative agreements, ethical consideration, study preparation, sample selection, validity of the questionnaire, pilot study, reliability of the questionnaire, data collection methods, statistical data analysis and limitations of the study.

### **3.1. Design of the Study:**

A descriptive study was conducted at the primary health care centers in Hilla city through period from 15<sup>th</sup> October 2023 to 21<sup>th</sup> July 2024.

### **3.2. Administrative Arrangements:**

The official permissions were obtained from relevant authorities before collecting the study data as follow:

1. Protocol of research and official permission taken from University of Kerbala / College of Nursing to conduct the study (Appendix A-I).
2. The title and questionnaire were presented to the Ethics Committee formed within the College of Nursing, which reviewed the study tool (questionnaire), and therefore agreed to conduct the study (Appendix B).
3. an official letter by the (Training Department and Development) Babylon Health Directorate was taken (Appendix A-II).
4. An official permission presented at primary health care sectors to formally access the primary health care centers was also taken (Appendix A-III).
5. In addition, the consent of the pregnant women to participate in the study, after explaining the objectives and usefulness of the study to them and assuring that all information provided will be confidential for scientific and research purposes (autonomy and privacy).

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### **3.3. Ethical Considerations:**

Ethical obligations are one of the most important things that must follow and adhere to when doing the study. Before starting the collection of the data from the (PHCCs) that has been identified for the study, the investigator should clarify the main purpose and desired goal of conducting this study for the participants to be included in the study, as well as adhere to the strict confidentiality of the data taken from the study sample and pledge to use it for scientific purposes related to the study only.

Before the beginning of the collection of data from the sample who are participating in the study, the investigator provided a brief explanation about the research methodology of the project, the objective of conducting it, and the duties of the pregnant women who participate in this research, in order to give a clear picture of the study to be carried out. On the other hand, the student investigator emphasized that all pregnant women who are participate in the study had the right not to complete their participation and withdraw from this study in case that they felt uncomfortable or annoyed with some of the items in the questionnaire that was prepared as a research tool or the student investigator method of collecting data or anything else (Appendix B).

### **3.4. Settings of the Study:**

A simple random sampling method was used to select (12) out of (22) main primary health care centers distributed for (11) main health centers for each of the two primary health care sectors in the city of Hilla (Appendix A - VI ). The centers were selected (6) from each sector, to achieve this, a lottery method was used, as each of them contains the name of one of the primary health care centers distributed in this sector. After that, twelve clippings were randomly selected for the purpose of the study.

### 3.5. Study Sample:

A non- probability convenience sample consisted of (300) pregnant women who were visiting the 12 PHCCs for many causes. The total sample of pregnant women was selected of 12 PHCCs which involved in the study in Hilla city. The total sample of pregnant women were selected as 10% from the total of the (3 previous month) visits to the PHCCs. The study sample was selected according to the following table:

**Table (3.1): Distribution of primary health care sectors, centers and participants at Al – Hilla City**

| Sectors           | Centres          | Number of pregnant women visiting the PHCCs within 3 months | participants according 10% |
|-------------------|------------------|---|----------------------------|
| The first sector  | Shaheed Al-Islam | 340   | 34                         |
|                   | Al- Mohandissen  | 270   | 27                         |
|                   | Al- Imam         | 210   | 21                         |
|                   | Al-Asatetha      | 250   | 25                         |
|                   | Al-Hussein       | 190   | 19                         |
|                   | Al Quds          | 220   | 22                         |
| The Second sector | Babylon training | 310   | 31                         |
|                   | Al-Zahraa        | 240   | 24                         |
|                   | Al- Hadi         | 230   | 23                         |
|                   | Al-Qadhia        | 260   | 26                         |
|                   | Shahada Nader    | 300   | 30                         |
|                   | Al- Nahdhah      | 180   | 18                         |
|                   | Total            | 3000  | 300                        |

### **3.6. Instrument of the Study:**

To assess nutritional knowledge and dietary intake habits' of pregnant women, the study adopted the questionnaire conducted by (Tahsin, 2022) to assess nutritional knowledge of pregnant women. While in regard to dietary intake habits' the study adopted the instrument conducted by (Lim et al., 2018). The questionnaire consists from (4) parts, the total items in this questionnaire were (50) items (Appendix C).

#### **3.6.1. Part 1: Socio-demographic Information questionnaire:**

This part consisting of (6) items contains information about the age, education level, occupation, type of the family, household monthly income, sources provided of pregnant women information about nutrition knowledge .

#### **3.6.2. Part 2: History of reproductive health questionnaire:**

Consisting of (5) items gravidity, number of parity (for multipara), gestational age, history of abortion, followup pregnant women for directions of the primary health care center in the previous pregnancy.

#### **3.6.3. Part 4: Nutritional Knowledge for Pregnant Women:**

In this part, assessment nutritional knowledge for pregnant women, consisting of (23) items.

#### **3.6.4. Part 5: Dietary Intake Habits:**

This part comprises (6) items to measuring food frequency intake and (10) items to measuring nutritional habits of pregnant women.

### **3.7. The validity of the Questionnaire:**

To make the study instrument more valid, the adopted instrument was determined through the use of panel of experts who have more than five years of experience at their jobs field to investigate clarity, relevancy and adequacy of the questionnaire to assess nutritional knowledge and dietary intake habits' of pregnant women. A preliminary copy of the questionnaire were designed and presented to a panel of (12) experts. They were (5) faculty members from College of Nursing/ Kerbala University; (1) faculty member



from College of Nursing/ Baghdad University; (3) faculty members from College of Nursing/ Kufa University; (2) faculty members from College of Nursing/ Babylon University; (1) Doctor specializing in nutrition and community medicine from Babylon Health Directorate (Appendix D).

Polit and Beck (2004) mentioned that the panel typically depends on at least three experts, but a larger number of them may be advisable if the construct is complex. Those experts reviewed and evaluated the questionnaire items, and all of them agreed on (50) items of the questionnaire, which have been clear and adequate for measurement of the study. Minor modification and changes were done on few items according to the experts' comments and suggestions.

### **3.8. The Pilot Study:**

A pilot study was conducted for the determination the validity of the study instruments (Content validity). Before starting of the data collection, a pilot study is carried out to determine the study instrument's reliability. It was done from the period of 15<sup>th</sup> to 20<sup>th</sup> January 2024, on a pilot study sample that consists of (30) pregnant women were selected conveniently and excluded from original sample of the study.

#### **3.8.1. The pilot study has achieved the following objectives:**

1. To determine the research instrument's reliability.
2. To find out whether the wording of the questions is clear and easy to be understood.
3. To determine whether any modifications were necessary to be made in instruments.
4. To calculate a time needed for each interview.

After the pilot study, all these purposes were achieved (Nieswidomy 2014). mentioned a pilot study can be used to evaluate an existing instrument or to test a new instrument, it can also be used to determine how long it will take to conduct the data collection.

**3.8.2. The Result of Pilot Study showed that:**

1. The items of the instruments are clear, easy to understand and adequate to investigate the phenomenon underlying the study.
2. Minor modifications were made relative to few items.
3. The average time required for answering questionnaire is nearly (15 - 20) minutes.
4. The validity of the instruments were determined.

**3.9. Reliability of the Questionnaire:**

Reliability in nursing research refers to the consistency and accuracy of the research instrument, such as a questionnaire or interview, in producing the same results if used in the same situation on repeated occasions (NSF, 2021). A reliable instrument is essential for producing valid results, which means that the instrument measures what it intends to measure (Nicoll et al., 2023).

The internal consistency type of reliability was determined in current study; internal consistency reliability measures the consistency between different items of the instrument. Edwin stated that “It measures the consistency within the instrument and questions on how well a set of items measures a particular characteristic of the test. Single items within a test are correlated to estimate the coefficient of reliability” (Edwin, 2019).

The internal consistency between items was determined by using Cronbach`s alpha coefficient which calculated through application of Statistical Package for Social Science Program (SPSS) version 26.0 as referred in (Table: 3-2) on a sample of (30) participants.

**Table (3-2) Reliability Analysis of the Instruments (N= 30)**

| Scales             | No. of Items | Cronbach`s alpha | Evaluation of Internal Consistency |
|--------------------|--------------|------------------|------------------------------------|
| Knowledge          | 23           | 0.726            | accepted                           |
| Nutritional habits | 10           | 0.803            | accepted                           |

The Cronbach's alpha shows good evaluation for knowledge scale (0.726), and shows very good evaluation for nutritional habits scale (0.803); these findings mean that the questionnaires had adequate level of internal consistency and equivalence measurability.

### **3.10. Methods of Data Collection**

The data were collected through the use of a questionnaire. Which started from the 20<sup>th</sup> January to 15<sup>th</sup> February 2024. The questionnaire was adopted as a self-reported questionnaire with a Likert scale to assess the nutritional knowledge and dietary intake habits' of pregnant women. Investigator utilized interview questionnaire a mean to data collection for pregnant women, then getting the official approval from primary health care. The data collected after getting permission from the subjects. The time consumed for filling the questionnaire is 15 -20 minutes.

### **3.11. Ranging and Scoring:**

#### **3.11.1. Nutritional Knowledge Scale:**

A 3-Likert scale was used for nutritional knowledge scale and scored as follows: I know (1), uncertain (0) and I don't know (0). The overall score of nutritional knowledge was estimated by calculating the range score for mean of total score after calculating the range from minimum score and maximum score; the range score rated into three levels and scored as follows: Poor= 0 –

7.66, Fair= 7.67 – 15.33, and Good= 15.34 – 23. The level of each item is scored and rated into three levels also as follow: Poor= 0 – 0.33, Fair= 0.34 – 0.66 and High= 0.67 – 1.

### **3.11.2. Food Frequency Intake:**

A 7-Likert scale was used for food frequency intake scale and scored as follows: Never (0), Once a month (1), Twice a month (2), Once a week (3), Twice a week (4), Once a day (5), and Twice a day (6). The overall score was estimated by calculating the range score for mean of total score after calculating the range from minimum score and maximum score; the range score rated into three levels and scored as follows: Poor= 0 – 12, Moderate= 12.1 – 24, and Good= 24.1 – 36.

The level of each item is scored and rated into three levels also as follow: Poor= 0 – 2, Moderate= 2.1 – 4 and Good= 4.1 – 6.

### **3.11.3. Nutritional Habits Scale:**

A 3-Likert scale was used for nutritional Habits scale and scored as follows: Never (0), Sometimes (1), and Always (2). Except items 3, 5, 8, and 9 that is reversely scored. The overall score was estimated by calculating the range score for mean of total score after calculating the range from minimum score and maximum score; the range score rated into three levels and scored as follows: Poor= 0 – 6.66, Moderate= 6.67 – 13.33, and Good= 13.34 – 20. The level of each item is scored and rated into three levels also as follow: Poor= 0 – 0.66, Moderate= 0.67 – 1.33 and Good= 1.34 – 2

## **3.12. Data Analysis:**

### **3.12.1. Descriptive Statistical Tests:**

- **Frequency (f):** In statistics the frequency of an event is the number of times the event occurred in an experiment or study (Kenny & Keeping, 2022). It was used to describe the sociodemographic characteristics of pregnant women, levels of nutritional knowledge, food frequency intake, and nutritional habits.

- **Percentage (%):** A percentage is a number or a ratio stated as a fraction of 100 in mathematics. A percentage is calculated by dividing a number by the whole and multiplying it by 100. As a result, % can be defined as a part per hundred. It is represented by the symbol percent. (Shwetha, 2023). It was used to describe the sociodemographic characteristics of pregnant women, levels of nutritional knowledge, food frequency intake, and nutritional habits.
- **Mean (M):** The "mean" in biostatistics refers to the arithmetic average of a set of values. It is a measure of central tendency and is calculated by summing up all the values in the data set and then dividing the sum by the total number of values. The mean is denoted by the symbol  $(\bar{x})$  and is used to represent the average value of a given set of data (Taylor, 2003). It was used to describe the levels of nutritional knowledge, food frequency intake, and nutritional habits.
- **Standard Deviation:** In statistics, the "standard deviation" is a measure of the amount of variation or dispersion of a random variable expected about its mean. It is a summary measure of the differences of each observation from the mean (Bland & Altman, 1996). It was used to determine the It was used to describe the levels of nutritional knowledge, food frequency intake, and nutritional habits.

### 3.12.2. Inferential Statistical Tests:

- **Cronbach Alpha ( $\alpha$ ):** Cronbach's alpha coefficient measures the internal consistency, or reliability, of a set of survey items. Use this statistic to help determine whether a collection of items consistently measures the same characteristic. Cronbach's alpha quantifies the level of agreement on a standardized 0 to 1 scale. Higher values indicate higher agreement between items (Polit & Hungler, 2013). It was used to estimate the internal consistency of the study instrument as well as correlation among study variables.

- **Spearman's rank correlation coefficient:** The Spearman correlation coefficient is defined as the Pearson correlation coefficient between the rank variables. The Spearman correlation between two variables is equal to the Pearson correlation between the rank values of those two variables. (Myers et al., 2003). It was used to determine the relationship among levels of nutritional knowledge, food frequency intake, and nutritional habits with sociodemographic characteristics of pregnant women.
- **Point Biserial Correlation:** is the value of Pearson's product moment correlation when one of the variables is dichotomous, taking on only two possible values coded 0 and 1. The point biserial correlation is a useful measure of effect size, that is, statistical magnitude, of the difference in means between two groups. It is based on Pearson's product moment correlation (Kornbrot, 2014). It was used to determine the relationship among levels of nutritional knowledge, food frequency intake, and nutritional habits with sociodemographic characteristics of pregnant women.

# **Chapter Four**

## **Results of the Study**

## Chapter Four

### Results of the Study

This chapter presents the descriptive analysis of the sample related to socio-demographic characteristics for pregnant women; and describes the levels of nutritional knowledge and dietary intake habits. This chapter also defines the significant relationships between nutritional knowledge and dietary intake habits. This chapter also determines the significant relationship among nutritional knowledge and dietary habits with socio-demographic characteristics of pregnant women.

The statistical procedures were applied for the purpose of analyzing the results of the present study; the results were manipulated and interpreted. Those results are based on the sample responses to the study questionnaire.

**Table (4-1): Distribution of Pregnant Women According to their Socio-demographic Characteristics**

| List | Characteristics | f          | %          |
|------|-----------------|------------|------------|
| 1    | Age (year)      |            |            |
|      | 15 – 19         | 34         | 11.3       |
|      | 20 – 29         | 212        | 70.7       |
|      | 30 – 39         | 54         | 18         |
|      | <i>Total</i>    | <i>300</i> | <i>100</i> |
| 2    | Occupation      |            |            |
|      | Housewife       | 165        | 55         |
|      | Employee        | 109        | 36.3       |
|      | Free work       | 12         | 4          |
|      | Student         | 14         | 4.7        |
|      | <i>Total</i>    | <i>300</i> | <i>100</i> |



Table (4-1): Continued

| List | Characteristics        | f                       | %          |            |
|------|------------------------|-------------------------|------------|------------|
| 3    | Level of education     | Doesn't read & write    | 25         | 8.3        |
|      |                        | Read & write            | 24         | 8          |
|      |                        | Primary school          | 58         | 19.3       |
|      |                        | Intermediate school     | 42         | 14         |
|      |                        | High school             | 53         | 17.7       |
|      |                        | Diploma and higher      | 82         | 27.3       |
|      |                        | Doctorate               | 16         | 5.3        |
|      |                        | <b>Total</b>            | <b>300</b> | <b>100</b> |
| 4    | Family type            | Nuclear                 | 124        | 41.3       |
|      |                        | Extended                | 176        | 58.7       |
|      |                        | <b>Total</b>            | <b>300</b> | <b>100</b> |
| 5    | Monthly income         | Insufficient            | 51         | 17         |
|      |                        | Barely sufficient       | 129        | 43         |
|      |                        | Sufficient              | 120        | 40         |
|      |                        | <b>Total</b>            | <b>300</b> | <b>100</b> |
| 6    | Sources of information | Media (TV/Radio)        | 36         | 12         |
|      |                        | Health Care center      | 91         | 30.3       |
|      |                        | Relatives / Friends     | 78         | 26         |
|      |                        | private women's clinics | 88         | 29.3       |
|      |                        | Social media            | 7          | 2.3        |
|      |                        | <b>Total</b>            | <b>300</b> | <b>100</b> |

f: Frequency, %: Percentage, M: Mean, SD: Standard deviation

This table shows that average age for pregnant women refers to 25±5 years in which 70.7% of them are seen with age group 20 – less than 30 year. The occupational status refers that 55% of pregnant women are housewives and 36% of them are governmental employee. Regarding level of education, the highest percentage refers to 27.3% for pregnant women who are graduated from college or institute.

The family type refers to 58.7% of pregnant women that are live in extended families. The monthly income refers that 43% of pregnant women associated with barely sufficient monthly income while 40% associated with sufficient monthly income. The sources of information about nutrition refer to 30.3% from health care centers, 29.3% from private women's clinics, and 26% from relatives or friends.

**Table (4-2): Distribution of Women According to their Reproductive History Characteristics.**

| <b>List</b> | <b>Characteristics</b> | <b>f</b>   | <b>%</b>   |
|-------------|------------------------|------------|------------|
| 1           | Primigravida           | 90         | 30         |
|             | multipara              | 210        | 70         |
|             | <b>Total</b>           | <b>300</b> | <b>100</b> |
| 2           | Primigravida           | 90         | 30         |
|             | One                    | 28         | 9.3        |
|             | Two                    | 79         | 26.3       |
|             | Three                  | 42         | 14         |
|             | Four                   | 29         | 9.7        |
|             | 5 or more              | 32         | 10.7       |
|             | <b>Total</b>           | <b>300</b> | <b>100</b> |

| <b>Table(4-2): Continued</b> |  |                  |            |            |
|------------------------------|--|------------------|------------|------------|
| 3                            | <b>Gestational age</b>                     | First trimester  | 66         | 22         |
|                              |  | Second trimester | 149        | 49.7       |
|                              |  | Third trimester  | 85         | 28.3       |
|                              |  | <b>Total</b>     | <b>300</b> | <b>100</b> |
| 4                            | <b>Abortion history</b>                    | No               | 225        | 75         |
|                              |  | Yes              | 75         | 25         |
|                              |  | <b>Total</b>     | <b>300</b> | <b>100</b> |
| 5                            | <b>Antenatal care follow-up (previous)</b> | No               | 101        | 33.7       |
|                              |  | Yes              | 199        | 66.3       |
|                              |  | <b>Total</b>     | <b>300</b> | <b>100</b> |

f: Frequency, %: Percentage

This table reveals that 70% of pregnant women are multigravida while 30% are primigravida. The highest percentage relative to parity refers to two among 26.3% of pregnant women. The gestational age refers to second semester among 49.7% of pregnant women, 28.3% in third semester, and 22% in first semester.

The pregnant women have abortion history is 25% of while 75% of them reported no history of abortion. Regarding antenatal care follow-up visits for previous pregnancy, 66.3% of pregnant women reported that they adhere to regular visits.

**Table (4-3): Assessment of Nutritional Knowledge for Pregnant Women (N=300)**

| List | Knowledge  | M   | SD   | Assessment |
|------|--|-----|------|------------|
| 1    | You know, in order for a pregnant woman to give birth to a healthy baby, she must have an ideal weight according to the Body Mass Index during her pregnancy | .73 | .443 | Good       |
| 2    | Pregnant women should eat at least 3-4 servings of milk and dairy products every day   | .54 | .499 | Fair       |
| 3    | If you do not want to eat meat during pregnancy, you can replace it with juice and natural jam   | .44 | .498 | Fair       |
| 4    | You know that pregnant mothers are advised to eat more non-vegetarian foods every day  | .61 | .489 | Fair       |
| 5    | The needs for proteins increase during pregnancy   | .74 | .439 | Good       |
| 6    | The recommended amount of protein during pregnancy is 25 milligrams per day  | .23 | .419 | Poor       |
| 7    | You know that the mother's daily need for Iron increases during pregnancy  | .77 | .422 | Good       |
| 8    | The recommended amount of Iron during pregnancy is 27 mg per day   | .26 | .438 | Poor       |
| 9    | Consuming tea and coffee with meals has an effect on Iron absorption   | .77 | .422 | Good       |
| 10   | Most pregnant women need at least 600 micrograms of folic acid in their daily.   | .27 | .466 | Poor       |
| 11   | Folic acid deficiency during pregnancy leads to birth defects in the nervous system of the newborn baby  | .71 | .453 | Good       |

**Table(4-3): Continued**

|    |  |     |      |      |
|----|--|-----|------|------|
| 12 | You know that the folic acid content in animal foods such as meat, milk, eggs and fish is higher than in plant foods such as lentils, cauliflower and spinach.   | .50 | .501 | Fair |
| 13 | You know that omega-3 and omega-6 fatty acids are essential for the development of the fetus's brain and retina.   | .53 | .500 | Fair |
| 14 | Seafood, milk and dairy products, and spinach are foods high in Iodine   | .42 | .494 | Fair |
| 15 | You know that you should avoid consuming some seafood during pregnancy, such as (Salmon), which contains a high percentage of mercury  | .30 | .458 | Poor |
| 16 | You know that it is necessary for pregnant women to get 1000 mg of calcium daily   | .40 | .491 | Fair |
| 17 | Inadequate consumption of minerals such as Calcium and Phosphorous during pregnancy and insufficient exposure to sunlight leads to softening of the bones and deterioration of bone tissue (Osteomalacia). | .69 | .463 | Good |
| 18 | The pregnant mother's daily consumption of vegetables and fruits should be increased during pregnancy compared to the pre-pregnancy period   | .77 | .422 | Good |
| 19 | You know that the need for (Vitamin A) increases during pregnancy  | .46 | .499 | Fair |
| 20 | You know that eating too much salt has an effect on the body's systems   | .66 | .473 | Fair |
| 21 | Women who eat a healthy diet during pregnancy do not need physical activity  | .50 | .501 | Fair |
| 22 | Take 2 pieces of yellow fruits daily to keep healthy   | .56 | .498 | Fair |
| 23 | Pregnant woman should be on a special diet   | .70 | .459 | Good |

M: Mean, SD: Standard Deviation Poor= 0 – 0.33, Fair= 0.34 – 0.66, Good= 0.67 – 1

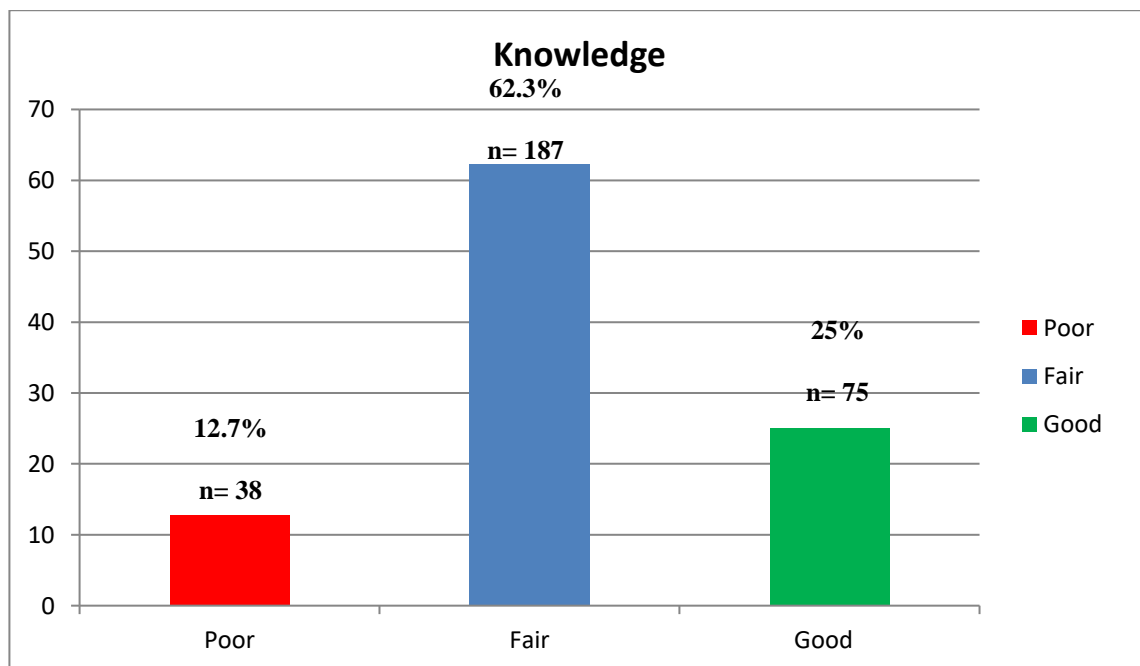
This table presents the nutritional knowledge items among pregnancy women; the finding indicates that pregnant women have moderate to good knowledge about nutrition as seen with mean scores of nutritional knowledge items.

**Table (4-4): Overall Assessment of Nutritional Knowledge for Pregnant Women**

| Knowledge    | f          | %          | M     | SD    | Ass. |
|--------------|------------|------------|-------|-------|------|
| Poor         | 38         | 12.7       | 12.56 | 4.388 | Fair |
| Fair         | 187        | 62.3       |       |       |      |
| Good         | 75         | 25         |       |       |      |
| <b>Total</b> | <b>300</b> | <b>100</b> |       |       |      |

f: Frequency, %: Percentage M: Mean for total score, SD: Standard Deviation for total score, Ass: Assessment Poor= 0 – 7.66, Fair= 7.67 – 15.33, Good= 15.34 – 23

This table indicates that pregnant women have fair level of nutritional-related knowledge as reported among 62.3% of them ( $M \pm SD = 12.56 \pm 4.388$ ) but 25% of them have good knowledge.



**Figure (4-1): Levels of Knowledge among Pregnant Women (N=300)**

This figure reveals that 62.3% of pregnant women have fair level of nutritional knowledge.

**Table (4-5): Assessment of Food Frequency Intake among Pregnant Women (N=300)**

| Food                           | Twice a day |      | Once a day |      | Twice a week |      | Once a week |      | Twice a month |      | Once a month |     | Never |     | M±SD       | Assessment |
|--------------------------------|-------------|------|------------|------|--------------|------|-------------|------|---------------|------|--------------|-----|-------|-----|------------|------------|
|                                | f           | %    | F          | %    | f            | %    | f           | %    | f             | %    | f            | %   | f     | %   |            |            |
| <b>Red meat</b>                | 11          | 3.7  | 41         | 13.7 | 73           | 24.3 | 103         | 34.3 | 31            | 10.3 | 27           | 9   | 14    | 4.7 | 3.20±1.403 | Moderate   |
| <b>White meat</b>              | 25          | 8.3  | 56         | 18.7 | 110          | 36.7 | 68          | 22.7 | 20            | 6.7  | 15           | 5   | 6     | 2   | 3.76±1.316 | Moderate   |
| <b>Fruit</b>                   | 128         | 42.7 | 128        | 42.7 | 131          | 43.7 | 16          | 5.3  | 21            | 7    | 2            | .7  | 2     | .7  | 5.19±.959  | Good       |
| <b>Egg &amp; Milk products</b> | 57          | 19   | 160        | 53.3 | 22           | 7.3  | 44          | 14.7 | 2             | .7   | 4            | 1.3 | 11    | 3.7 | 4.75±1.363 | Good       |
| <b>Legumes</b>                 | 37          | 12.3 | 97         | 32.3 | 49           | 16.3 | 108         | 36   | 3             | 1    | 5            | 1.7 | 1     | .3  | 4.13±1.187 | Good       |
| <b>Vegetables</b>              | 115         | 38.3 | 155        | 51.7 | 15           | 5    | 14          | 4.7  | 1             | .3   | 0            | 0   | 0     | 0   | 5.23±.774  | Good       |

f: Frequency, %: Percentage, M: Mean, SD: Standard deviation

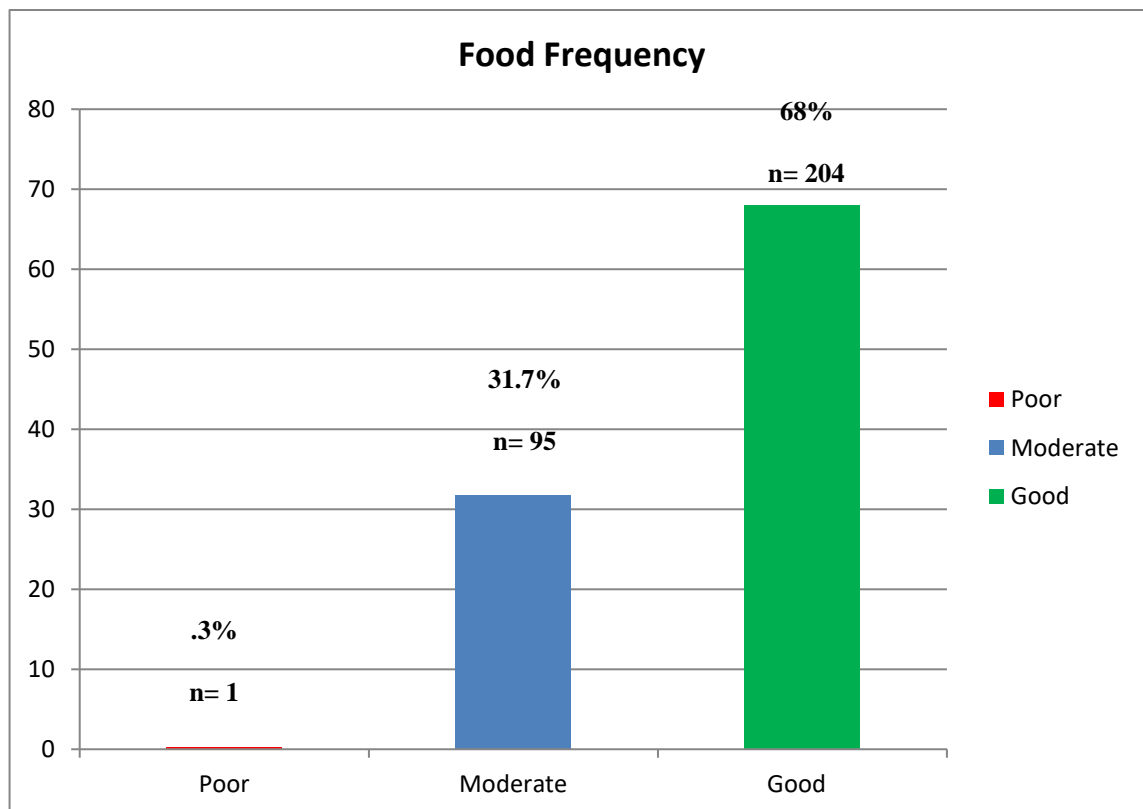
This table presents the food frequency intake items; the findings reveal that pregnant women consume moderate red meat (M±SD= 3.20±1.403), and white meat (M±SD= 3.76±1.316) while they consume good fruits (M±SD= 5.19±1.959), egg & milk products (M±SD= 4.75±1.363), legumes (M±SD= 4.13±1.187), and vegetables (M±SD= 5.23±.774).

**Table (4-6): Overall Assessment of Food Frequency Intake among Pregnant Women**

| Food frequency | f          | %          | M     | SD    | Ass. |
|----------------|------------|------------|-------|-------|------|
| Poor           | 1          | .3         | 26.06 | 3.725 | Good |
| Moderate       | 95         | 31.7       |       |       |      |
| Good           | 204        | 68         |       |       |      |
| <b>Total</b>   | <b>300</b> | <b>100</b> |       |       |      |

f: Frequency, %: Percentage, M: Mean for total score, SD: Standard Deviation for total score, Ass: Assessment, Poor= 0 – 12, Moderate= 12.1 – 24, Good= 24.1 – 36

This table indicates that pregnant women consume foods with moderate to good frequency ( $M \pm SD = 12.56 \pm 4.388$ ) in which 68% show good food frequency and 31.7% show moderate food frequency.



**Figure (4-2): Food Frequency Intake among Pregnant Women (N=300)**

This figure reveals that 68% of pregnant women associated with good food frequency intake.



**Table (4-7): Assessment of Nutritional Habits among Pregnant Women (N=300)**

| List | Nutritional Habits            | Scale     | f (%)     | M    | Assess.  |
|------|-------------------------------|-----------|-----------|------|----------|
| 1    | Eating three main meals a day | Never     | 5(1.7)    | 1.71 | Good     |
|      |                               | Sometimes | 78(26)    |      |          |
|      |                               | Always    | 217(72.3) |      |          |
| 2    | Eating secondary meals a day  | Never     | 48(16)    | 1.07 | Moderate |
|      |                               | Sometimes | 182(60.7) |      |          |
|      |                               | Always    | 70(23.3)  |      |          |
| 3    | Eating sweets                 | Never     | 43(14.3)  | .92  | Moderate |
|      |                               | Sometimes | 190(63.3) |      |          |
|      |                               | Always    | 67(22.3)  |      |          |
| 4    | Eating boiled foods           | Never     | 63(21)    | 1.05 | Moderate |
|      |                               | Sometimes | 158(52.7) |      |          |
|      |                               | Always    | 79(26.3)  |      |          |
| 5    | Eating canned food            | Never     | 185(61.7) | 1.52 | Good     |
|      |                               | Sometimes | 86(28.7)  |      |          |
|      |                               | Always    | 29(9.6)   |      |          |
| 6    | Taking iron supplements       | Never     | 29(9.7)   | 1.28 | Moderate |
|      |                               | Sometimes | 86(28.7)  |      |          |
|      |                               | Always    | 185(61.6) |      |          |
| 7    | Taking folic acid supplements | Never     | 53(17.7)  | 1.39 | Good     |
|      |                               | Sometimes | 111(37)   |      |          |
|      |                               | Always    | 136(45.3) |      |          |
| 8    | Drinking tea                  | Never     | 66(22)    | .88  | Moderate |
|      |                               | Sometimes | 132(44)   |      |          |
|      |                               | Always    | 102(34)   |      |          |
| 9    | Drinking coffee               | Never     | 170(56.7) | 1.48 | Good     |
|      |                               | Sometimes | 104(34.6) |      |          |
|      |                               | Always    | 26(8.7)   |      |          |
| 10   | Drinking natural orange juice | Never     | 38(12.7)  | 1.26 | Moderate |
|      |                               | Sometimes | 145(48.3) |      |          |
|      |                               | Always    | 117(39)   |      |          |

M: Mean, Assess: Assessment, Poor= 0 – 0.66, Moderate= 0.67 – 1.33, Good= 1.34 – 2

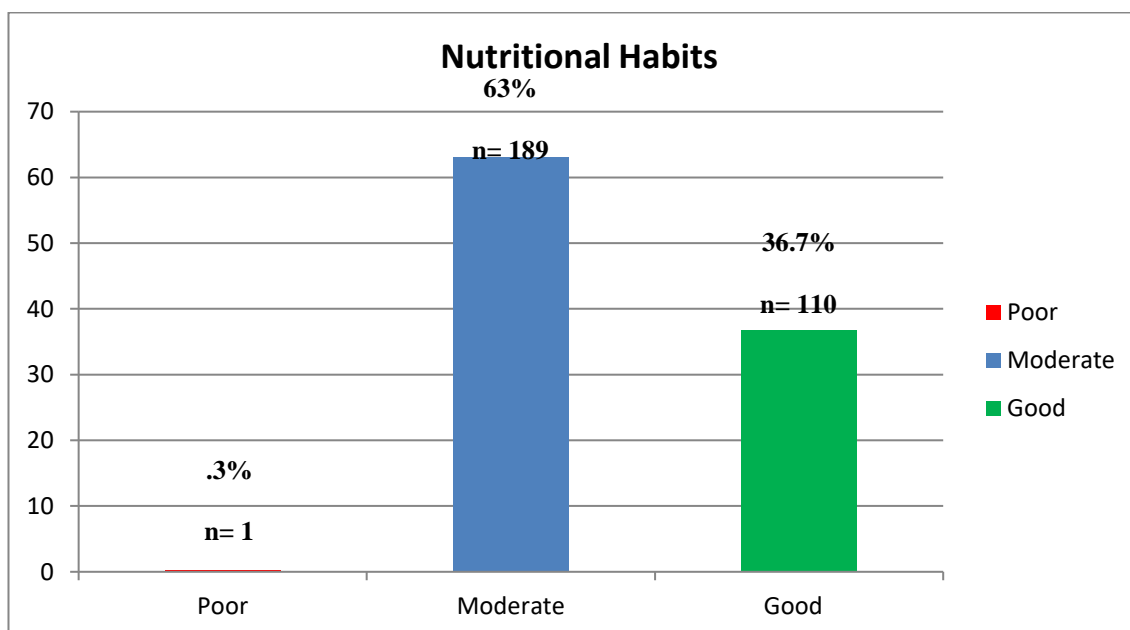
This table presents the nutritional habits items among pregnancy women; the finding indicates that pregnant women associated with moderate to good nutritional habits as seen with mean scores of nutritional habits items.

**Table (4-8): Overall Assessment of Nutritional Habits among Pregnant Women**

| Nutritional Habits | f          | %          | M     | SD    | Ass.     |
|--------------------|------------|------------|-------|-------|----------|
| Poor               | 1          | .3         | 12.56 | 2.546 | Moderate |
| Moderate           | 189        | 63         |       |       |          |
| Good               | 110        | 36.7       |       |       |          |
| <b>Total</b>       | <b>300</b> | <b>100</b> |       |       |          |

f: Frequency, %: Percentage, M: Mean for total score, SD: Standard Deviation for total score, Ass: Assessment, Poor= 0 – 6.66, Moderate= 6.67 – 13.33, Good= 13.34 – 20

This table reveals that pregnant women show moderate nutritional habits as reported among 63% of them ( $M \pm SD = 12.56 \pm 2.546$ ) but 36.7% of them show good nutritional habits.



**Figure (4-3): Nutritional Habits among Pregnant Women (N=300)**

This figure reveals that 63% of pregnant women associated with moderate nutritional habits.

**Table (4-9): Relationship among Nutritional Knowledge, Food Frequency Intake, and Nutritional Habits for Pregnant Women (N=300)**

| Correlation           |                     | Food frequency intake | Nutritional habits | Nutritional knowledge |
|-----------------------|---------------------|-----------------------|--------------------|-----------------------|
| Food frequency intake | Pearson Correlation | 1                     | .254**             | .299**                |
|                       | Sig. (2-tailed)     |                       | .001               | .001                  |
| Nutritional habits    | Pearson Correlation | .254**                | 1                  | .231**                |
|                       | Sig. (2-tailed)     | .001                  |                    | .001                  |
| Nutritional knowledge | Pearson Correlation | .299**                | .231**             | 1                     |
|                       | Sig. (2-tailed)     | .001                  | .000               |                       |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

This table indicates that there is strong positive correlation among nutritional knowledge with food frequency intake and nutritional habits at p-values= .001 and .001 respectively.

**Table (4-10): Relationship among Nutritional Knowledge for Pregnant Women and their Sociodemographic Variables (N=300)**

| Variables    | Nutritional Knowledge |            |           |            | Association   |
|--------------|-----------------------|------------|-----------|------------|---|
|              | Poor                  | Fair       | Good      | Total      |   |
| 15 – 19      | 7                     | 23         | 4         | 34         | $r^s = .155$<br><b>P-value= .007</b><br><b>Sig= S</b> |
| 20 – 29      | 25                    | 133        | 54        | 212        |   |
| 30 – 39      | 6                     | 31         | 17        | 54         |   |
| <i>Total</i> | <b>38</b>             | <b>187</b> | <b>75</b> | <b>300</b> |   |
|              |                       |            |           |            |   |

| <b>Table(4-10): Continued</b> |                         |           |            |           |            |   |
|-------------------------------|-------------------------|-----------|------------|-----------|------------|---|
| <b>Level of education</b>     | Doesn't read & write    | 8         | 16         | 1         | 25         | <b><math>r^s = .403</math></b><br><b>P-value= .001</b><br><b>Sig= H.S</b> |
|                               | Read & write            | 3         | 19         | 2         | 24         |   |
|                               | Primary school          | 8         | 41         | 9         | 58         |   |
|                               | Intermediate school     | 8         | 26         | 8         | 42         |   |
|                               | High school             | 8         | 31         | 14        | 53         |   |
|                               | Diploma and higher      | 3         | 46         | 33        | 82         |   |
|                               | Doctorate               | 0         | 8          | 8         | 16         |   |
|                               | <b>Total</b>            | <b>38</b> | <b>187</b> | <b>75</b> | <b>300</b> |   |
| <b>Occupation</b>             | Housewife               | 30        | 105        | 30        | 165        | <b><math>r^s = .297</math></b><br><b>P-value= .001</b><br><b>Sig= H.S</b> |
|                               | Employee                | 7         | 68         | 34        | 109        |   |
|                               | Free work               | 0         | 6          | 6         | 12         |   |
|                               | Student                 | 1         | 8          | 5         | 14         |   |
|                               | <b>Total</b>            | <b>38</b> | <b>187</b> | <b>75</b> | <b>300</b> |   |
| <b>Family type</b>            | Nuclear                 | 15        | 73         | 36        | 124        | <b><math>r^* = .166</math></b><br><b>P-value= .004</b><br><b>Sig= H.S</b> |
|                               | Extended                | 23        | 114        | 39        | 176        |   |
|                               | <b>Total</b>            | <b>38</b> | <b>187</b> | <b>75</b> | <b>300</b> |   |
| <b>Monthly income</b>         | Insufficient            | 9         | 30         | 12        | 51         | <b><math>r^s = .116</math></b><br><b>P-value= .045</b><br><b>Sig= S</b>   |
|                               | Barely sufficient       | 21        | 77         | 31        | 129        |   |
|                               | Sufficient              | 8         | 80         | 32        | 120        |   |
|                               | <b>Total</b>            | <b>38</b> | <b>187</b> | <b>75</b> | <b>300</b> |   |
| <b>Sources of information</b> | Media (TV/Radio)        | 6         | 19         | 11        | 36         | <b><math>r^s = .119</math></b><br><b>P-value= .737</b><br><b>Sig= N.S</b> |
|                               | Health Care center      | 9         | 56         | 26        | 91         |   |
|                               | Relatives / Friends     | 12        | 59         | 7         | 78         |   |
|                               | private women's clinics | 11        | 49         | 28        | 88         |   |
|                               | Social media            | 0         | 4          | 3         | 7          |   |
|                               | <b>Total</b>            | <b>38</b> | <b>187</b> | <b>75</b> | <b>300</b> |   |

$r^s$ : Spearman Correlation coefficient,  $r^*$ : Biserial correlation coefficient, P: Probability, Sig: Significance, N.S: Not Significant, S: Significant, H.S: High Significant

This table indicates that there are significant relationships among nutritional knowledge for pregnant women with their age group, level of education, occupation, family type, and monthly income at p-values= .007, .001, .001, .004, and .045 respectively.

**Table (4-11): Relationship among Nutritional Knowledge for Pregnant Women and their Reproductive Health Variables (N=300)**

| Variables                           |                  | Nutritional Knowledge |      |      |       | Association                               |
|-------------------------------------|------------------|-----------------------|------|------|-------|---|
|                                     |                  | Poor                  | Fair | Good | Total |   |
| Gravidity                           | Primigravida     | 15                    | 58   | 17   | 90    | $r^* = .070$<br>P-value= .229<br>Sig= N.S |
|                                     | Multipara        | 23                    | 129  | 58   | 210   |   |
|                                     | <b>Total</b>     | 38                    | 187  | 75   | 300   |   |
| Parity                              | Primigravida     | 15                    | 58   | 17   | 90    | $r^s = .095$<br>P-value= .100<br>Sig= N.S |
|                                     | One              | 3                     | 21   | 4    | 28    |   |
|                                     | Two              | 8                     | 47   | 24   | 79    |   |
|                                     | Three            | 6                     | 23   | 13   | 42    |   |
|                                     | Four             | 4                     | 19   | 6    | 29    |   |
|                                     | 5 or more        | 2                     | 19   | 11   | 32    |   |
|                                     | <b>Total</b>     | 38                    | 187  | 75   | 300   |   |
| Gestational age                     | First trimester  | 9                     | 46   | 11   | 66    | $r^s = .080$<br>P-value= .167<br>Sig=N. S |
|                                     | Second trimester | 19                    | 91   | 39   | 149   |   |
|                                     | Third trimester  | 10                    | 50   | 25   | 85    |   |
|                                     | <b>Total</b>     | 38                    | 187  | 75   | 300   |   |
| Abortion history                    | No               | 29                    | 136  | 60   | 225   | $r^* = .063$<br>P-value= .280<br>Sig= N.S |
|                                     | Yes              | 9                     | 51   | 15   | 75    |   |
|                                     | <b>Total</b>     | 38                    | 187  | 75   | 300   |   |
| Antenatal care follow-up (previous) | No               | 17                    | 67   | 17   | 101   | $r^* = .115$<br>P-value= .047<br>Sig= S   |
|                                     | Yes              | 21                    | 120  | 58   | 199   |   |
|                                     | <b>Total</b>     | 38                    | 187  | 75   | 300   |   |

$r^s$ : Spearman Correlation coefficient,  $r^*$ : Biserial correlation coefficient, P: Probability, Sig: Significance, N.S: Not Significant, S: Significant, H.S: High Significant

This table reveals that there is significant relationship between nutritional knowledge for pregnant women with their antenatal care follow-up visits for previous pregnancy at  $p$ -value= .047.

**Table (4-12): Relationship among Food Frequency Intake for Pregnant Women and their Sociodemographic Variables (N=300)**

| Variables          |                      | Food Frequency Intake |           |            |            | Association   |
|--------------------|----------------------|-----------------------|-----------|------------|------------|---|
|                    |                      | Poor                  | Moderate  | Good       | Total      |   |
| Age (year)         | 15 – 19              | 0                     | 14        | 20         | 34         | $r^s = .111$<br><b>P-value= .044</b><br><b>Sig= S</b>   |
|                    | 20 – 29              | 1                     | 70        | 141        | 212        |   |
|                    | 30 – 39              | 0                     | 11        | 43         | 54         |   |
|                    | <b>Total</b>         | <b>1</b>              | <b>95</b> | <b>204</b> | <b>300</b> |   |
| Level of education | Doesn't read & write | 0                     | 14        | 11         | 25         | $r^s = .141$<br><b>P-value= .014</b><br><b>Sig= S</b>   |
|                    | Read & write         | 0                     | 6         | 18         | 24         |   |
|                    | Primary school       | 0                     | 21        | 37         | 58         |   |
|                    | Intermediate school  | 1                     | 8         | 33         | 42         |   |
|                    | High school          | 0                     | 18        | 35         | 53         |   |
|                    | Diploma and higher   | 0                     | 25        | 57         | 82         |   |
|                    | <b>Total</b>         | <b>1</b>              | <b>95</b> | <b>204</b> | <b>300</b> |   |
| Occupation         | Housewife            | 1                     | 54        | 110        | 165        | $r^s = .009$<br><b>P-value= .872</b><br><b>Sig= N.S</b> |
|                    | Employee             | 0                     | 23        | 86         | 109        |   |
|                    | Free work            | 0                     | 6         | 6          | 12         |   |
|                    | Student              | 0                     | 12        | 2          | 14         |   |
|                    | <b>Total</b>         | <b>1</b>              | <b>95</b> | <b>204</b> | <b>300</b> |   |

| Table(4-12): Continued |                         |          |           |            |            |   |
|------------------------|-------------------------|----------|-----------|------------|------------|---|
| Family type            | Nuclear                 | 0        | 34        | 90         | 124        | $r^* = 060928$<br>P-value= .113<br>Sig= N.S |
|                        | Extended                | 1        | 61        | 114        | 176        |   |
|                        | <b>Total</b>            | <b>1</b> | <b>95</b> | <b>204</b> | <b>300</b> |   |
| Monthly income         | Insufficient            | 1        | 19        | 31         | 51         | $r^s = .031$<br>P-value= .591<br>Sig= N.S   |
|                        | Barely sufficient       | 0        | 35        | 94         | 129        |   |
|                        | Sufficient              | 0        | 41        | 79         | 120        |   |
|                        | <b>Total</b>            | <b>1</b> | <b>95</b> | <b>204</b> | <b>300</b> |   |
| Sources of information | Media (TV/Radio)        | 1        | 15        | 20         | 36         | $r^s = .067$<br>P-value= .250<br>Sig= N.S   |
|                        | Health Care center      | 0        | 25        | 66         | 91         |   |
|                        | Relatives / Friends     | 0        | 29        | 49         | 78         |   |
|                        | private women's clinics | 0        | 25        | 63         | 88         |   |
|                        | Social media            | 0        | 1         | 6          | 7          |   |
|                        | <b>Total</b>            | <b>1</b> | <b>95</b> | <b>204</b> | <b>300</b> |   |

$r^s$ : Spearman Correlation coefficient,  $r^*$ : Biserial correlation coefficient, P: Probability, Sig: Significance, N.S: Not Significant, S: Significant, H.S: High Significant

This table depicts that there are significant relationships among food frequency intake for pregnant women with their age group and level of education at p-values= .044 and .014.

**Table (4-13): Relationship among Food Frequency Intake for Pregnant Women and their Reproductive Health Variables (N=300)**

| Variables    | Food Frequency Intake |           |            |            | Association                              |
|--------------|-----------------------|-----------|------------|------------|--|
|              | Poor                  | Moderate  | Good       | Total      |  |
| Primigravida | 1                     | 31        | 58         | 90         | $r^* = 020$<br>P-value= .724<br>Sig= N.S |
| multipara    | 0                     | 64        | 146        | 210        |  |
| <b>Total</b> | <b>1</b>              | <b>95</b> | <b>204</b> | <b>300</b> |  |

| <b>Table(4-13): Continued</b>              |                  |   |    |     |     |   |
|--|------------------|---|----|-----|-----|---|
| <b>Parity</b>                              | Primigravida     | 1 | 31 | 58  | 90  | <b><math>r^s = .033</math><br/>P-value= .567<br/>Sig= N.S</b> |
|  | One              | 0 | 10 | 18  | 28  |   |
|  | Two              | 0 | 25 | 54  | 79  |   |
|  | Three            | 0 | 12 | 30  | 42  |   |
|  | Four             | 0 | 6  | 23  | 29  |   |
|  | 5 or more        | 0 | 11 | 21  | 32  |   |
|  | <b>Total</b>     | 1 | 95 | 204 | 300 |   |
| <b>Gestational age</b>                     | First trimester  | 0 | 27 | 39  | 66  | <b><math>r^s = .089</math><br/>P-value= .124<br/>Sig= N.S</b> |
|  | Second trimester | 0 | 48 | 101 | 149 |   |
|  | Third trimester  | 1 | 20 | 64  | 85  |   |
|  | <b>Total</b>     | 1 | 95 | 204 | 300 |   |
| <b>Abortion history</b>                    | No               | 1 | 73 | 151 | 225 | <b><math>r^* = 016</math><br/>P-value= .779<br/>Sig= N.S</b>  |
|  | Yes              | 0 | 22 | 53  | 75  |   |
|  | <b>Total</b>     | 1 | 95 | 204 | 300 |   |
| <b>Antenatal care follow-up (previous)</b> | No               | 1 | 33 | 67  | 101 | <b><math>r^* = 038</math><br/>P-value= .511<br/>Sig= N.S</b>  |
|  | Yes              | 0 | 62 | 137 | 199 |   |
|  | <b>Total</b>     | 1 | 95 | 204 | 300 |   |

$r^s$ : Spearman Correlation coefficient,  $r^*$ : Biserial correlation coefficient, P: Probability, Sig: Significance, N.S: Not Significant, S: Significant, H.S: High Significant

This table depicts that there is no significant relationships among food frequency intake for pregnant women with their reproductive health variables.

**Table (4-14): Relationship among Nutritional Habits for Pregnant Women and their Sociodemographic Variables (N=300)**

|                   | <b>Variables</b> | <b>Nutritional Habits</b> |     |     |     | <b>Association</b>  |
|-------------------|------------------|---------------------------|-----|-----|-----|---|
|                   |                  |                           |     |     |     |   |
| <b>Age (year)</b> | 15 – 19          | 0                         | 24  | 10  | 34  | <b><math>r^s = .023</math><br/>P-value= .694<br/>Sig= N.S</b> |
|                   | 20 – 29          | 1                         | 128 | 83  | 212 |   |
|                   | 30 – 39          | 0                         | 37  | 17  | 54  |   |
|                   | <b>Total</b>     | 1                         | 189 | 110 | 300 |   |



| <b>Table(4-14): Continued</b> |                         |   |     |     |     |   |
|-------------------------------|-------------------------|---|-----|-----|-----|---|
| <b>Level of education</b>     | Doesn't read & write    | 0 | 16  | 9   | 25  | <b><math>r^s = .066</math><br/>P-value= .251<br/>Sig= N.S</b> |
|                               | Read & write            | 0 | 16  | 8   | 24  |   |
|                               | Primary school          | 0 | 41  | 17  | 58  |   |
|                               | Intermediate school     | 0 | 26  | 16  | 42  |   |
|                               | High school             | 0 | 28  | 25  | 53  |   |
|                               | Diploma and higher      | 1 | 53  | 28  | 82  |   |
|                               | Doctorate               | 0 | 9   | 7   | 16  |   |
|                               | <b>Total</b>            | 1 | 189 | 110 | 300 |   |
| <b>Occupation</b>             | Housewife               | 0 | 104 | 61  | 165 | <b><math>r^s = .028</math><br/>P-value= .634<br/>Sig=N.S</b>  |
|                               | Employee                | 1 | 65  | 43  | 109 |   |
|                               | Free work               | 0 | 10  | 2   | 12  |   |
|                               | Student                 | 0 | 10  | 4   | 14  |   |
|                               | <b>Total</b>            | 1 | 189 | 110 | 300 |   |
| <b>Family type</b>            | Nuclear                 | 0 | 75  | 49  | 124 | <b><math>r^* = .096</math><br/>P-value= .098<br/>Sig= N.S</b> |
|                               | Extended                | 1 | 114 | 61  | 176 |   |
|                               | <b>Total</b>            | 1 | 189 | 110 | 300 |   |
| <b>Monthly income</b>         | Insufficient            | 0 | 29  | 22  | 51  | <b><math>r^s = .115</math><br/>P-value= .046<br/>Sig= S</b>   |
|                               | Barely sufficient       | 1 | 76  | 52  | 129 |   |
|                               | Sufficient              | 0 | 84  | 36  | 120 |   |
|                               | <b>Total</b>            | 1 | 189 | 110 | 300 |   |
| <b>Sources of information</b> | Media (TV/Radio)        | 0 | 27  | 9   | 36  | <b><math>r^s = .011</math><br/>P-value= .847<br/>Sig= N.S</b> |
|                               | Health Care center      | 0 | 55  | 36  | 91  |   |
|                               | Relatives / Friends     | 0 | 54  | 24  | 78  |   |
|                               | private women's clinics | 1 | 49  | 38  | 88  |   |
|                               | Social media            | 0 | 4   | 3   | 7   |   |
|                               | <b>Total</b>            | 1 | 189 | 110 | 300 |   |

$r^s$ : Spearman Correlation coefficient,  $r^*$ : Biserial correlation coefficient, P: Probability, Sig: Significance, N.S: Not Significant, S: Significant, H.S: High Significant

This table indicates that there is significant relationship between nutritional habits for pregnant women and their monthly income at  $p$ -value= .046.

**Table (4-15): Relationship among Nutritional Habits for Pregnant Women and their Reproductive Health Variables (N=300)**

| Variables       |                  | Nutritional Habits |            |            |            | Association   |
|-----------------|------------------|--------------------|------------|------------|------------|---|
|                 |                  | Poor               | Moderate   | Good       | Total      |   |
| Gravidity       | Primigravida     | 0                  | 57         | 33         | 90         | $r^* = .007$<br><b>P-value= .909</b><br><b>Sig= N.S</b> |
|                 | multipara        | 1                  | 132        | 77         | 210        |   |
|                 | <b>Total</b>     | <b>1</b>           | <b>189</b> | <b>110</b> | <b>300</b> |   |
| Parity          | Primigravida     | 0                  | 57         | 33         | 90         | $r^s = .043$<br><b>P-value= .456</b><br><b>Sig= N.S</b> |
|                 | One              | 0                  | 16         | 12         | 28         |   |
|                 | Two              | 1                  | 48         | 30         | 79         |   |
|                 | Three            | 0                  | 26         | 16         | 42         |   |
|                 | Four             | 0                  | 24         | 5          | 29         |   |
|                 | 5 or more        | 0                  | 18         | 14         | 32         |   |
|                 | <b>Total</b>     | <b>1</b>           | <b>189</b> | <b>110</b> | <b>300</b> |   |
| Gestational age | First trimester  | 0                  | 40         | 26         | 66         | $r^s = .005$<br><b>P-value= .927</b><br><b>Sig= N.S</b> |
|                 | Second trimester | 0                  | 100        | 49         | 149        |   |
|                 | Third trimester  | 1                  | 49         | 35         | 85         |   |
|                 | <b>Total</b>     | <b>1</b>           | <b>189</b> | <b>110</b> | <b>300</b> |   |

| <b>Table(4-15): Continued</b>              |              |          |            |            |            |  |
|--|--------------|----------|------------|------------|------------|--|
| <b>Abortion history</b>                    | No           | 1        | 140        | 84         | 225        | <b><math>r^* = 043</math></b><br><b>P-value= .453</b><br><b>Sig= N.S</b> |
|  | Yes          | 0        | 49         | 26         | 75         |  |
|  | <b>Total</b> | <b>1</b> | <b>189</b> | <b>110</b> | <b>300</b> |  |
| <b>Antenatal care follow-up (previous)</b> | No           | 0        | 64         | 37         | 101        | <b><math>r^* = 017</math></b><br><b>P-value= .764</b><br><b>Sig= N.S</b> |
|  | Yes          | 1        | 125        | 73         | 199        |  |
|  | <b>Total</b> | <b>1</b> | <b>189</b> | <b>110</b> | <b>300</b> |  |

*r*<sup>s</sup>: Spearman Correlation coefficient, *r*<sup>\*</sup>: Biserial correlation coefficient, *P*: Probability, *Sig*: Significance, *N.S*: Not Significant, *S*: Significant, *H.S*: High Significant

This table indicates that there is no significant relationship is reported among nutritional habits for pregnant women and their reproductive health variables.

**Chapter Five**

**Discussion and**

**Conclusion and**

**Recommendations of**

**Study Results**

## Chapter Five

### Discussion of Study Results

This chapter is presenting a detailed findings interpretation and systematic discussion of the study results, with regard to the study objectives. Supportive evidence to such findings is presented as being available in the relevant literature.

#### **5.1. Discussion of Participants according to their Socio-demographic Characteristics:**

The current study (table 4-1), indicate that average age for pregnant women refers to (25±5) years in which shows that two thirds 70.7% of them are seen with age group 20 – 29 year. This finding supported by a cross – sectional study in Ethiopia with sample size 436 to assess dietary practice and associated factors among pregnancy mother attending antenatal care which was done by (Koster & Niguse 2023). Who reported that the mean ages of the respondents were 27.96 years (SD ± 5.3), more than half of this study participants age group were 247, about 57.7% in age between 21 and 30 years.

Regarding the occupational status this study refers that more than half of participant 55% are housewives and about one third 36% of them are governmental employee, this findings is consistent with a cross –sectional study in Ethiopia, with sample size 436 to assess dietary practice and associated factors among pregnancy mother attending antenatal care which was done by (Koster & Niguse 2023). refers that 44.2% of pregnant women are housewives and 33.2% of them are governmental employee.

Regarding level of education, the highest percentage refers to more than quarter of sample 27.3% who are graduated from diploma and higher. which came in agreement with findings of cross-sectional study conducted among 422 pregnant women attending antenatal care service at shegaw motta hospital

in Ethiopia (Ambaw, et al 2021). In which the among those study participants, 25% of pregnant women had attended diploma and above educational status.

This study according of family type refers to more than half of pregnant women 58.7% live in extended families, which came in agreement with findings of experimental and investigation study to find out the relationship between maternal nutrition education and mother's nutritional knowledge score, dietary habits, food consumption and health status among 173 pregnant women in Turkey (Soylu, 2019). In which the 84% of the women living with the extended families .

Regarding the monthly income refers that less than half of participant 43% have with barely sufficient monthly income while 40% associated with sufficient monthly income. which came in agreement with findings of descriptive study at Al-Amara City aims to assessment of knowledge for 150 pregnant women toward risk of pregnancy and to identify the association between level of awareness and demographic data (AlAbedi, Arar & Radhi 2019). In which 72% of participants had sufficient monthly income, due to the country's poor economic situation or the fact that the majority of women were housewives with limited education.

In addition, this study the sources of information about nutrition reveal about two third of the sample 59.6% obtaining information about nutrition from healthcare centers and private women's clinics, this finding agree with a cross-sectional study of 332 pregnant women to assess the prevalence and factors associated with anemia among pregnant women attending antenatal care in health institutions in Southern Ethiopia (Zekarias et al., 2017). In which the majority of the sample 89.3% had ANC follow-up in the previous

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pregnancy and obtain information from healthcare centers and private women's clinics. Another result in this study more than a quarter of the sample 29.3% obtaining information from social media, these findings agreement with a cross-sectional study conducted at the Royal Women's Hospital in Australia (Grimes, Forster & Newton 2014). Which involved 376 women, less than half (44%) of the participants used the internet to access information, with 28% reporting it as their most useful source of information.

### **5.2 Discussion of the Reproductive Health History of Pregnant Women:**

The study results (table 4-2), regarding gravidity reveals that about two thirds of pregnant women 70% are multigravida while about one third 30% are primigravida, this finding came in the same line with study was conducted on pregnant women in Indonesia (Permatasari, 2021). This study aims to determine the effect of nutrition and reproductive health education of 194 pregnant women. The majority of participants 68.0% were multipara had been pregnant two to four times.

In this study, the highest percentage relative to parity refers to (two) among more than a quarter of the sample 26.3%, which came in agreement with findings of descriptive study to assess ANC services among 280 pregnant women in Al-Amara City/Iraq (Al-Abedi, 2021). In which the highest percentage of the study participants 31.4% had only two children, and that agree with a cross sectional study in South West Ethiopia were the highest percentage of pregnant women had 2-3 children among 332 pregnant women who attended antenatal care (Zekarias et al., 2017). The gestational age refers to second trimester among about half of pregnant women 49.7%, while 28.3% in third trimester, and 22% in first trimester. This result consistent with study in India among 646 pregnant women the objective of the study was to estimate

the prevalence of anemia among pregnant women and to determine its association with maternal and fetal outcome where about 47.8% of pregnant women in second semester and 34.8% in the third trimester and 17.4% in first trimester(Suryanarayana et al., 2017).

Regarding abortion history is positive among than a quarter of the sample 25%, while than two a quarter of the sample 75% of them reported no history of abortion, this finding consistent with what has been reported in cross-sectional study conducted among 422 pregnant women attending antenatal care service at shegaw motta hospital in Ethiopia (Ambaw, et al 2021). In which 92.4% and greater than three fourth 91.7% of study subjects did not have any history of still birth and abortion in their reproductive life respectively, and this finding is consistent with another case control study conducted in Sulaimania city to determine the prevalence of anemia and its associated risk factors among supplemented and non-supplemented pregnant women. Of the 641 pregnant women in Kurdistan-Iraq, in which 74.3 % had no abortion (Pirof & weli., 2022).

Regarding antenatal care follow-up visits for previous pregnancy more than two third of pregnant women 66.3% reported that they adhere to regular visits, this result could be attributed to pregnant women's awareness of monitoring their health status, or their overall satisfaction with the services, as well as their continued attendance at immunization units to receive tetanus toxoid. This is consistent with a cross-sectional study of 332 pregnant women to assess the prevalence and factors associated with anemia among pregnant women attending antenatal care in health institutions in Southern Ethiopia (Zekarias et al., 2017). In which the majority of the sample 89.3% had ANC follow-up in the previous pregnancy.



### **5.3. Assessment of Nutritional Knowledge for Pregnant Women.**

In this study (table 4-4), pregnant women have fair level of nutritional-related knowledge as reported among about two third 62.3% of them ( $M\pm SD= 12.56\pm 4.388$ ), but a quarter 25% of them have good knowledge. The results are in agreements with a similar study in Kenya to find out the nutritional knowledge and dietary practices of 195 pregnant women exposed to nutrition education while receiving antenatal care (Maloba, 2022). In which more than two thirds of the respondents had adequate nutritional knowledge.

A set of educational programs that pregnant women receive during their frequent visits to the primary health care center for the purpose of obtaining health care services and health awareness by health care providers, increasing the educational level of study participants, media influence, and community support can collectively contribute to the observed level of nutritional awareness.

### **5.4. Assessment of Food Frequency Intake among the Pregnant Women:**

The study (table 4-6), indicates that pregnant women consume foods with moderate to good frequency ( $M\pm SD= 12.56\pm 4.388$ ) in which more than two third of sample 68% show good food frequency, while about one third of sample 31.7% show moderate food frequency, which came in agreement with findings of cross-sectional study conducted among 422 pregnant women attending antenatal care service in Ethiopia (Ambaw, et al., 2021). In which the current magnitude of unacceptable food consumption score (poor or borderline) in this study was found to be 18.5 and 81.5% of participants having acceptable food consumption score. In additional, the findings reveal that pregnant women consume moderate red meat ( $M\pm SD= 3.20\pm 1.403$ ), and white meat ( $M\pm SD= 3.76\pm 1.316$ ) while they consume good fruits ( $M\pm SD=$

5.19±1.959), egg & milk products (M±SD= 4.75±1.363), legumes (M±SD= 4.13±1.187), and vegetables (M±SD= 5.23±.774). This finding came in the same line with an analytical cross-sectional study aimed to assess the effect of maternal dietary intake, gestational weight on birth weight among 316 pregnant women in Ghana (Abubakari, Asumah & Abdulai, 2023). In which the consumption of meat and fish, as well as other fruits and vegetables, were high among study participants.

This result of study disagree with what has been reported in a cross-sectional study was carried out among 712 pregnant women aimed to assess the dietary practices and associated factors among pregnant women in Ethiopia (Demilew, Alene & Belachew 2020). In which the most frequently eaten foods were cereals, legumes, and oils but animal source foods, fruits, and vegetables were not often consumed by the study participants. Increased knowledge, improved economic status, monthly income of pregnant women participating in the study, and beliefs regarding the importance of nutrition during pregnancy can lead to access to high-quality foods and resources, enabling pregnant women to make choices with good nutritional content.

### **5.5. Assessment of Nutritional Habits among Pregnant Women:**

In this study (table 4-6), reveals that pregnant women show moderate nutritional habits as reported among about two thirds 63% of them (M±SD= 12.56±2.546), but more than one third 36.7% of them show good nutritional habits. Which came in agreement with findings of cross-sectional study to assess nutrition uptake among a sample of 98 pregnant women in Zambia (Muchima, Ngoma & Shitima 2023). It was observed in study that more respondents 61% with a positive attitude towards nutrition had good nutrition habits during pregnancy compared to those 25% with a negative attitude,

taking information from health care professionals, family, relatives, and social media, including information related to nutritional health, can lead to improved dietary behavior and widespread positive reinforcement of healthy eating habits for pregnant women, and this contributes to better nutritional practices.

### **5.6. Relationship among Nutritional Knowledge, Food Frequency Intake, and Nutritional Habits for Pregnant Women:**

The results of this study (table 4-9), indicate that there is strong positive relationship among nutritional knowledge with food frequency intake and nutritional habits at p-values= .001 and .001 respectively, and clarifies the positive relationship that increasing nutritional knowledge lead to improved food frequency intake and nutritional habits. Which came in agreement with findings of a cross- sectional study in Iran, aimed to determine whether there is an association between different levels of nutritional knowledge of 400 pregnant women and healthy attitude and practice (Mirsanjari et al., 2016). The findings of this study revealed that pregnant women's nutrition knowledge was significantly associated with a healthier choice of foods for their daily meals lunch and dinner and types of drinks, less frequent consumption of fast foods, more frequent consumption of chicken, and proper use of vitamin and mineral supplements.

The relationship between nutritional knowledge, frequency of food, and healthy eating habits in this study can be explained by the fact that about two-thirds (62.3%) of the sample had fair knowledge about the importance of food during pregnancy. The more a pregnant woman is receives to new nutritional information, which may stimulate changes in attitudes, increase food intake, and improve dietary behavior.

### **5.7. Relationship among Nutritional Knowledge for Pregnant Women and their Socio-demographic Variables**

This study (table 4-10), indicates that there are significant relationships among nutritional knowledge for pregnant women with their age group, level of education, occupation, family type, and monthly income at p-values= .007, .001, .001, .004, and .045 respectively, this result consistent with a cross-sectional study was conducted on 310 pregnant females in China (Wang et al., 2023). This study aims to investigate the socio-demographic determinants associated with pregnant females. Result of this study show age, household registry and education level were significant in nutrition knowledge and nutrition practice.

In additional, this findings agree with what has been reported in a cross-sectional study aimed to assess the food and nutrition-related KAP among reproductive-age women and understanding of household food and nutritional security in Sri Lanka (Weerasekara et al., 2020). In which the results showed a highly significant positive association between nutritional knowledge, attitude score, and BMI degree, and a significant difference existed in the area, age, family size, monthly income, educational level, attitudes toward nutrition, food, and nutrition practices among reproductive women. Younger and older pregnant women may follow different diets, and younger women, who make up approximately two-thirds of the sample, may rely more on contemporary food sources, while older women may rely more on traditional means to implement their diet.

Higher levels of education among women participating in the study are associated with better information availability and a greater ability to understand and apply nutritional knowledge. Since more than half of the study

participants are housewives, the nature of their occupation could also have an impact on the amount of time available to search for and implement nutritional information, as well as the type of household on the availability of support and resources to obtain and implement nutritional information. Furthermore, pregnant women's good income levels also affect their ability to purchase nutritious food, as low-income individuals have fewer options for obtaining healthy food, which may affect their nutritional knowledge.

### **5.8. Relationship among Nutritional Knowledge for Pregnant Women and their Reproductive Health Variables:**

This study (table 4-11), reveals that there is significant relationship between nutritional knowledge for pregnant women with their antenatal care follow-up visits for previous pregnancy at  $p\text{-value}=.047$ . This result consistent with a randomized controlled trial study was conducted among 257 pregnant women in Malawi (Katenga-Kaunda et al., 2021). Aimed to compared the effect of supplementary nutrition education and dietary counselling with routine ANC service on nutrition knowledge and dietary intakes among Malawian pregnant women, that showed that should be made to strengthen the nutrition education component of ANC services as these are decentralized and locally accessible in most low- and middle-income countries and therefore contribute to higher nutrition knowledge regarding a healthy diet during pregnancy.

The results are in agreements with a similar study in Kenya to find out the nutritional knowledge and dietary practices of (195) pregnant women receives to nutrition education while receiving antenatal care. In which less than half of the respondents (48%) acknowledged to have been informed about the importance of nutrition education by the health worker on their

every visit to the health care center (Maloba, 2022). Frequent visits to primary health care centers and private women's clinics for the purpose of obtaining health care and therapeutic services, vaccinations, and discussion with health care workers about nutrition contribute to increasing the level of nutritional knowledge and awareness about the importance of nutritional supplements for pregnant women during pregnancy.

### **5.9. Relationship among Food Frequency Intake for Pregnant Women and their Sociodemographic Variables.**

This study (table 4-12), depicts that there are significant relationships among food frequency intake for pregnant women with their age group and level of education at p-values= .044 and .014. This finding came in the same line with Cross-sectional study aimed to analyze food consumption according to the degree of food processing, dietary diversity, and associated socio-demographic factors during pregnancy in Brazil (Naspolini et al., 2021). In which found a strong association of regular intake of meat and eggs among respondents with high school education, and present a strong association with older women.

The age of pregnant women has a noticeable impact on understanding nutritional needs during pregnancy. Since the highest percentage of the sample groups are between 20 - 30 years old, this gives them a broader understanding of nutritional needs during pregnancy. Participants' high levels of education also often influence knowledge of nutrition and health. Higher levels of education may be associated with a greater understanding of the importance of a balanced diet during pregnancy.

### **5.10. Relationship among Food Frequency Intake for Pregnant Women and their Reproductive Health Variables**

This study (table 4-13), depicts that there is no significant relationships among food frequency intake for pregnant women with their reproductive health variables, this finding disagree with what has been reported in a cross-sectional study was carried out among 194 pregnant women in Indonesia (Permatasari, et al.,2021). This study aims to determine the effect of nutrition and reproductive health education of pregnant women, and showed indicated that the relationship nutrition frequency during pregnancy and reproductive health of participants were significantly increased especially after education.

The lack of a relationship or effect between the frequency of food intake and reproductive health items is explained by the fact that about two-thirds of the pregnant mothers participating in the current study have good awareness of the necessity of increasing the frequency and diversity of food intake because of its significant impact on the health of the mother and her fetus.

### **5.11. Relationship among Nutritional Habits for Pregnant Women and their Sociodemographic Variables.**

Results of this study (table 4-14), indicates that there is significant relationship between nutritional habits for pregnant women and their monthly income at p-value= .046. This result consistent with cross-sectional study was conducted to among 119 pregnant women in Kenya (King'ori, 2021). To assess the nutritional status of pregnant women, in which this study respondents income finding showed that there was a relation between the respondents income and food they ate. Moreover, this was consistent with the results of a cross-sectional study assessing knowledge, attitudes, and dietary

diversity in nutrition among 130 low-economic pregnant women from a rural area in Ghana ( Agyei et al., 2021 ).

The result of the study was that when the dietary diversity of pregnant women was suboptimal, consumption of vitamin A and iron-rich food groups was insufficient. Income levels are a more important factor in dietary diversity, and the higher income levels of the pregnant women participating in the current study give them a greater opportunity to consume a variety of nutritious food options.

#### **5.12. Relationship among Nutritional Habits for Pregnant Women and their Reproductive Health Variables:**

This study (table 4-15), indicates that there is no significant relationship is reported among nutritional habits for pregnant women and their reproductive health variables, this finding in agreement with the cross-sectional study was used to assess dietary practice and associated factors among 580 pregnant women conducted in Ethiopia (Alemayehu & Tesema, 2015). This study found no correlation between mothers' nutritional habits during pregnancy, regardless of their husband's educational status, age, marital status, pregnancy gap duration, family size, employment status, or number of pregnancies. This may indicate that human eating habits are deep-rooted habits and are not affected by the various variables that occur in them.



## **Conclusions:**

A conclusion that resulted after discussing and interpreting the study's findings.

1- The study concludes that more than half of the sample that have fair level of nutritional-related knowledge and about two-thirds of the sample consume foods with moderate to good frequency, and about two-thirds of the sample with moderate nutritional habits.

2- The study found the pregnant women consume the meats within moderate level. While they consume fruits, egg & milk products, legumes, and vegetables within good level.

3- There was a strong positive relationships among nutritional knowledge for pregnant women with their food frequency intake and nutritional habits.

4- There was a significant relationships among nutritional knowledge for pregnant women with their age group, level of education, occupation, family type, and monthly income.

5- There was a significant relationships among food frequency intake for pregnant women with their age group and level of education, and between nutritional habits for pregnant women and their monthly income.

### **Recommendations:**

The following recommendations have been reached based on the conclusions of the current study:

- 1- The study recommends that pregnant women should be encourage pregnant women to increase the number of visits to primary health care centers to obtain cognitive information about the importance of nutrition during pregnancy.
- 2- The Ministry of Health pay attention comprehensive nutritional education programs targeting pregnant women, especially those suffering from nutrition-related health problems such as anemia and malnutrition.
- 3- These programs cover essential topics such as the importance of key nutrients, recommended dietary guidelines during pregnancy, and potential consequences of nutritional deficiencies and leverage technology, such as mobile apps and social media, to disseminate nutritional information to pregnant women.
- 4- It is possible for researchers in the future to conduct broader studies about nutritional knowledge and dietary habits especially on pregnant women who have special nutritional conditions such as malnutrition.

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# Appendices

# Administrative Agreements

## Appendix A-I

Republic of Iraq  
Ministry of higher education & scientific research  
University of Karbala  
College of Nursing  
Graduate studies Division



جمهورية العراق  
وزارة التعليم العالي والبحث العلمي  
جامعة كربلاء  
كلية التمريض  
شعبة الدراسات العليا

التاريخ: 2023 / 11 / 15

العدد : د.ع / 356

### الى / دائرة صحة بابل – مركز التدريب و التطوير


### م/ تسهيل مهمة

### تحية طيبة...

يرجى التفضل بالموافقة على تسهيل مهمة طالب الدراسات العليا / الماجستير  
(عمار شاكر ارحيم) في كليتنا للعام الدراسي (2023-2024) لغرض جمع العينات  
الخاصة برسالته الموسومة :


"المعارف التغذوية وعادات تناول الغذاء للنساء الحوامل المراجعات لمراكز الرعاية  
الصحية الأولية"  
"Nutritional Knowledge and Dietary Intake Habits' of Pregnant  
Women Attending Primary Health Care Centers"

\*\* مع التقدير \*\*




أ.م.د. سلمان حسين فارس الكريطي  
معاون العميد للشؤون العلمية و الدراسات العليا  
2023 / 11 / 15

نسخة منه الى :  
- مكتب السيد معاون العمي المحترم .  
- شعبة الدراسات العليا .



العنوان : العراق - محافظة كربلاء المقدسة - حي الموظفين - جامعة كربلاء  
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## Appendix A-II

جمهورية العراق

|   |   |  |
|---|---|--|
| <p>Ministry Of Health<br/>Babylon Health Directorate<br/>Email:-<br/>Babel_Healthmoh@yahoo.com</p> <p>لأجل عراق اخضر مستدام ..سنعمل معا لترشيد استهلاك الطاقة الكهربائية والمحافظة على البيئة من التلوث</p> |  | <p>وزارة الصحة<br/>دائرة صحة محافظة بابل<br/>المدير العام<br/>مركز التدريب والتنمية البشرية<br/>وحدة ادارة البحوث</p> <p>العدد : ١٩٠٨<br/>التاريخ : ٢٠٢٣ / ١١ / ١٥</p> |
|---|---|--|

### إلى / قطاع الحلة الأول للرعاية الصحية الأولية قطاع الحلة الثاني للرعاية الصحية الأولية م / تسهيل مهمة

تحية طيبة ...

أشارة إلى كتاب جامعة كربلاء / كلية التمريض المرقم ٣٥٦ في ٢٠٢٣/١١/١٥ نرفق لكم ربطا استثمارات الموافقة المبدئية لمشروع البحث العائد للباحث طالب الدراسات / الماجستير (عمار شاكر ارحيم) للتفضل بالاطلاع وتسهيل مهمة الموما أليها من خلال توقيع وختم استثمارات إجراء البحث المرفقة في مؤسساتكم وحسب الضوابط والإمكانات لاستحصال الموافقة المبدئية ليتسنى لنا إجراء اللازم على أن لا تتحمل مؤسساتكم أية تبعات مادية وقانونية .... مع الاحترام .

المرفقات :

استمارة عدد ٢ /

وزارة الصحة  
دائرة صحة بابل  
مركز التدريب والتنمية البشرية

الدكتور

محمد عبد الله عجرش  
مدير مركز التدريب والتنمية البشرية  
٢٠٢٣ / /

نسخة منه إلى :

• مركز التدريب والتنمية البشرية / وحدة إدارة البحوث مع الأوليات ...

سوزان

دائرة صحة محافظة بابل / مركز التدريب والتنمية البشرية // ايميل المركز [babiltraining@gmail.com](mailto:babiltraining@gmail.com)

## Appendix A-III

جمهورية العراق

Ministry Of Health  
Babylon Health Directorate  
First Hilla Sector



وزارة الصحة  
دائرة صحة بابل  
قطاع المركز الأول  
وحدة التدريب والتنمية البشرية  
العدد / ٣٠ / ٢٧١  
التاريخ ١٤ / ١٢ / ٢٠٢٣

إلى مراكز الرعاية الصحية الرئيسية  
م/ تسهيل مهمه

استناداً الى كتاب دائرة صحة محافظة بابل / المدير العام /مركز التدريب والتنمية البشرية / وحدة ادارة البحوث ذي العدد ١٩٠٨ في ٢٠٢٣/١٢/٥ والمعطوف على كتاب جامعة كربلاء / كلية التمريض المرقم ٣٥٦ في ٢٠٢٣/١١/١٥

نرفق لكم ربطاً استمارات الموافقة المبدئية لمشروع البحث العائد للباحث طالب الدراسات /الماجستير عمار شاكر ارحيم للتفضل بالاطلاع و تسهيل مهمة الموما اليه من خلال توقيع وختم استمارات اجراء البحث المرفقة في مؤسساتكم وحسب الضوابط والامكانيات لاستحصال الموافقة المبدئية ليتسنى للمركز اعلاه اجراء اللازم اجراء اللازم على ان لاتحمل مؤسساتكم اية تبعات مادية او قانونية ..... مع الاحترام .

المرفقات:-  
استمارات عدد ٢/



١٤ / ١٢ / ٢٠٢٣  
الطبيب الاختصاص  
علي زغير حميد  
مدير قطاع مركز الحلة الاول

نسخة منه:-  
وحدة التدريب والتنمية البشرية/مع الاوليت.

## Appendix A-IV

جمهورية العراق  
وزارة الصحة  
دائرة صحة بابل  
قطاع مركز الحلة الثاني  
شعبة الموارد البشرية

العدد: ٧١ / ٢٤  
التاريخ: ٢٠٢٣ / ٨ / ١٤

الى / المراكز الصحية الرئيسية  
م / تسهيل مهمة

تحية طيبة...  
اشارة الى كتاب دائرة صحة بابل / مركز التدريب والتنمية البشرية ووحدة البحوث  
ذي العدد ١٩٠٨ في ٢٠٢٣ / ١٢ / ٥ .... يرجى تسهيل مهمة الباحث طالب الدراسات  
العليا / ماجستير مجتمع (عمار شاكر ارحيم) من خلال توقيع وختم استمارات اجراء  
البحث المرفقة في مؤسساتكم وحسب الضوابط والامكانات على ان لا تتحمل مؤسساتكم  
اية تبعات مادية وقانونية .

مع الاحترام


ط  
د. احمد  
مدير

الطبيب الاختصاص  
مروان هشام عبد العزيز  
مدير قطاع الحلة الثاني  
٢٠٢٣ / ٨ / ١٤

نسخة منه الى :-  
الارشفة الالكترونية / الافراد

اسمهان

## Appendix A- V

|   |   |   |
|---|---|---|
| <p>Ministry Of Health<br/>Babylon Health Directorate<br/>Email:-<br/>Babel_Healthmoh@yahoo.com<br/>Tel:282628 or 282621</p> | <p>جمهورية العراق</p>  | <p>وزارة الصحة والبيئة<br/>دائرة صحة محافظة بابل<br/>المدير العام<br/>مركز التدريب والتنمية البشرية<br/>لجنة البحوث</p> |
|---|---|---|

استمارة رقم :- ٢٠٢١/٠٣

رقم القرار :- ٢٢٠  
تاريخ القرار :- ٢٠٢٤/١٢/١٤

وزارة الصحة  
دائرة صحة بابل  
مركز التدريب والتنمية البشرية  
لجنة البحوث

### قرار لجنة البحوث

تحية طيبة ...

درست لجنة البحوث في دائرة صحة بابل مشروع البحث ذي الرقم (٢٠٢٣/٠١١٨ / بابل) المعنون (المعارف التغذوية وعادات تناول الغذاء للنساء الحوامل المراجعات لمراكز الرعاية الصحية الأولية) والمقدم من الباحث (عمار شاكرا أرحيم) إلى وحدة إدارة البحوث والمعرفي مركز التدريب والتنمية البشرية في دائرة صحة بابل بتاريخ ٢٠٢٣/١٢/١٤ وقررت :

قبول مشروع البحث أعلاه كونه مستوفيا للمعايير المعتمدة في وزارة الصحة والخاصة بتنفيذ البحوث ولا مانع من تنفيذه في مؤسسات الدائرة .

مع الاحترام

الدكتور  
محمد عبد الله عجرش  
رئيس لجنة البحوث  
٢٠٢٤ / /

نسخة منه إلى :  
• مكتب المدير العام / مركز التدريب والتنمية البشرية / وحدة إدارة البحوث ... مع الأوليات .

دائرة صحة محافظة بابل / مركز التدريب والتنمية البشرية // ايميل المركز [babiltraining@gmail.com](mailto:babiltraining@gmail.com)

## Appendix A- VI

### Distribution of the Primary Health Care Centers

| Health Directorate   | Primary Health Care Sector | Primary Health Care Centers |
|----------------------|----------------------------|-----------------------------|
| <b>Al-Hilla City</b> | <b>The first sector</b>    | Al-Asatetha                 |
|                      |                            | Al-Mohandissen              |
|                      |                            | Al-Imam                     |
|                      |                            | Shaheed al-Islam            |
|                      |                            | Al-Qodos                    |
|                      |                            | Halef Koran                 |
|                      |                            | Al-Hussein                  |
|                      |                            | Al-Regla                    |
|                      |                            | Tefel                       |
|                      |                            | Al-Kefil main               |
|                      |                            | Al-Kefil Model              |
|                      | <b>The second sector</b>   | Al-Zahraa                   |
|                      |                            | Al-Hadi                     |
|                      |                            | Shahada Nader               |
|                      |                            | Babylon training            |
|                      |                            | Al-Qadhia                   |
|                      |                            | Margan                      |

|              |          |            |
|--------------|----------|------------|
|              |          | Al-Khalesa |
|              |          | Al-Wardia  |
|              |          | Al-Bager   |
|              |          | Al-Kawther |
|              |          | Al-Nahdhah |
| <b>Total</b> | <b>2</b> | <b>22</b>  |


# Ethical Considerations

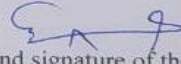

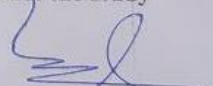
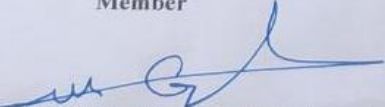

## Appendix B

UOK. CoN. 23. 016

Ethical Committee Code:  
Date: 15/ 11 /2023

Ministry of Higher Education and Scientific Research  
University of Karbala / College of Nursing  
Scientific Research Ethics Committee

  
**Research Ethical Approval Form**

| Title of the research project   |   |               |   |
|---|---|---------------|---|
| In the English language   | In the Arabic language  |               |   |
| Nutritional Knowledge and Dietary Intake Habits for Pregnant Womens attending Primary Health Care Centers.  | المعارف التغذوية وعادات تناول الغذاء للنساء الحوامل المراجعات لمراكز الرعاية الصحية الاولى  |               |   |
| Data About the Main Researcher /Student:  |   |               |   |
| Full Name   | Scientific Title  | Mobile Number | Email   |
| Ammar Shakir Irhayim  | Academic Nurse  | 07802581178   | ammargaiem@gmail.com  |
| Data About the Co-author /Supervisor:   |   |               |   |
| Full Name   | Scientific Title  | Mobile Number | Email   |
| Dr. Ghazwan Abdulhussein Al-Abedi   | Assist Prof Dr.   | 07705571856   | Ghazwan.a@uokerbala.edu.iq  |
| Study objectives  |   |               |   |
| 1- To assess the nutritional knowledge for pregnant womens.<br>2- To assess dietary intake habits for pregnant womens.<br>3- To find out the relationship between nutritional knowledge and dietary intake habits for pregnant womens with their socio- demographic characteristic such as age, education level, Occupation, type of the family and household monthly income.   |   |               |   |
| Time and Setting of the Study   |   |               |   |
| Time: Start from October 2023 to August 2024<br>The sample will be collected from primary health care centers in Al-Hilla city  |   |               |   |
| Study Design  |   |               |   |
| Quantitative design /Descriptive study  |   |               |   |
| Sampling method and sample size   |   |               |   |
| Non probability (convenience sampling) of 300 pregnant women  |   |               |   |
| Statement of Ethical Commitment   |   |               |   |
| The study will be conducted in accordance with what was mentioned in the protocol above and to commitment that all rules set by the ethical committee are followed in present research process. The researcher also makes a commitment to abide by ethical principles, moral values, law and instruction of the institutions. There is no bias will be during collecting the data, gender, regional aspects and is totally impartial and objective. The researcher will have taken an informed consent from the participants, and provide clarifications and information about the study to the sample members. The researcher deals with the data of the sample members in complete confidentiality. |   |               |   |
|   |   |               | <br>Name and signature of the researcher |
| Recommendation of the College's Research Ethical Committee  |   |               |   |
| <input checked="" type="checkbox"/> Agreement to conduct the study  | <input type="checkbox"/> Disagreement to conduct the study  |               |   |
| <br><b>Instructor Dr. Sajidah Saadoon Oleiwi</b><br>Member   | <br><b>Ass. Prof. Dr. Zeki Sabah Musihb</b><br>Member                        |               |   |
| <br><b>Ass. Prof. Dr. Ghazwan Abdulhussein</b><br>Member   | <br><b>Ass. Prof. Dr. Hassan Abdullah Athbi</b><br>Chairman of the Committee |               |   |

# Appendix C

## Questionnaire

### Nutritional Knowledge and Dietary Intake Habits' of Pregnant Women attending

### Primary Health Care Centers

Dear review

The information that is issued by you will be strictly confidential and will only be used for the purpose of scientific research. Therefore, you can express your opinion with all seriousness and credibility.

#### **Part One: Socio-demographic Information**

1. Age:  years

**2. Education level**

Unable to read and write

Elementary school

Secondary school

Postgraduate

Read and write

Middle school

College

**3. Occupation**

Housewife

Free Business

Government Employ

Student

**4. Type of the family**

Nuclear

Extended

**5. Household monthly income:**

Adequate

Enough to some extent

Insufficient

**6. Which of the following sources provided you with information about nutrition knowledge?**

The media (television / radio)

Relatives and friends

Health Center / Mother and Child Care

private women's clinics

Social Media



## **Second/ History of reproductive health:-**

### **1. Gravidity:**

Primigravida  Multipara

### **2. Number of Parity (for Multipara):**

1  2  3  4  <5

### **3. Gestational age:**

1st trimester  2nd trimester  3rd trimester

### **4. History of abortion:**

Yes  No

### **5. Did you follow the directions of the primary health care center in the previous pregnancy?**

Yes  No

## **Third / Nutritional Knowledge for Pregnant Women:-**

| No | Items   | Yes | Not sure | NO |
|----|---|-----|----------|----|
| 1  | In order to give birth to a healthy baby, a pregnant woman must maintain an ideal weight during pregnancy |     |          |    |
| 2  | Pregnant women should eat at least 3-4 servings of milk and dairy products every day                      |     |          |    |
| 3  | If you do not want to eat meat during pregnancy, you can replace it with juice and natural jam            |     |          |    |
| 4  | You know that pregnant mothers are advised to eat more non-vegetarian foods every day                     |     |          |    |
| 5  | The needs for proteins increase during pregnancy  |     |          |    |
| 6  | The recommended amount of protein during pregnancy is 25 milligrams per day                               |     |          |    |

|           |  |  |  |  |
|-----------|--|--|--|--|
| <b>7</b>  | You know that the mother's daily need for Iron increases during pregnancy  |  |  |  |
| <b>8</b>  | The recommended amount of Iron during pregnancy is 27 mg per day   |  |  |  |
| <b>9</b>  | Consuming tea and coffee with meals has an effect on Iron absorption   |  |  |  |
| <b>10</b> | Most pregnant women need at least 600 micrograms of folic acid in their daily.   |  |  |  |
| <b>11</b> | Folic acid deficiency during pregnancy leads to birth defects in the nervous system of the newborn baby  |  |  |  |
| <b>12</b> | You know that the folic acid content in animal foods such as meat, milk, eggs and fish is higher than in plant foods such as lentils, cauliflower and spinach. |  |  |  |
| <b>13</b> | You know that omega-3 and omega-6 fatty acids are essential for the development of the fetus's brain and retina.   |  |  |  |
| <b>14</b> | Seafood, milk and dairy products, and spinach are foods high in Iodine   |  |  |  |
| <b>15</b> | You know that you should avoid consuming some seafood during pregnancy, such as (Salmon), which contains a high percentage of mercury                          |  |  |  |

|           |  |  |  |  |
|-----------|--|--|--|--|
| <b>16</b> | You know that it is necessary for pregnant women to get 1000 mg of calcium daily   |  |  |  |
| <b>17</b> | Inadequate consumption of minerals such as Calcium and Phosphorous during pregnancy and insufficient exposure to sunlight leads to softening of the bones and deterioration of bone tissue (Osteomalacia). |  |  |  |
| <b>18</b> | The pregnant mother's daily consumption of vegetables and fruits should be increased during pregnancy compared to the pre-pregnancy period   |  |  |  |
| <b>19</b> | You know that the need for (Vitamin A) increases during pregnancy  |  |  |  |
| <b>20</b> | You know that eating too much salt has an effect on the body's systems   |  |  |  |
| <b>21</b> | Women who eat a healthy diet during pregnancy do not need physical activity  |  |  |  |
| <b>22</b> | Eating two pieces of yellow fruit daily helps maintain health  |  |  |  |
| <b>23</b> | Pregnant woman should be on a special diet   |  |  |  |

## Fourth / Dietary Intake Habits:-

### 1. Measuring food frequency intake:

| Food                | Once a day | Twice a day | Once a week | Twice or more a week | Once a month | Twice or more a month | Never |
|---------------------|------------|-------------|-------------|----------------------|--------------|-----------------------|-------|
| Red meat            |            |             |             |                      |              |                       |       |
| White meat          |            |             |             |                      |              |                       |       |
| Fruit               |            |             |             |                      |              |                       |       |
| Egg & Milk products |            |             |             |                      |              |                       |       |
| legumes             |            |             |             |                      |              |                       |       |
| vegetables          |            |             |             |                      |              |                       |       |

### 2. Nutritional habits of pregnant women

| No | Nutritional habits            | Always | Sometimes | Never |
|----|-------------------------------|--------|-----------|-------|
| 1  | eating three main meals a day |        |           |       |
| 2  | eating secondary meals a day  |        |           |       |
| 3  | eating sweets                 |        |           |       |
| 4  | eating boiled foods           |        |           |       |
| 5  | eating canned food            |        |           |       |
| 6  | taking iron supplements       |        |           |       |
| 7  | taking folic acid supplements |        |           |       |
| 8  | drinking tea                  |        |           |       |
| 9  | drinking coffee               |        |           |       |
| 10 | drinking natural orange juice |        |           |       |

## الاستبانة

عزيزتي المراجعة

إن المعلومات التي تصدر عنك ستكون في غاية السرية ولن تستخدم إلا لغرض البحث العلمي فقط . . لذا يمكنك الإيلاء برأيك بكل جدية ومصداقية

### المحور الاول / المعلومات الديموغرافية:-

1.العمر :

2- مستوى التعليم :-

تقرأ وتكتب  
متوسطة  
كلية

لا تقرأ ولا تكتب  
ابتدائية  
اعدادية  
دراسات عليا

3- المهنة :-

طالبة

أعمال حرة

موظفة

ربة بيت

4- نوع العائلة :-

ممتدة

نووية

1- الدخل الشهري للعائلة (بالدينار العراقي):-

- كاف

- كافي لحد ما

- غير كاف

6- أي من مصادر المعلومات التالية رفدتك بالمعلومات حول المعرفة الغذائية:-

1- وسائل الاعلام ( التلفاز - الراديو)

2- المركز الصحي / رعاية الأم والطفل

3- الأقارب والاصدقاء

4- عيادات نسائية خاصة

5- مواقع التواصل الاجتماعي

### المحور الثاني/ تاريخ الصحة الإنجابية:-

1. عدد مرات الحمل :-

متكررة الحمل

حمل لأول مرة

2. عدد الولادات (لمتكررة الحمل):-

 ≤ 5 4 3 2

1

3. عمر الحمل:-

الثلث الأول  الثلث الثاني  الثلث الثالث

4. هل لديك تاريخ اجهاض؟

نعم  لا

5. هل تابعتي توجيهات مركز الرعاية الصحية الأولية في الحمل السابق؟

نعم  لا

المحور الثالث/ المعارف الغذائية للنساء الحوامل:-

| ت | الفقرة   | نعم | غير متأكد | كلا |
|---|--|-----|-----------|-----|
| 1 | لكي تلد طفلاً سليماً، على المرأة الحامل الحفاظ على وزن مثالي خلال فترة الحمل         |     |           |     |
| 2 | الحامل يومياً يجب أن تتناول ما لا يقل عن 3-4 حصص من الحليب ومنتجات الألبان           |     |           |     |
| 3 | في حالة عدم الرغبة من تناول اللحوم أثناء الحمل يمكن تعويضها بالعصير و المربي الطبيعي |     |           |     |
| 4 | تعلمين انه ينصح الام الحامل بتناول المزيد من الأطعمة غير النباتية كل يوم             |     |           |     |
| 5 | ان احتياجات من البروتينات تزداد أثناء الحمل  |     |           |     |
| 6 | أن الكمية الموصى بها من البروتين للمرأة أثناء الحمل هي 25 ملي غرام يومياً            |     |           |     |
| 7 | تعلمين ان حاجة الأم اليومية من الحديد تزداد خلال فترة الحمل                          |     |           |     |
| 8 | الكمية الموصى بها من الحديد للمرأة أثناء الحمل هي 27 ملي غرام يومياً                 |     |           |     |
| 9 | تناول الشاي والقهوة مع الوجبات الغذائية له تأثير على امتصاص الحديد                   |     |           |     |

|  |  |  |    |  |
|--|--|--|----|--|
|  |  |  | 10 | تحتاج معظم النساء الحوامل إلى 600 ميكروغرام على الأقل من حمض الفوليك يومياً.   |
|  |  |  | 11 | نقص حمض الفوليك أثناء الحمل يؤدي إلى حدوث عيوب خلقية في الجهاز العصبي للطفل الوليد   |
|  |  |  | 12 | تعلمين ان محتوى حمض الفوليك في الأطعمة الحيوانية مثل اللحوم والحليب والبيض والأسماك أعلى منه في الأطعمة النباتية مثل العدس والقرنبيط والسبانخ            |
|  |  |  | 13 | تعرفين أن أحماض أوميغا(3) وأوميغا(6) الدهنية ضرورية لنمو الدماغ وشبكية العين للجنين  |
|  |  |  | 14 | المأكولات البحرية والحليب ومنتجات الألبان والسبانخ من الأطعمة التي تحتوي على نسبة عالية من اليود   |
|  |  |  | 15 | ينبغي تجنب استهلاك بعض المأكولات البحرية مثل (سمك السلمون) الذي تحتوي على نسبة عالية من الزئبق أثناء الحمل   |
|  |  |  | 16 | تعلمين أنه من الضروري أن تحصل النساء الحوامل على 1000 ملي غرام من الكالسيوم يومياً   |
|  |  |  | 17 | ان الاستهلاك غير الكافي للمعادن مثل الكالسيوم والفسفور أثناء الحمل والتعرض غير الكافي لأشعة الشمس يؤدي إلى تليين العظام وتدهور أنسجة العظام (لين العظام) |
|  |  |  | 18 | يجب زيادة الاستهلاك اليومي من الخضار والفواكه للأم الحامل خلال فترة الحمل مقارنة بفترة ما قبل الحمل  |
|  |  |  | 19 | تعلمين أن الحاجة إلى فيتامين ( أ ) تزداد أثناء الحمل   |
|  |  |  | 20 | تعرفين ان تناول الكثير من الملح له تأثير على أجهزة الجسم   |
|  |  |  | 21 | النساء اللاتي يتغذين بنظام غذائي صحي خلال فترة الحمل لا يحتاجن إلى نشاط بدني   |
|  |  |  | 22 | تناول قطعتين من الفاكهة الصفراء يومياً يساعد على الحفاظ على الصحة  |
|  |  |  | 23 | يجب أن تتبع المرأة الحامل نظاماً غذائياً خاصاً   |

## المحور الرابع/ عادات تناول الغذاء:-

### 1- قياس كمية الغذاء المتناولة:-

| لا يوجد | مرتين أو أكثر بالشهر | مرة بالشهر | مرتين أو أكثر بالاسبوع | مرة بالاسبوع | مرتين باليوم | مرة باليوم | الغذاء              |
|---------|----------------------|------------|------------------------|--------------|--------------|------------|---------------------|
|         |                      |            |                        |              |              |            | لحم أحمر            |
|         |                      |            |                        |              |              |            | لحم أبيض            |
|         |                      |            |                        |              |              |            | فاكهة               |
|         |                      |            |                        |              |              |            | بيض و مشتقات الحليب |
|         |                      |            |                        |              |              |            | بقوليات             |
|         |                      |            |                        |              |              |            | خضروات              |

### 2-العادات الغذائية:-

| ت  | الفقرة                           | دائما | أحيانا | أبدا |
|----|----------------------------------|-------|--------|------|
| 1  | تناول ثلاث وجبات رئيسية في اليوم |       |        |      |
| 2  | تناول وجبات ثانوية في اليوم      |       |        |      |
| 3  | تناول الحلويات                   |       |        |      |
| 4  | تناول الأطعمة المسلوقة           |       |        |      |
| 5  | تناول الأطعمة المعلبة            |       |        |      |
| 6  | تناول مكملات الحديد              |       |        |      |
| 7  | تناول مكملات حمض الفوليك         |       |        |      |
| 8  | شرب الشاي                        |       |        |      |
| 9  | شرب القهوة                       |       |        |      |
| 10 | شرب عصير البرتقال الطبيعي        |       |        |      |



## Appendix D Expert's Panel

| مكان العمل  | سنوات الخبرة | الاختصاص العلمي                    | الشهادة   | العنوان الوظيفي | اسم الخبير              | ت  |
|---|--------------|------------------------------------|-----------|-----------------|-------------------------|----|
| جامعة بابل / كلية التمريض                                 | 36           | تمريض<br>صحة مجتمع                 | الدكتوراه | استاذ           | أمين عجيل ياسر          | 1  |
| جامعة بابل / كلية التمريض                                 | 33           | تمريض<br>صحة مجتمع                 | الدكتوراه | استاذ           | سلمى كاظم جياذ          | 2  |
| جامعة الكوفة/ كلية التمريض                                | 30           | تمريض صحة<br>مجتمع                 | الدكتوراه | استاذ           | فاطمة وناس<br>خضير      | 3  |
| جامعة بغداد / كلية التمريض                                | 16           | تمريض<br>الصحة النفسية<br>والعقلية | الدكتوراه | استاذ           | قحطان قاسم محمد         | 4  |
| جامعة كربلاء / كلية<br>التمريض                            | 25           | تمريض<br>الاطفال                   | الدكتوراه | استاذ           | خميس بندر عبيد          | 5  |
| جامعة كربلاء / كلية<br>التمريض                            | 33           | تمريض صحة<br>مجتمع                 | الدكتوراه | استاذ<br>مساعد  | سلمان حسين<br>فارس      | 6  |
| جامعة كربلاء / كلية<br>التمريض                            | 21           | تمريض بالغين                       | الدكتوراه | استاذ<br>مساعد  | حسن عبد الله<br>عذبي    | 7  |
| جامعة كربلاء / كلية<br>التمريض                            | 20           | تمريض صحة<br>الأم والوليد          | الدكتوراه | استاذ<br>مساعد  | ساجدة سعدون<br>عليوي    | 8  |
| جامعة الكوفة / كلية<br>التمريض                            | 19           | تمريض صحة<br>مجتمع                 | الدكتوراه | استاذ<br>مساعد  | منصور عبد الله<br>فلاح  | 9  |
| جامعة الكوفة/ كلية التمريض                                | 12           | تمريض صحة<br>مجتمع                 | الدكتوراه | استاذ<br>مساعد  | حسين منصور<br>علي       | 10 |
| وزارة الصحة/ دائرة صحة<br>بابل / مستشفى الحلة<br>التعليمي | 25           | تغذية                              | البورد    | أستشاري         | رائد عبد المحسن<br>حمود | 11 |
| جامعة كربلاء / كلية<br>التمريض                            | 12           | تمريض صحة<br>مجتمع                 | الدكتوراه | مدرس            | حقي إسماعيل<br>منصور    | 12 |

## Appendix E1

Republic of Iraq  
Ministry of higher education & scientific research  
University of Karbala  
College of Nursing  
Graduate studies Division



جمهورية العراق  
وزارة التعليم العالي والبحث العلمي  
جامعة كربلاء  
كلية التمريض  
شعبة الدراسات العليا

### إقرار الخبير الإحصائي

أشهد بأن الرسالة الموسومة :

" المعارف التغذوية وعادات تناول الغذاء للنساء الحوامل المراجعات لمراكز الرعاية الصحية الأولية "

" Nutritional Knowledge and Dietary Intake Habits' of Pregnant Women Attending Primary Health Care Centers "

قد تم الإطلاع على الإسلوب الإحصائي المتبع في تحليل البيانات و إظهار النتائج الإحصائية وفق مضمون الدراسة و لأجله وقعت .



توقيع الخبير الإحصائي :

الإسم و اللقب العلمي : د. نبينا عبد الجبار كاظمي

الإختصاص الدقيق : إحصاءات

مكان العمل : جامعة كربلاء كلية التمريض والدراسات العليا

التاريخ : 2024 / 5 / 22

العنوان : العراق - محافظة كربلاء المقدسة - حي الموظفين - جامعة كربلاء

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## Appendix E2

Republic of Iraq  
Ministry of higher education & scientific research  
University of Karbala  
College of Nursing  
Graduate studies Division



جمهورية العراق  
وزارة التعليم العالي والبحث العلمي  
جامعة كربلاء  
كلية التمريض  
شعبة الدراسات العليا

### إقرار الخبير اللغوي

أشهد بأن الرسالة الموسومة :

" المعارف التغذوية وعادات تناول الغذاء للنساء الحوامل المراجعات لمراكز الرعاية الصحية الأولية "

"Nutritional Knowledge and Dietary Intake Habits' of Pregnant Women Attending Primary Health Care Centers "

قد جرى مراجعتها من الناحية اللغوية بحيث أصبحت بإسلوب علمي سليم خالٍ من الأخطاء اللغوية ولأجله وقعت .

توقيع الخبير اللغوي :

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الإختصاص الدقيق : لغات أجنبية

مكان العمل : جامعة كربلاء | كلية

التاريخ: 2024 / 6 / 12

العنوان : العراق - محافظة كربلاء المقدسة - حي الموظفين - جامعة كربلاء

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## المستخلص

تلعب المعرفة الغذائية وعادات تناول الغذاء أثناء الحمل دورًا أساسيًا في الحفاظ على الصحة العامة والعقلية لكل من المرأة الحامل والجنين، فالتغذية التي يحصل عليها الجنين أثناء فترة الحمل، يبقى تأثيرها طوال حياته، لذا يتعين على الأم الحامل الاهتمام بالتغذية الصحية حفاظاً على صحتها وصحة جنينها مستقبلاً. تهدف الدراسة إلى تقييم المعرفة الغذائية والعادات التغذوية للنساء الحوامل وإيجاد علاقة بين المتغيرات الديموغرافية. أجريت دراسة وصفية ارتباطية في مراكز الرعاية الصحية الأولية في مدينة الحلة خلال المدة من 15 تشرين الأول 2023 إلى 12 تموز 2024. وتألقت عينة الدراسة من (300) امرأة حامل تم اختيارهن وفق طريقة أخذ العينات الملائمة غير الاحتمالية. تم التحقق من صدق الاستبانة من قبل (12) خبيراً وتم تحقيق ثباتيتها من خلال دراسة المصغرة. وشمل العدد الكلي لفقرات الاستبانة 53 فقرة. تم جمع البيانات من خلال المقابلة وتم تحليلها من خلال تطبيق التحليل الإحصائي الوصفي والاستدلالي.

أظهرت نتائج الدراسة أن متوسط عمر العينة يتراوح بين 20 إلى 29 سنة (70.7%)، (27.3%) متخرجون من دبلوم وأعلى، يعيشون في أسرة ممتدة (58.7%)، (70%) ذوي حمل متعدد، بينما (26.3%)، (75%)، (49.7%) لديهم حملان سابقان وليس لديهم تاريخ إجهاض وفي الثلث الثاني من الحمل على التوالي. كما أن أكثر من نصف النساء (63.3%) يلتزم بالرعاية السابقة للولادة في الحمل السابق. وأظهرت المعرفة الغذائية والعادات الغذائية (62.3%)، (63%) بمستوى متوسط على التوالي، مع تناول متوسط ( $1.403 \pm 3.20$ ) للحوم الحمراء. تشير الدراسة إلى وجود علاقة إيجابية ذات دلالة إحصائية بين المعرفة الغذائية وتكرار تناول الطعام والعادات الغذائية عند القيم الاحتمالية = 0.001 و 0.001 على التوالي. وخلصت الدراسة إلى أن المعرفة الغذائية لدى النساء

الحوامل بمستوى متوسط بينما العادات الغذائية بمستوى جيد فيما يتعلق بتكرار تناول الأطعمة. توصي الدراسة وزارة الصحة الاهتمام بالبرامج التثقيفية حول أهمية الغذاء للنساء الحوامل من خلال مقدمي الرعاية الصحية وتشجيع النساء الحوامل على زيادة عدد زيارتهن لمراكز الرعاية الصحية الأولية للحصول على معلومات معرفية حول أهمية التغذية أثناء الحمل.



جامعة كربلاء

كلية التمريض

المعارف التغذوية وعادات تناول الغذاء للنساء الحوامل المراجعات  
لمراكز الرعاية الصحية الأولية

رسالة مقدمة الى مجلس كلية التمريض / جامعة كربلاء وهي جزء من متطلبات

نيل درجة الماجستير علوم في التمريض

من قبل

عمار شاكر ارحيم

بإشراف

أ.م.د. غزوان عبد الحسين عبد الواحد

محرم - 1446 هـ

تموز - 2024 م