An-Najah National University

Faculty of Graduate Studies

ASSOCIATION OF HOUSEHOLD FOOD INSECURITY AND NUTRITION-RELATED KNOWLEDGE, ATTITUDES, AND PRACTICES WITH NUTRITIONAL STATUS AMONG MOTHERS AGED ≥ 18 IN PALESTINE: NATIONAL STUDY

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Dedication

I dedicate this work to my family who have consistently believed in me.

To all the children who contributed with their pure minds and honest thoughts to this study.

To the children who are just starting their journey in life, who will become the future creator.

To every situation, and to every single person who has crossed my life and served as a source of motivation, guiding me through their actions and words and even through their shared aspiration.

Eeman

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Initially, we attribute all honor to God, our ultimate source of strength, for enabling us to accomplish this significant mental and physical undertaking.

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Finally, we want to thank all of our colleagues, students, lecturers, and doctors at An-Najah National University for their ongoing encouragement and support.

Declaration

I, the undersigned, declare that I submitted the thesis entitled:

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I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

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Date: 17/2/2025

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Abstract

Background: The global understanding of the relationship between food insecurity and maternal nutrition has improved, with researchers underlining the necessity of evaluating not just the availability of food but also the quality of food and its nutritional content. Furthermore, the need to look at food's social and cultural aspects, such as women's nutrition-related behaviors, attitudes, and knowledge, is becoming increasingly apparent. Developing successful treatments to enhance maternal nutrition and, consequently, improve child health outcomes requires consideration of these aspects. Nutrition-related knowledge and attitudes are required for dietary changes toward a healthier pattern of nutrition and dietary intake. As a result, nutrition-related knowledge, attitude, and practice are some of the important elements in reaching households' nutritional and food security.

Aim: to examine the association between household food insecurity and nutritional status and nutrition-related knowledge, attitudes, and practices (KAP) among mothers aged ≥ 18 years in the West Bank, Palestine.

Methodology: A cross-sectional design was used in the study, which was conducted in households in West Bank/ Palestine. The target population in the households living in the West Bank is mothers aged ≥ 18 years. Stratified cluster sampling with a total sample size of 720 Households. The validated Radimer/Cornell Household Food Security questionnaire was used to assess the food security status in the households. Nutritional status (Body mass index) and dietary intake recall (24-hour dietary recalls for two days) were taken to make assessment the nutritional status of the mothers. Nutrition-related Knowledge, attitude, and practice (KAP) of mothers was assessed

using the Food and Agriculture Organization module related to Iron deficiency anemia (Module no. 6)

Result: Numerous socioeconomic characteristics were found in 720 West Bank families surveyed; the majority of household mothers were under 40, and 62.6% had a university degree. The average family size was 4.4, 33.8% of households made between 3001 and 5000 NIS per month, and only 5.6% of households received food assistance. 13.1% of households experienced food insecurity, mostly as a result of financial hardships, and 3.3% of the households had hungry children. Tiny percentages (1.5%) were underweighted, whereas the majorities (61.5%) were overweight or obese, indicating the need for dietary treatments. Factors such as education, income, location, and dependence on food assistance were associated with food insecurity, underscoring the need for focused assistance for disadvantaged populations.

Conclusion: Food insecurity in the West Bank is complex, as this study shows, with notable socioeconomic, demographic, nutritional, and KAP differences between households. The main risk factors for food insecurity were found to be middle-aged families, lower educational attainment, geographical disparities, refugee status, and poor income.

Key words: Household food security status; Arab states; Nutritional status; Dietary intake; Iron Deficiency Anemia; Nutrition- related KAP.

Chapter One

Introduction

1.1 Background

According to the World Food Summit Declaration in 1996, Food security exists when "all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life"(1). On the other hand, Food insecurity according to the USDA food security reports is a household-level economic and social condition of limited or uncertain access to adequate food, while Hunger is an individual-level physiological condition that may result from food insecurity (2). WHO in 2020 announced that the global population experiencing moderate-to-severe food insecurity in 2022 will continue to grow. With almost 320 million more individuals than the previous year, nearly one-third of the global population did not have access to enough food (3).

Because healthy meals are expensive and incomes remain high disparity, approximately three billion people worldwide especially the poor, cannot afford healthy diets (4). Food insecurity is still a major issue affecting people globally, especially in low- and middle-income nations, despite national and international efforts to end extreme poverty and improve the world's food supply (5).

In the Palestinian situation, people were affected by food insecurity, which was primarily caused by war and made worse by high rates of unemployment and poverty. Food insecurity affects 19 percent of the West Bank and 1.6 million food-insecure Palestinians are unable to cover their basic expenses (6). Undernutrition is the result of inadequate nutritional intake in terms of the amount, quality, absorption and biological utilization of nutrients from recurrent illnesses (3).

Up to 811 million people, or almost 10% of the world's population, suffered from malnutrition in 2022. According to the statistics, a significant amount of work will be required to fulfill the global commitment to eradicate hunger by 2030 (7). Anemia is a public health problem that is globally important, it affects mothers and women that are pregnant (8). The most frequent causes of anemia are nutritional inadequacies, especially iron deficiency anemia (9). Micronutrient deficiency and unbalanced diets are

associated with the prevalence of households food insecurity which can be considered a predictor of various forms of diet-related health conditions of concern particularly iron deficiency anemia in mothers (10). Avoiding costly food is the most popular coping mechanism in the West Bank, according to coping mechanisms used by families, particularly mothers, to deal with food poverty in their homes. Additionally, the research indicates that a significant portion of households employ detrimental practices including eating fewer meals and consuming food of lower quality(11). Also, studies have shown that moms may put their children's needs ahead of their own. Despite having its roots in cultural conventions, this practice can make maternal malnutrition worse(12). Nutrition-related knowledge, attitudes, and practices (KAP) of mothers are important factors that influence eating habits and nutritional results because it influences both their own and their children's nutritional health, while poor nutrition knowledge or negative attitudes about healthy eating can frequently result in less-than-ideal nutritional choices for mothers and their families (13).

Although they are two different ideas, food security and nutrition security are related. To address problems like hunger and financial obstacles to food access, food security aims to guarantee the steady availability, affordability, accessibility, and appropriate usage of enough food to satisfy fundamental dietary needs. On the other hand, nutrition security places more emphasis on the food's nutritional value and quality, making sure it offers the necessary nutrients for development, growth, and health. Nutrition security covers malnutrition, dietary diversity, and general health outcomes, whereas food security addresses hunger and food scarcity. Together, they emphasize how crucial it is to have access to a variety of wholesome, safe, and nourishing food options in addition to having enough food to sustain well-being (14).

In Palestine, a national project was conducted in the West Bank parallel to that done in Gaza to study the household's food security status and its association with nutritional status and nutrition-related knowledge, attitudes, and practices and dietary intake between several categories of Palestinians. Our data from this study are extracted -after permission- from this project done by the Ministry of Health in combination with WHO, and Al-Quds university, Bir-Zeit university, Hebron university and An Najah National university.

1.2 Introduction

1.2.1 A Global View of Maternal Nutrition and Food Insecurity

Globally, there is recognition that food insecurity poses a significant obstacle to accomplishing the Sustainable Development Goals (SDG) of the United Nations, especially SDG 2: Zero Hunger. Recent figures show that the number of people experiencing food insecurity is increasing, with the pandemic of COVID-19 worsening the situation, despite notable success in reducing hunger in some places(15). The Food and Agriculture Organization declares that in 2019, over 690 million people experienced hunger, and many more suffered from moderate to severe food insecurity (3).

Food instability and maternal malnutrition are intimately related, particularly in low- and middle-income countries, where women frequently bear disproportionate risks. Limited accessibility of nutrient-dense foods, an elevated frequency of micronutrient deficiencies, and heightened susceptibility to illnesses are all linked to food insecurity in low- and middle-income nations. Gender variation exacerbates these problems by limiting women's entree to resources and healthcare, which worsens their nutritional status (16).

The global understanding of the relationship between food insecurity and maternal nutrition has improved, with researchers underlining the necessity of evaluating not just the availability of food but also the quality of food and its nutritional content. Furthermore, the need to look at food's social and cultural aspects, such as women's nutrition-related behaviors, attitudes, and knowledge, is becoming increasingly apparent. Developing successful treatments to enhance maternal nutrition and, consequently, improve child health outcomes requires consideration of these aspects (17).

1.2.2 Palestine's Food Insecurity

There are particular difficulties in treating food insecurity because of the circumstances in Palestine. Food insecurity is widespread due to the ongoing Israeli-Palestinian conflict, access and mobility limitations, and unstable economic conditions. Nearly 1.6 million Palestinians were food insecure as of 2021, and many of them depended on

humanitarian aid to achieve their basic nutritional needs, according to the World Food Programme(13).

Food insecurity in the West Bank and Gaza Strip is influenced by a number of variables, such as the consequences of military occupation, high food costs, restricted agricultural productivity, and unemployment. With 68.5% of Gazan households categorized as food insecure, the embargo has had especially devastating impacts, yet this number varies based on the state of the economy and politics (13).

In Palestine especially in Gaza, mothers confront particular difficulties in providing their families and themselves with a healthy diet. Maternal health is under stress due to several factors, including rising reproduction rates, limited access to healthcare, and the demanding tasks that women play as caretakers. Furthermore, women's capacity to prioritize their own nutritional needs might be impacted by social and cultural conventions surrounding food and nutrition. In this environment, establishing targeted public health measures requires an understanding of how family food insecurity affects maternal nutrition (12).

1.2.3 Mothers' Knowledge, Attitudes, and Practices (KAP) Concerning Nutrition

Nutrition-related knowledge, attitudes, and practices (KAP) are important factors that influence eating habits and nutritional results. Poor nutrition knowledge or negative attitudes about healthy eating can frequently result in less-than-ideal nutritional choices, even when food is available. KAP is essential for moms because it influences both their own and their children's nutritional health (17).

Research has indicated that enhanced understanding and instruction in nutrition might result in healthier eating habits, including consuming more fruits and vegetables, breastfeeding, and consuming fewer processed foods. However, because attitudes and cultural practices can operate as mediating variables, the relationship between knowledge and conduct is complicated. It is especially critical to comprehend the role of KAP in Palestine, where customary eating practices may clash with contemporary dietary recommendations (18).

For example, studies have shown that moms, particularly those in households where there is food insecurity, may put their children's needs ahead of their own. Despite having its roots in cultural conventions, this practice can make maternal malnutrition worse. Bad eating habits can also be caused by false beliefs about particular foods or a lack of understanding about the nutritional worth of various food groups (19).

1.2.4 Iron Deficiency Anemia (IDA)

A common dietary condition that presents serious health hazards, particularly for women of reproductive age, is iron deficiency anemia (IDA) (20). The high prevalence of IDA among mothers in Palestine is a reflection of underlying issues that affect women's dietary choices and health outcomes, including food insecurity, a lack of knowledge about nutrition, and socioeconomic limitations (13).

Fatigue, weakness, dizziness, shortness of breath, and impaired cognitive function are some of the symptoms of iron deficiency anemia (IDA), which occurs when the body does not produce enough iron to produce hemoglobin, the molecule in red blood cells that carries oxygen. For mothers, these symptoms can interfere with daily activities, caregiving responsibilities, and overall quality of life. Additionally, IDA is associated with a higher risk of preterm delivery, low birth weight, and developmental delays in infants during pregnancy, highlighting the condition's effects on both mother and child health (18, 21).

Iron deficiency anemia is largely caused by household food insecurity, which restricts access to iron-rich foods like lean meats, legumes, and leafy green vegetables—all of which are vital for preventing anemia (22). Mothers who are food insecure frequently turn to inexpensive, high-energy foods that are deficient in micronutrients, including iron, which increases their risk of developing IDA (23). In Palestine, economic hardships and limited food availability due to regional instability further exacerbate food insecurity, posing a significant obstacle to mothers' attaining adequate dietary iron intake (13).

Mothers' iron status is also greatly influenced by their nutritional knowledge, attitudes, and behaviors(24). Lack of knowledge about iron-rich foods, appropriate dietary sources of iron, and factors that either promote or hinder iron absorption (such vitamin C) can frequently result in inadequate iron consumption, even in situations where food

security is not a barrier. For example, moms may avoid foods high in iron or mix meals in ways that prevent iron absorption due to cultural beliefs or misconceptions about particular foods (e.g., drinking tea with meals). Iron availability and absorption are further decreased by dietary habits like consuming processed or refined foods frequently (17).

Both food security and dietary practices are significantly impacted by socioeconomic and demographic factors, including household size, income level, and education(25). Mothers with lower levels of education and resources may have less access to nutrition information and fewer resources to prioritize foods high in iron. Socioeconomic constraints also impact healthcare access, making it difficult for women to receive regular screenings, counseling, and treatment for anemia. In the Palestinian context, these difficulties are frequently made worse by political instability, which interferes with access to vital resources and health services (5).

1.3 Literature Review

1.3.1 Search Strategy

This chapter create recent research concerning the association of household food insecurity and nutrition-related knowledge, attitudes, and practices with nutritional status among mothers aged ≥ 18. Concepts that are critical to the study of this phenomenon include household food insecurity and nutrition, knowledge, attitudes, and practices with nutritional status, mothers aged ≥ 18. Each idea is individually discussed.

The collection of literature was conducted utilizing a computerized search of databases. Databases including PubMed, Research Gate, and Google Scholar were used for relevant articles and journals. The studies reviewed were published from 2014 to 2024.

1.3.2 Review of the studies

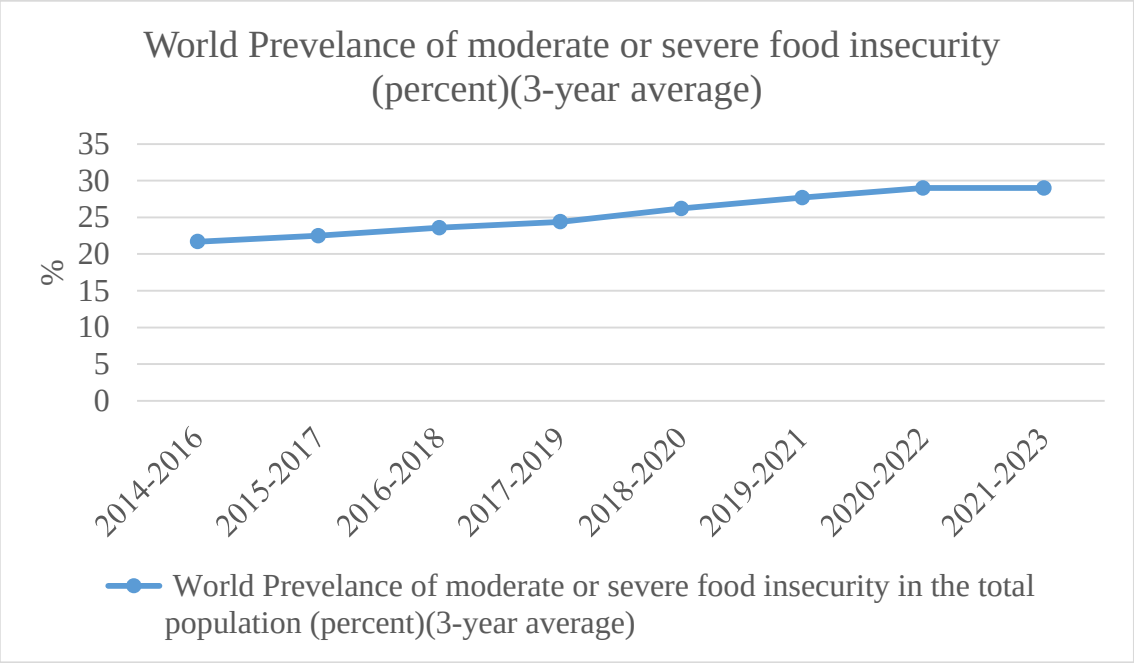
Global view:

Recent estimates from the 2024 FAO report on the State of Food Security and Nutrition in the World indicate that the global rates of moderate or severe food insecurity are still significantly higher than they were before the COVID-19 pandemic, showing minimal change over the past four years. After a notable increase in food insecurity from 2019 to 2020 because of the pandemic, these levels have stayed largely the same. In 2023,

approximately 28.9 percent of the world's population – 2.33 billion individuals – experienced moderate or severe food insecurity, indicating they lacked consistent access to sufficient food. Although the prevalence of food insecurity remained almost the same from 2020 to 2023, the total number of people dealing with moderate or severe food insecurity globally rose by over 65 million due to population increase during that era.(26) as in figure (1).

Figure 1

World prevalence of moderate or severe food insecurity



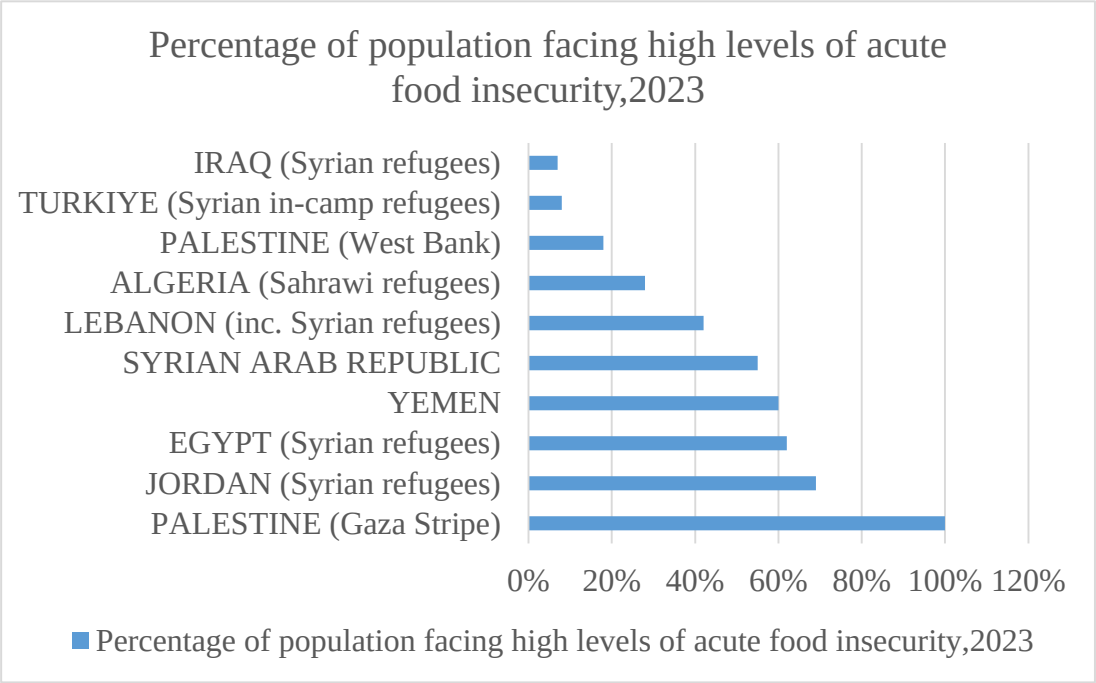
Middle East and North Africa- 2024 Global Report on Food Crises:

From 8 December 2023 until 7 February 2024, roughly 2.2 million individuals in the Gaza Strip faced severe acute food insecurity. This distressing circumstance is expected to persist until July 2024. The West Bank of Palestine has witnessed a significant decline in acute food security since 2022, attributed to increased violence, economic challenges, and a spike in unemployment. Yemen continues to face the region's most severe food crisis, with 18 million people (56%) experiencing acute food insecurity. In Syria, the food catastrophe remained as dire as it was in 2022, as the economic situation continued to decline alongside an uptick in conflict, resulting in increased displacement. At the beginning of 2023, Lebanon encountered a deteriorating food crisis compared to 2022, with 42 percent of its assessed population experiencing high levels of acute food

insecurity from January to April, an increase from 37% recorded between September and December 2022, driven by the deteriorating financial predicament and rising food inflation. Funding limitations for relief organizations limited the help available to refugee groups. Analyses of Syrian refugee populations indicate that 69 percent in Egypt, 62 percent in Jordan, and 53 percent in Lebanon are experiencing significant acute food insecurity due to deteriorating economic conditions in these host nations. Approximately 28 percent of Sahrawi refugees in Algeria are dealing with high levels of acute food insecurity. The situation regarding acute food insecurity is less critical for Syrian refugees Iraq and Türkiye as shown in figure 2. (27).

Figure 2

Percentage of population facing high levels of acute food insecurity, 2023



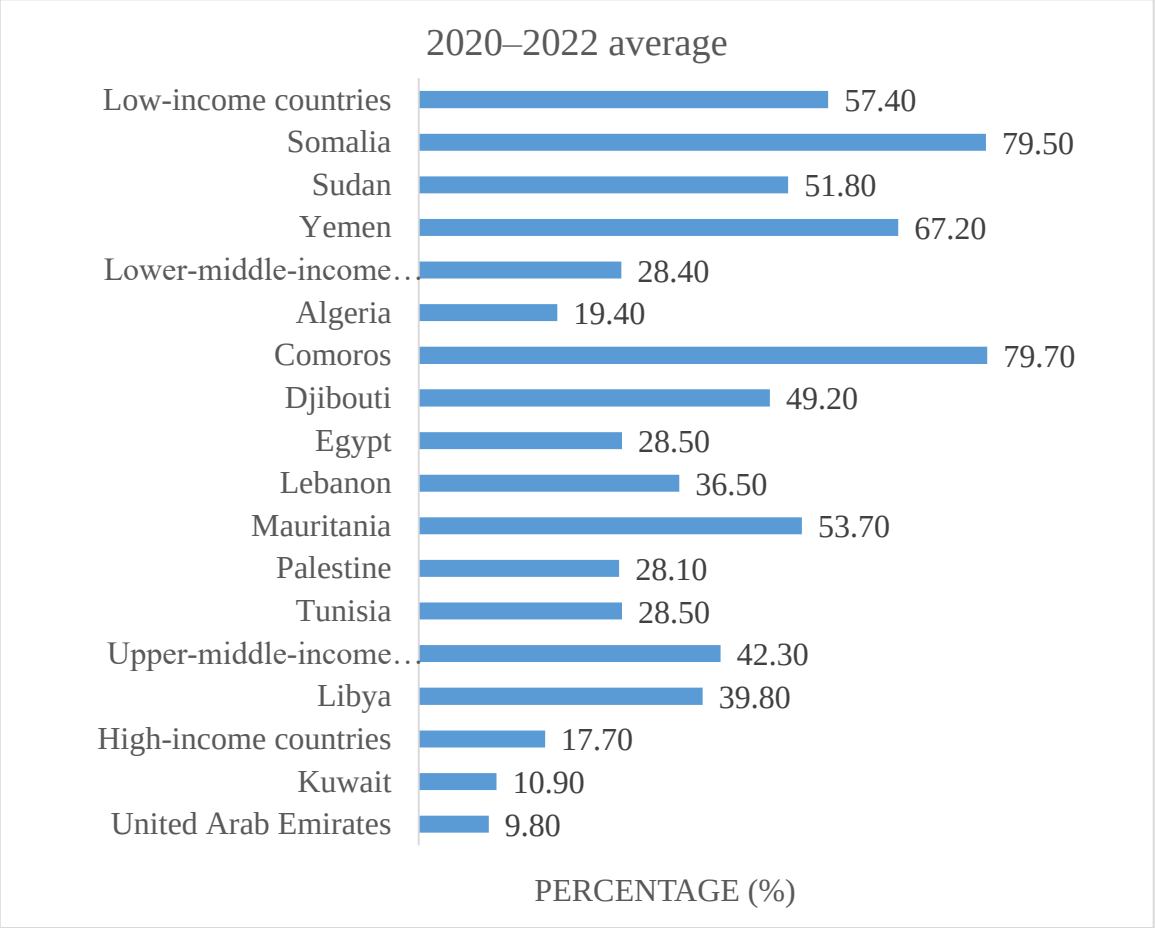
Near East and North Africa-Regional Overview of Food Security and Nutrition in Arab States- 2023 FAO Report

Yemen (67.2 percent) and Somalia (79.5 percent) had incredibly high rates of severe or moderate food insecurity (Figure 3). Conflict, a large number of internally displaced people, and the country's reliance on imported grains due to droughts are the primary causes of food insecurity in Somalia. More than half of Yemen's population, or about 17 million people, suffered from severe acute food insecurity. Beyond conflict, the devaluation of the national currency and high fuel and global food prices are the

primary causes of food insecurity. The prevalence of severe or moderate food insecurity (Figure 3) more than doubled in Mauritania between 2014–2016 and 2020–2022, and it rose sharply in Tunisia, Yemen, and Libya. The economic-social crisis is the main cause of the concerning increase in food insecurity in Lebanon. The three economic impacts of the enormous explosion in the Port of Beirut, COVID-19 epidemic, and the skyrocketing cost of food since the commencement of the Ukraine war have all contributed to the ongoing economic and financial crisis. Food insecurity increased in Tunisia and Morocco as a result of the pandemic. In addition to the severe political and economic crisis the country is going through, three years of drought in Tunis have dried up Tunisia's reservoirs, endangering crops. Since 2022, Morocco has experienced drought. The region is also susceptible to the supply and price shock effects of the conflict in Ukraine because many of the nations in the region rely heavily on foodstuffs and fertilizers that imported from Ukraine and the Russian Federation, notably wheat, a primary grain. High-income nations like the United Arab Emirates (9.8%), Kuwait (10.9%), and Saudi Arabia (16.7%) had the lowest rates of moderate to severe food insecurity in 2020–2022. These nations saw a significant decline in food insecurity from 2014–2016, with Saudi Arabia seeing a 24.4 percent decrease (28).

Figure 3

Prevalence of moderate or severe food insecurity in Arab States by country and subregion



1.3.2.1 Food Insecurity in Households and Its Effect on Nutrition

A study conducted by Negash, Shaleka, and Ashenafi (2022) in Ethiopia that for many years, Northern Ethiopia has experienced periodic droughts and persistent food instability, with newborns and small children being disproportionately affected by foodborne infections and malnutrition. This study looked into the nutritional condition of children under five in Adigrat town, which is in Ethiopia's Tigray region, as well as the degree of food insecurity in homes with low income and their food safety procedures. A total of 342 homes were chosen at random from the town's six parts. There was a cross-sectional study carried out with these households. The situation of food security was estimated using the Household Food Insecurity Access Scale, and the food safety practices—including food handling, personal hygiene, and water sanitation—were evaluated. Anthropometric information was used to assess children under five's nutritional status. The percentage of households with secure food was 2.2%.

Nearly 97% of the participants were unemployed, and all of the participants were moms, with the majority (54%) being over 45. Four or more people were present in about 46% of the homes. To get food, a lot of families had to go door-to-door begging or perform menial labor for others. The majority of households had food insecurity classified as light (26.7%), moderate (27%), or severe (44.3%). Despite having a favorable attitude toward food safety (91.7%), the respondents showed low knowledge and practice about food handling, water sanitation and personal cleanliness (37.6%) (37.1%) respectively. 28.8% of children under five were found to be underweight, 56.6% to be stunted, and 48.3% to be malnourished. Supplemental nourishment is desperately needed for children who are extremely malnourished (14).

A cross-sectional study design centered in a facility was carried out by Tilahun, Kebede, and Ejigu (2021) in Ethiopia, the purpose of this study was to assess pregnant women's food habits and the factors that are related to them. 378 pregnant women participated in a study that took place in a public health facility in Mizan-Aman town, southwest Ethiopia, between March and May of 2021. A technique known as systematic random sampling was employed to pick the participants. A nutrition habits checklist and brief food-frequency questionnaires were used to evaluate dietary practices. Dietary beliefs were evaluated using nine questions. If a participant's score was higher than the median, they were classed as having a favorable attitude; if it was equal to or lower than the median, they were labeled as having an unfavorable attitude. 25.1% of pregnant women reported following a healthy diet overall. The following variables showed significant correlations with practices of good dietary in the multivariate logistic regression analysis: incomes at month of 1000 to 2000 Ethiopian birr and more than 2000 Ethiopian birr; household food security; favorable dietary attitudes; and good dietary knowledge. It was discovered that pregnant ladies had relatively little dietary behaviors. Pregnant women who followed better dietary habits had monthly salaries of at least 2000 birr, had access to television and radio, had strong nutritional knowledge, had household food security, and had favorable dietary attitudes (16).

A cross-sectional study was conducted by El Bilbeisi et al (2022) in Palestine, the purpose of this study was to evaluate the incidence of food insecurity in households and the associations it has with socioeconomic and demographic variables. At 2021, in September, research comprising a sample that is taken representatively of Gaza Strip

households was carried out. The analysis comprised 1,167 randomly selected families from each of the five governorates. The prevalence and severity of household food insecurity were assessed using the Radimer/Cornell food security scale. Using an interview-based questionnaire, data on the socioeconomic and demographic traits of homes were gathered. SPSS version 25 was used for statistical analysis. The overall household prevalence of food insecurity was determined to be 71.5%. By governorate, Gaza had the highest prevalence (30.8%), followed by North Gaza (18.6%), Middle Area (15.2%), Rafah (12.4%), and Khanyounis (23.0%). Regarding food insecurity, there were 333 households (28.5%) that were food secure, 422 households (36.2%) that were mildly food insecure, 161 families (13.8%) that were moderately food insecure, and 251 households (21.5%) that were severely food insecure. With crude odds ratios (CORs) of 2.02, 2.00, 2.36, and 1.14, respectively, significant correlations between food insecurity and the governorate, monthly income, homeownership, and job status were found. According to the study's findings, there is a strong correlation between substandard living conditions and food insecurity in the Gaza Strip (25).

1.3.2.2 Nutrition-Related Knowledge, Attitudes, and Practices (KAP)

In a study conducted by El Bilbeisi et al (2022) in Palestine, the purpose of this study was to investigate the association between dietary consumption and family food insecurity as well as nutrition-related knowledge, attitudes, and practices (KAP) between parents in the Gaza Strip, Palestine, who are 18 years of age and older. Adults (fathers and mothers) who were at least 18 years old took part in the cross-sectional study, which was carried out in 2021. Through the use of a cluster random selection technique, 614 individuals in all of the Gaza Strip's governorates were selected. Nutrition-related KAP was assessed using the Food and Agriculture Organization (FAO) of the United Nations questionnaire (Modules 5, 6, 7, and 9). Standardized procedures and questionnaires were used to gather data on anthropometric measures, nutritional intake, household food security status, and demographic and socioeconomic factors. According to the findings, 28.5% of participants had stable access to food, whereas 71.5% of individuals suffered from household food insecurity. Several sociodemographic variables, anthropometric measurements, energy, protein, carbohydrates and calcium intake, nutrition-related knowledge and attitudes toward vitamin A deficiency and Undernutrition, KAP related to iron deficiency anemia, and attitudes and practices regarding food safety were found to differ significantly between

food-secure and food-insecure households (all P-values < 0.05). In conclusion, high levels of food insecurity in households may be associated with anthropometric measurements, demographic and socioeconomic variables, and inadequate nutritional intake; on the other hand, parents who are 18 years of age and older and who have acceptable nutrition-related KAP may have lower levels of food insecurity (13).

In a cross-sectional study conducted by Sienso, Lyford, and Oldewage-Theron (2022) in Ghana, Health extension and nutrition education encourage healthy lifestyles to increase nutrition, health outcomes, productivity, and economic development. The effect of nutrition education on health and nutrition knowledge, attitudes, and practices (KAP) in Ghana, however, has not received much attention. In Ghana's northern area, this study evaluated the impact of household KAP and health outcomes on access to nutrition information. 504 households in the Northern region participated which provided primary data for the study. Fisher's exact test, Pearson's chi-square tests, and descriptive statistics were used to assess the relationship between maternal KAP and access to nutrition information. Maternal awareness of important nutrition-related topics, including exclusive breastfeeding, infant feeding, and undernutrition prevention, increased with access to nutrition information. This implies that future nutrition education initiatives might need to pay less attention to these regions. Future nutrition interventions should focus on these areas, as evidenced by the low knowledge levels identified on the signs and causes of undernutrition in women and children as well as the prevention of undernutrition in children aged 6-23 months. It is advised to regularly analyze performance to help redirect attention and focus efforts on areas that require improvement (17).

A study conducted by Indris, Shaleka, and Ashenafi (2021) in Ethiopia, this study was carried out in a semi-urban and rural kebele, sought to assess family food security, as well as the nutritional condition of children aged 6 to 23 months and mothers' knowledge, attitudes, and practices (KAP) toward child nutrition. Tehuledere Woreda (district) undertook a community-based cross-sectional study in these locations to evaluate family food security and the nutritional condition of children in this age range. Out of the two kebeles, 245 mother-child pairs were chosen at random. Anthropometric measurements, including weight, height, and age, were taken to assess the children's nutritional status. Z-scores for weight-for-age, weight-for-height, and height-for-age

were then computed. The total level of malnutrition was also evaluated using the Composite Index of Anthropometric Failure. To assess the degree of food security, the Household Food Insecurity Access Scale was used. Mothers' knowledge, attitudes, and behaviors on feeding methods, food diversity, and child nutrition were gathered through structured questionnaires. After that, data were statistically examined. According to the survey, 17% of children in the rural kebele and 7.5% of children in the semi-urban kebele suffered from stunting. The rate of thinness was the same for both kebeles (6%). Compared to the rural kebele (3.6%), the semi-urban kebele had a greater frequency of underweight children (5.2%). In the semi-urban area, 20% of youngsters and 15% of those in the rural area were found to have chronic energy insufficiency. The semi-urban kebele had a greater rate of malnutrition (48%) than the rural kebele (31%). The majority of households were either somewhat (54.4%) or moderately (27.8%) food insecure, with only a small percentage (17.9%) experiencing food insecurity. In semi-urban and rural settings, mothers' average understanding of child nutrition was relatively low (approximately 34% and 37%, respectively). The children's poor anthropometric results may be related to their low food consumption, lack of variety in their diets, and moms' deficient knowledge and application of nutrition. It is advised to spread knowledge about the value of a diverse diet and appropriate child-feeding techniques (18).

The cross-sectional, community-based, study design was conducted by Diddana (2019) in Ethiopia, Undernutrition in mothers is common in settings with minimal resources. The aim of this study was to detect the variables affecting pregnant women's nutritional condition and eating habits in Dessie Town, northeastern Ethiopia. Research involving 604 expectant mothers. Participants were selected using a two-stage sampling procedure. Socio-economic and socio-demographic data were acquired by a standardized, interviewer-administered questionnaire. A standard non-stretchable MUAC tape was used to measure mid-upper arm circumference, and 13 specific questions were used to analyze dietary behaviors. Data were imported into Epi-Info 7 and subsequently exported to SPSS 20 for further examination. Both binary and multiple logistic regression analyses were performed, with the variables included in the multiple logistic regression that had a P-value of less than 0.2 in the bivariate analysis. A 95% confidence interval was used to determine statistical significance for P-values less than 0.05. Of the pregnant women, about 19.5% were undernourished and 54.8%

had poor dietary habits. Being in the first trimester of pregnancy, not being sick in the two weeks before data collection, low self-efficacy, low perceived severity, and low perceived benefits were found to have significant relationships with poor eating behaviors. Undernutrition was found to be substantially correlated with several factors, including low self-efficacy, poor eating practices, insufficient nutritional awareness, a history of illness, and inadequate dietary diversity. Pregnant women's food habits were subpar, which contributed to the comparatively high rate of undernutrition. Poor dietary behaviors were adversely correlated with characteristics like being in the first trimester and not having a medical history, but these practices were positively correlated with self-efficacy, perceived benefits, and an inadequate understanding of the severity of malnutrition. Undernutrition was positively connected with not attending antenatal care, poor dietary diversity, inadequate nutritional understanding, not good dietary behaviors, a history of illness, and low self-esteem. Governments, health extension workers, and other relevant organizations should promote antenatal care attendance, boost maternal health during pregnancy, and provide support to improve nutrition habits and dietary diversity, concentrating on changing attitudes toward dietary behaviors (19).

In a study conducted by Disassa and Ashenafi (2022) in Ethiopia, Foodborne infections can be fatal, especially to elderly or sick family members. It is imperative to have sufficient information, attitudes, and behaviors about food safety to reduce the incidence of these disorders in households. This study looked into the experiences of mothers with outpatient children at Cure Hospital in Addis Ababa, Ethiopia, regarding food insecurity as well as their knowledge, attitudes, and practices (KAP) around food safety. 210 moms were enrolled in the study as a randomly selected sample. A semi-structured questionnaire was used in a cross-sectional manner to collect data on participants' experiences with food insecurity and their knowledge of food safety. With the use of descriptive statistics, data were examined. The majority of respondents (68%), had one or two children under the age of five (71%), were married (68%), and reported making between ETB 500 and ETB 2500 per month (62%). In the previous 30 days, between 70% and 80% of participants reported feeling anxious or unsure about having enough food for household members, as well as a decrease in food quality or quantity. Of them, 58% reported feeling hungry at this time. The majority of mothers (below 60%) lacked an understanding of food safety, including proper food handling, personal cleanliness, and water sanitation. In a similar vein, their actual practices—particularly concerning

food handling and hygiene—as well as their attitudes toward food safety fell short (below 60%) (29).

A study by Weerasekara et al (2020) in Germany, this study intends to assess food and nutrition-related KAP in Sri Lankan women of reproductive age, with a particular emphasis on underprivileged groups. 400 women in these areas, ages 18 to 49, were given a KAP model questionnaire as part of a cross-sectional survey. Data were gathered using a random sampling technique. The results showed that women in the reproductive age range knew very little about nutrition. Although the majority of women were enthusiastic about learning about nutrition, they did not always put their newfound knowledge of healthy eating practices into practice. Furthermore, these women's Body Mass Index (BMI) and household food security were highly influenced by their knowledge, behaviors, and attitudes. A strong positive correlation was found between nutritional knowledge, attitude scores, and BMI levels. Additionally, there were significant differences found in factors like area, family size, age, educational level, income and attitudes toward nutrition and dietary practices among women of reproductive age ($p < 0.01$). These factors were identified through the use of multiple linear regression analysis. The study indicates that KAP significantly influences women's nutrition and household food security, stressing the need for greater nutritional education targeting women in underserved parts of Sri Lanka (30).

A study used a mixed–method approach conducted by Oh Hye-Kyung et al (2019) in Senegal, to provide baseline information for a mother and child nutrition program, this study set out to evaluate the nutritional knowledge, attitudes, and practices (KAP) of nursing women in Senegal and identify factors impacting nutritional practices. Semi-structured interviews with seven stakeholders were combined with structured surveys given to nursing women in Senegal. The questions were on practices, attitudes, and understanding about nutrition. Multiple linear regression analysis, independent t-tests, and Pearson's correlation coefficients were used in the quantitative analysis of data from 171 individuals. Inductive thematic analysis was used to examine the interview data, which covered subjects like obstacles, undernutrition reasons, and the nutritional health of mothers and children. Important variables that were substantially linked to good eating habits (and which accounted for 27.1% of the variance) included being in the highest income quintile (5th quintile) ($B = 1.24$, $p = .014$), having a mother ($B = 0.96$,

p =.017) and having a household head (B = 1.03, p =.015). Inadequate nutrition programs in health centers, gaps in national nutrition policy, low public interest in undernutrition issues, unfavorable economic conditions, and a lack of partnerships—all of which are necessary for long-term solutions—were among the obstacles to effective nutritional management that were brought to light during stakeholder interviews (31).

In a study conducted by Bayked et al (2024) in Ethiopia, progress in lowering maternal malnutrition has lagged behind international standards despite concerted efforts worldwide. This review sought to investigate dietary knowledge, attitudes, and practices (KAP) in the Ethiopian environment. A thorough understanding of KAP and its influencing factors is crucial to developing successful treatments. On January 3, 2024, a search was done on Google Scholar, HINARI, PubMed, and Scopus. The "Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement" and the Joanna Briggs Institute (JBI) tools were utilized to assess bias and organize the review. Stata 17 was used to examine the data, and the Luis Furuya-Kanamori index, sensitivity, and subgroup analyses were used to gauge the degree of certainty. Good dietary practices, a happy attitude, and good dietary knowledge were all aggregated at 48.0%, 47.0%, and 34.0%, respectively. It was discovered that there was a reciprocal linking between knowledge and attitude, and that gynecological and sociodemographic factors affected both. Dietary behaviors were connected with urban residence, food security, knowledge access to nutrition information, attitude, family support, perceived degree of malnutrition, and positive view of dietary advantages. In conclusion, knowledge and positive attitudes were higher than good dietary practices. Sociodemographic elements, income, gynecological health, information, attitudes and intents, decision-making processes, family support, and expectations regarding nutrition consequences and behaviors all had an impact on these practices (32).

1.3.2.3 Nutritional Status and Malnutrition in Vulnerable Groups

A cross-sectional study conducted by Banu et al (2023) in Bangladesh, in the northern part of Bangladesh, this study looks at the variables affecting mother awareness and child nutrition. Rangpur and Rajshahi, two divisions in the northern area, were the subjects of a cross-sectional study. Three districts were chosen at random from each division. To assure clarity, data were gathered from 527 respondents through in-person interviews with questionnaires written in their native tongue. Using weight-for-age,

height-for-age, weight-for-height, and weight-for-height indices, the study evaluated the nutritional status of children. Mothers' nutritional knowledge was assessed using descriptive analysis, and factor analysis was conducted using bivariate logistic analysis. The results show that antenatal care, wealth index, sanitation, mother employment, maternal nutritional knowledge, and education are important factors that influence the nutritional status of children. Additionally, when feeding their children, just thirty percent of the moms (158 out of 527) were cognizant of their child's nutritional state, according to the study. The findings imply that raising women's self-esteem and diversifying diets for both children and women greatly improves the nutritional health of children. Additionally, it suggests that policies like requiring women to complete higher education, educating the public on child nutrition, and discouraging child marriage and early pregnancy can all help to improve the health of both mothers and their offspring(33).

In a study conducted by El Bilbeisi et al (2022) in Palestine, In this study, children under five in the Gaza Strip, Palestine, were asked to rate their household food insecurity and its relationship to dietary intake as well as nutrition-related knowledge, attitudes, and practices (KAP). This cross-sectional survey, which took place in 2021, had a sample of children under five who were representative. Using a cluster random selection technique, 350 kids and their caretakers were chosen from each of the Gaza Strip governorates. A 24-hour dietary recall was performed to assess nutritional consumption, and household food security was measured using the Radimer/Cornell food security scale. Through questionnaires based on interviews, data on anthropometric measurements, demographic-socioeconomic factors, and nutrition-related KAP were gathered. The results demonstrated the high rates of acute undernutrition (30.4%), wasting (9.6%), stunting (32.8%), and mild underweight (30.4%) in children from food-insecure homes. The study found notable distinctions between the food-insecure and food-secure cohorts concerning factors such as weight, height/length, weight-for-age, mid-upper arm circumference z-scores, underweight prevalence, acute undernutrition, and protein, fat, vitamin D, and zinc intake. Continued breastfeeding, adequate nutrition-related knowledge, favorable nutrition-related attitudes, and accomplishment of the minimal dietary diversity score also differed significantly between the groups ($P < 0.05$ for all). Furthermore, 95.2% of food-insecure households did not achieve the required dietary diversity score, 56.0% of them had

unfavorable attitudes, and 77.6% of them lacked sufficient information about nutrition. In summary, there was a high prevalence of moderate underweight, stunting, wasting, and acute undernutrition among children from food-insecure households. Low economic level, poor dietary consumption, insufficient KAP connected to nutrition, and a lack of dietary diversity might all be contributing factors (34).

1.3.2.4 Economic and Sociodemographic Factors Affecting Nutrition

In a descriptive-analytical study conducted by Karajibani and Montazerifar (2018) in Iran, the drive of this study was to enhance households' nutritional status by empowering, encouraging, and supporting them in using their knowledge of nutrition. In this descriptive-analytical study, 188 families in the southeast Iranian city of Zahedan were randomly selected from four areas that were designated as the population lab. Given that mothers are typically the major carers in families, they were the target population. The participants had one-on-one teaching sessions with nutrition experts. Before and after the intervention, which consisted of three specially designed educational sessions for each location, pre-and post-tests were given. Participants' knowledge (15 questions) and practices (10 items) were evaluated by the questionnaire. After calculating the sum of the knowledge and practice scores, individuals were categorized as weak, medium, or good. There was a significance threshold of $P < 0.05$. The mean knowledge scores increased from 6.5 ± 2.7 before the intervention to 8.6 ± 3.0 afterward ($P = 0.0001$). Mothers' expertise and variables like age and household size were significantly correlated ($P < 0.01$). Before the intervention, the participants' knowledge was divided into three categories: medium (43%), good (12%), and weak (55%). Following the intervention, these percentages were 21.5%, 51%, and 27.5%, in that order. The results point to the possibility of enhancing home dietary practices through the implementation of supplemental, interactive, and advisory programs (35).

A cross-sectional, descriptive-analytical study conducted by Yeganeh et al (2018) in Iran, using anthropometric measures, the current study, carried out in 2016, sought to assess mothers' attitudes and knowledge of food security in Bushehr, Iran. Four hundred mothers of children between the ages of one and two years in Bushehr, Iran, participated in this cross-sectional descriptive-analytical study. The moms completed a 26-item attitude questionnaire (CVI = 0.94, CVR = 0.91, reliability = 0.76), a 16-item Radimer/Cornell questionnaire, and a knowledge questionnaire of 20-item (CVR = 0.95,

CVI = 0.95, reliability = 0.7). The children's anthropometric measurements, such as height for age, weight for age, and weight for height, were evaluated using the World Health Organization's z-score criteria. Regarding complementary feeding, a strong and positive association was discovered between mothers' views and knowledge as well as between knowledge and household food security. Of the youngsters surveyed, almost 26% were deemed to be at risk of being overweight or obese. Furthermore, a significant correlation was found between mothers' lack of knowledge and the children's weight-for-height and height-for-age measurements. Furthermore, a negative attitude of the mothers was linked to the weight-for-height index. The results indicate that household food security, as opposed to the food security of a single child, is largely correlated with knowledge of food security. Although a mother's knowledge is a good thing, it doesn't seem to be enough to assist a child's food security when there is hunger and limited access to food due to household food poverty. Additionally, there is a connection between a higher risk of obesity with both low awareness and unfavorable attitudes toward food security. Mothers' incorrect habits may have an impact on weight gain in addition to their knowledge and attitudes. It is advised that this topic be investigated further (36).

In a study conducted by Beitze et al (2024) in Germany, several individual and environmental factors, including food availability, price, knowledge, and dietary consumption, have an impact on maternal nutrition. The drive of this cross-sectional study was to estimate the knowledge, attitudes, and practices of nursing women in the Bukavu region of the Democratic Republic of the Congo about nutrition and their relationships with hemoglobin concentration. In total, 444 nursing moms took part in the study and questionnaires with a score range of 0 to 1 were used to assess their behaviors and knowledge of nutrition. A 24-hour dietary recall was used to generate the Dietary Diversity Score (DDS), which has a potential range of 0 to 10. Attitudes and factors influencing food choices were also evaluated. The levels of hemoglobin (Hb) in mothers and their babies were assessed. The results showed that 74.3% of infants aged 3 to 8 months and 28.2% of moms suffered from anemia. With a median DDS of 3.0 and a total knowledge score of 0.39, the mothers' dietary behaviors and understanding were lacking. The DDS did not significantly connect with either knowledge or hemoglobin, although there were modest positive relationships between maternal knowledge and hemoglobin levels. Less than half of the moms could provide evidence to support their

fears, even though over half of them indicated concern about their vulnerability to anemia (56.4%) and vitamin A insufficiency (47.4%) (40.9% and 44.2%, respectively). Taste (68.1%), appearance (42.5%), availability (29.0%), and perceived health effects (25.6%) were the main determinants of meal choices. In summary, initiatives for nutrition education must be implemented in addition to treatments aimed at addressing the different impacting factors (37).

1.3.3 Summary

Food deprivation, a lack of vital nutrients, inadequate dietary information, and overall poor nutrition are the hallmarks of food insecurity, a serious public health concern that affects a large number of people (22). Since 2014, there has been an increase in the prevalence of moderate to severe food insecurity worldwide. In 2020, 928 million people that is about 12% of the world's population, experienced extreme food insecurity, up 148 million from the previous year (38). Due to high expenses and economic inequities, around 3 billion people in 2019—mostly from low-income backgrounds—could not obtain healthy foods (4).

A cross-sectional survey conducted in the Gaza Strip by El Belbeisi et al. revealed a prevalence of household food insecurity of 71.5% (13). Food insecurity and malnutrition are made worse by several variables, including war, climate change, and economic downturns (4). Food security, which includes availability, access, usage, and stability, is the state in which all people consistently have access to enough safe and nourishing food for a healthy existence (6).

Studies reveal a robust correlation between food instability and shortages in micronutrients, namely iron, which can result in anemia. Anemia affected about 30% of women worldwide between the ages of 15 and 49 in 2019; the Eastern Mediterranean region had an estimated 32.4% of cases (20). Understanding nutrition is essential for encouraging a healthy diet and has a big impact on what people choose to eat (39).

Assessing individuals' knowledge, attitudes, and practices (KAP) connected to nutrition provides valuable insights into dietary patterns. For conducting KAP surveys, the Food and Agriculture Organization provides a reference guide with modules covering several nutrition themes such as iron deficiency anemia (40). Given the deteriorating circumstances, it is imperative to assess household food insecurity in Palestine and its

associations with nutritional status, dietary consumption, and KAP in connection to iron deficiency anemia (IDA). Policymakers, academics, and program officers need these kinds of data to improve food security actions and policies.

1.4 Problem Statement

The food security and Nutrition in the World Report of WHO, 2019, shows for the first time that a large number of individuals worldwide, even those who are not hungry, suffer from mild food insecurity due to uncertainty about their capacity to receive food and pressure to make dietary compromises regarding quantity and/or quality(41). This phenomenon of food insecurity is seen around the world, not just in nations with high incomes but also in low- and middle-income nations. El Bilbeisi et al. in their study in Gaza demonstrate that food insecurity is very high dominant in the Gaza Strip, Palestine (12). In addition, the socioeconomic and demographic status, poor dietary intake and anthropometric measurements may have an association with increased levels of household food insecurity. This important study emphasizes that the nutrition-related KAP of iron deficiency anemia (IDA) had statistically significant differences between household food-secured and household food-insecure participants. Additionally, the participants from food-insecure households similarly have lower intakes of iron than the food secured counterparts (13). The results reflect and give an image of the possible situation in the West Bank since the culture and socioeconomic status have multiple common factors. Studies looking at these connections in Palestine are notably lacking.

1.5 Significance of the study

This study determined the food insecurity status in Palestine. Studies examining these connections in Palestine are conspicuously lacking. Consequently, the existing study concerns the food insecurity and its association with nutritional status and nutrition-related KAP among mothers aged ≥18 years in the West Bank- Palestine. Mothers are considered the backbone of the whole family health life and nutrition choices, so it is essential to study the nutrition-related KAP among mothers about Iron deficiency anemia which is a great risk to her wellbeing and health especially in situations of food insecurity household status that often increase the anemia risk. In addition, Policymakers ought to keep focusing their resources and efforts on the projects that work best together and detect where the field that need intervention for reducing Iron deficiency anemia and food insecurity in Palestine.

1.6 Study Objective

1.6.1 General Objective

The purpose of this study is to examine the association between household food insecurity and nutritional status and nutrition-related knowledge, attitudes, and practices (KAP) among mothers aged ≥ 18 years in the West Bank, Palestine.

1.6.2 Specific Objective

1. To study the household food insecurity prevalence in the West Bank, Palestine
2. Evaluate the nutritional status of mothers aged ≥ 18 years
3. To make assessment of the nutrition-related KAP of the mothers, using the FAO of the United Nations questionnaire (Module 6: IDA) using (FAO 2014).
4. To assess the relationship between household food insecurity and nutritional status as well as nutrition-related knowledge, attitudes, and practices among mothers ≥18 in West Bank, Palestine.

1.7 Study Question

1. What is the level of household food insecurity in the West Bank, Palestine?
2. What is the BMI of mothers aged ≥ 18 years?
3. What is the nutritional status assessment by using two days of 24-hour diet recall to calculate the number of macronutrients and micronutrients?
4. What is the mothers nutrition-related KAP, by applying the questionnaire of the FAO of the United Nations (Module 6: IDA) using (FAO 2014)?
5. What is the relationship between household food insecurity and nutritional status as well as nutrition-related knowledge, attitudes, and practices among mothers ≥18 in West Bank, Palestine?

1.8 Study Hypothesis

1. A high percentage of Households in Palestine have food insecurity status.
2. There is a strong association between the status of household food security and the participants demographic and socioeconomic characteristics, as well as their nutritional status, anthropometric measurements, and overall health.
3. Among Palestinian mothers aged 18 and older, nutrition-related knowledge, attitudes, and practices about iron deficiency anemia are associated with their household food security status.

1.9 Study Variables

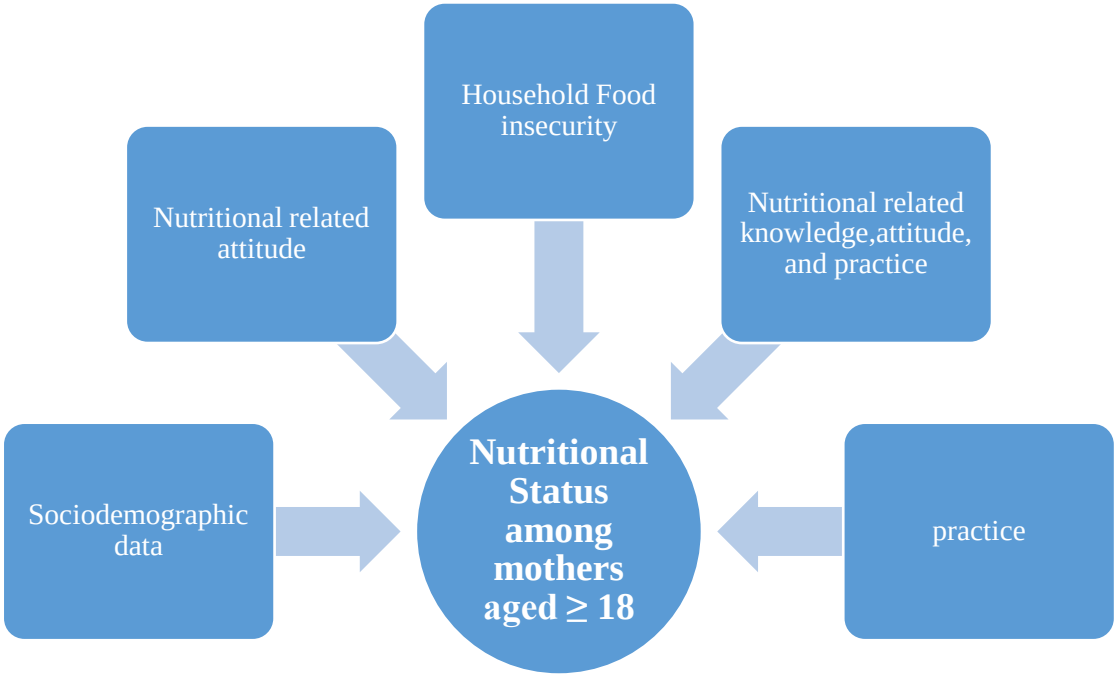
1.9.1 Dependent Variable

Nutritional Status among mothers aged ≥ 18

1.9.2 Independent Variables

Household Food insecurity, Nutritional related knowledge, Nutritional related attitude, Nutritional-related practice, Sociodemographic data (Mother age, educational level, household income, employment status, household size, place of residence, marital status, health status).

1.10 Variables Framework



1.11 Conceptual Definition

1. **Household Food insecurity**: When a household lacks the financial or other resources to purchase enough food to meet the nutritional needs of every member, it is said to be experiencing household food insecurity. It can range from less certain circumstances like food scarcity, hunger, or malnutrition to more serious ones like doubt about the future availability of food (14).

2. **Nutritional status of mothers**: The term "nutritional status" describes how a person's intake and utilization of nutrients affect their overall health. It indicates whether a person consumes enough nutrients in their diet to keep their body in good condition and avoid obesity, undernutrition, or malnutrition. On the other hand, anthropometrics that is body measurements of weight and length and BMI(42).

3. **Nutritional related knowledge**: A person's awareness and comprehension of the fundamentals of nutrition, such as food groups, dietary standards, the value of balanced meals, and the nutritional requirements during various life stages, such as pregnancy and lactation, are referred to as their nutrition-related knowledge (43).

4. **Nutritional-related attitude**: The term "attitudes" describes a person's convictions, perspectives, and state of mind regarding the value of good nutrition and eating habits for themselves and their families. Healthy dietary choices and habits are linked to positive attitudes regarding nutrition (18).

5. **Nutritional-related practice**: The actual acts or behaviors people do about the selection, preparation, and consumption of food are referred to as nutrition-related practices. This covers the mother's food preferences, how she prepares her meals, how she breastfeeds her child, and other related behaviors (19).

1.12 Operational Definition

1. **Household Food insecurity**: A validated scale, such as the Radimer/Cornell Food Insecurity Scale, which evaluates multiple aspects of food security, such as the availability, accessibility, and adequacy of food within the household, were used to measure household food insecurity in this study. The scale classifies households based on responses indicating levels of food security, insecurity (44).

2. **Nutritional status of mothers**: We'll use the following to evaluate nutritional status:

Weight (kg) divided by height (m2) yields the body mass index (BMI)(45) according to the following categories:

- Underweight (BMI < 18.5).
- Weight normal (BMI 18.5–24.9)
- Overweight (BMI range of 25–29.9)
- Obesity (BMI ≥ 30.0)

3. **Nutritional knowledge attitude and practice: it is done using FAO module no 6 which is about iron deficiency anemia,** this assesses people's knowledge, attitudes, and actions on iron deficiency anemia. It encompasses understanding iron-rich foods and the variables that affect iron absorption, perspectives on the significance of preventing anemia, and dietary habits such as eating foods high in iron and supplementing with other nutrients to increase iron consumption(40)

Chapter Two

Methods

2.1 Study design

A cross-sectional design was used in the current study. The target goal to assess household food insecurity and nutritional status and nutrition-related knowledge, attitudes, and practice among mothers aged ≥ 18 years.

2.2 Study Sitting

The current study was conducted in households in West Bank / Palestine. The estimated population of the West Bank is about 3.19 million in mid-2022, according to Palestinian Central Bureau of Statistics (46). West Bank is divided into 11 governorates (Nablus, Qalqilya, Tubas, Salfit, Tulkarm, Jenin, Jericho and the Jordan Valley, Ramallah and al-Bireh, Bethlehem, Hebron and Jerusalem) (47).

2.3 Study Population

The target population in the households living in the West Bank is mothers aged ≥ 18 years.

2.4 Sample and Sampling

The study depended on the Area Sampling Frame. In addition, this frame contains all the Palestinian localities or Enumeration Areas according to the last Census in Palestine (47). The study considered these localities to be primary sampling units.

To improve the representativeness of the sample, stratification was made by dividing the primary sampling units (localities) according to the following:

1. Region: North, Middle, and South of the West Bank.
2. Locality Type: Urban, Rural, Refugee Camps.

2.5 Inclusion Criteria

1. Mothers who are at least 18 years old.
2. People who live in Palestine- West Bank.

3. A readiness to take part in the research.

2.6 Exclusion Criteria

1. Mothers who suffer from serious chronic illnesses that impact their nutritional health, such as advanced cancer or renal failure.
2. Either transient guests or non-residents.
3. Pregnant women who are at 2nd trimester or more.

2.7 Sample size

The sample size was estimated by the following equation:

$$n = \frac{t^2 * S^2 * (1 + nr\%) * Deff}{E^2} \qquad S^2 = p(1-p) \tag{2.1}$$

Where:

n: Total sample size

t: Confidence level factor = 1.96 for confidence interval 95%

S^2 :Variance, which is calculated for the main variable of interest

p: the main variable of interest, (*P* =25%) The prevalence of household food insecurity in the West Bank was (World Food Program, 2021).

Deff: design effect because of using the cluster sample and it is supposed to equal 1.15

nr: non-response rate = 10%.

E: margin of error, which is around 2.5 %

The Total Sample size = 720 Households.

2.8 Sample allocation

The sample allocation by the main strata was depending on the distribution of the households as shown in table1.

Table 1

Distribution of the governorates proportionally (approximately)

Governorate	sample Percent	Households sample
North of the West Bank	37.1%	267
Middle of the West Bank	28.6%	206
South of the West Bank	34.3%	247
Total of the West Bank	100.0%	720

In each Region that has more than two governorates, we selected randomly only two governorates.

Therefore, we had the following sample appear in table 2:

Table 2

Selected Randomly Sample

Governorate	sample Percent	Households sample
Jenin	15.0%	108
Nablus	22.1%	159
North of the West Bank	37.1%	267
Ramallah & Albireh	19.3%	139
Jerusalem	9.3%	67
Middle of the West Bank	28.6%	206
Bethlehem	10.7%	77
Hebron	23.6%	170
South of the West Bank	34.3%	247
Total of the West Bank	100.0%	720

2.9 Sample Type and Approach

The sample type is three stages stratified cluster sample as follows:

1. In the First stage:

The sample of localities was selected (or enumeration areas) covering all the strata (Region, locality types).

2. In the Second stage:

About 20 to 40 households were enumerated in each locality selected in the first stage (using the random walk technique)

3. In the Third stage:

The eligible individual was selected in the household selected in the second stage.

2.10 Data Collection Procedure

2.10.1 Research tools and instruments

Interview questionnaire: Sixteen trained research assistants (interviewers) made house visits to collect all pertinent research information through face-to-face interviews, Individual interviews were done with mothers aged ≥18. The questionnaire consisted of items on the demographic and socioeconomic characteristics of the households, along with the participants nutritional status (dietary intakes and anthropometric measures). In addition to nutrition-related knowledge, attitudes, and practices. The questionnaire items are organized as illustrated in Table 3.

Table 3

The sections of the questionnaire

No.	The mother aged ≥ 18
1.	Household socio-economic and demographic status
2.	Radimer/Cornell Household Food Security questionnaire
3.	Dietary intake recall (24-hour dietary recalls for two days)
4.	Nutritional status (Body mass index)
5.	Knowledge, attitude, and practice (KAP): -Iron deficiency anemia, (Module no. 6)

1. **Socioeconomic and demographic characteristics**: Mothers were interviewed for information such as their age, education, occupation, income, the number of family members, home ownership, food aids received from government or non-government agencies.

2. **Household food insecurity measurement**: Household food insecurity was assessed at the household level using the 10-item Radimer/Cornell hunger scale(44). The household food insecurity construct examines food quantity, food quality and food anxiety. The scale a reliable and valid tool for measuring household food insecurity in a diverse cultural setting. Based on their level of food security, the families were divided into the following groups : 1) Household food secured: Negative answers to all hunger and food insecurity questions; 2) Household food insecured: Positive answers to one or more hunger and food insecurity questions ('sometimes true' or 'often true') (44).

3. **Nutritional assessment- Dietary intake recall** Dietary intake recall, Two days of 24-hour diet recall were utilized to determine the quantity of macronutrients and micronutrients consumed by all participants. Mothers were requested to recall all beverages and food consumed in the past 24 hours. The portion sizes were estimated using a set of household measurements (i.e. plates, cups, glasses, and spoons) using AL-QUDS university food atlas. Dietary data from the 24-hour diet recalls were processed by hand (office work) to calculate the net grams of foods consumed by participants and this information was analyzed using the AL-QUDS university nutrition-data base to determine nutrient and energy intakes (i.e. protein,fat, carbohydrate, iron).

4. **Nutritional assessment- Anthropometric measurements**

4.1 **Height**: The mother heights were measured following the standard procedures specified by the World Health Organization, using a portable SECA body meter with a horizontal headboard attachment. The vertical distance between the standing surface and the top measurement repeated twice to a precision of 0.1 cm, and a mean value was calculated (48).

4.2 **Weight**: A SECA digital weighing scale was used to have measurement of the weight to the nearest 0.1 kg. The women were asked to remove their all heavy clothing, shoes and socks. The two measurements average was used for the analyses(48).

4.3 **Body mass index**: Body Mass Index (BMI) was calculated using the women's weight and height as weight in (kg)/(height in (m))². At that time, the women who participated were sectioned according to the classifications of World Health Organization into the various BMI categories : BMI: < 18.5 kg/m2 (underweight); BMI: 18.5–24.9 kg/m2 (normal weight); BMI: 25–29.9 kg/m2 (overweight); and BMI: ≥30 kg/m2 (obese)(49).

5. **Nutrition-related Knowledge, Attitudes, and Practices (KAP):** The nutrition-related knowledge, attitudes, and practices questionnaire that was developed by the Food and Agriculture Organization of the United Nations (FAO) in 2014 was modified and used in the present study. The nutrition-related KAP (Module 6: IDA) consists of eight questions related to knowledge (question 1: general signs of IDA; question 2: consequences of IDA for infants and young children; question 3: consequences of IDA for pregnant women; question 4: causes of IDA; question 5: prevention of anemia; question 6: iron-rich foods - easily absorbed; question 7: foods that increase iron absorption; and question 8: foods that decrease iron absorption); six-questions related to attitudes [attitudes towards IDA (question 1: perceived susceptibility, and question 2: perceived severity); attitudes towards preparing meals with iron-rich foods (question 3: perceived benefits, question 4: perceived barriers, and question 5: self-confidence); and question 6: attitudes towards food preferences]; and three-questions related to practices (question 1: food-intake practices; question 2: consumption of vitamin-C-rich fruits; and question 3: consumption of coffee/ tea). (40, 50).

2.11 Statistical Analysis Methods

The Statistical Package for Social Science (SPSS) for Windows (version 25) was used for data analysis. Descriptive statistics were used to describe continuous and categorical data including the prevalence of food insecurity. A chi-square test and was used to examine the association between household food insecurity and the nutritional status of participants and nutrition-related knowledge, attitudes, and practices among participants.

Chapter Three

Results

3.1 Introduction

The study's findings are presented in the results chapter, which focuses on the connections between several aspects of nutrition, health knowledge, attitudes, behaviors, and the state of food security. To investigate important factors such as dietary intake, nutritional status, and the knowledge, attitudes, and practices (KAP) around iron-deficiency anemia (IDA), data from 720 participants who were divided into groups that were food-secure and those who were food-insecure is analyzed.

The demographics of the study population are described first in this chapter, which is followed by a thorough examination of the relationships amid food security and the dietary practices, perceived risks, and IDA awareness of the participants. To shed light on how food security affects people's knowledge, attitudes, and behaviors linked to nutrition, it is intended to draw attention to notable distinctions or similarities between homes that are food secure and those that are not.

This chapter's analysis of the data highlights possible gaps in nutrition habits and understanding, especially about food poverty, and how they could affect the population's overall nutritional status and health effects. To give a thorough grasp of the connection between nutrition-related parameters and food security, the findings are examined within the framework of the larger body of literature.

3.2 Socio-economic and demographic characteristics

In table 4, a thorough profile of the population may be obtained from the socioeconomic and demographic traits of the 720 West Bank households that were polled. With an average age of 39.2 years (range 18-87, SD = 13.4), participants' ages vary greatly. Just 6.7% of the population is over 60, with the majority (54.0%) being under 40 and 39.3% being between 40 and 60. According to this distribution, the majority of participants are actively employed, which could have an impact on the financial strains that these families especially those with dependents face.

Regarding education, a sizable percentage of household mothers have completed higher education. 11.5% only have an elementary education, 24.7% have finished secondary school, and the majority (62.6%) have university degrees. The percentage of illiterate mothers is under 1.1%. Higher education is frequently linked to better access to resources and more stable employment possibilities, making these educational levels a good indicator of the households' economic potential.

The households are dispersed geographically over the West Bank's three primary regions. The northern region is home to the biggest percentage (42.8%), followed by the southern region (34.7%) and the central or middle region (22.5%). Food security may be impacted by these geographic boundaries, which may be a reflection of variations in regional economic circumstances, agricultural production, and job prospects.

In terms of locale type, 36.0% of the households live in villages, 9.4% are in refugee camps, and more over half (54.6%) are in metropolitan areas, especially cities. Although cities often provide easier access to jobs, services, and markets, they might also have greater living expenses, which makes food insecurity more likely to affect lower-income households. Families in refugee camps, on the other hand, frequently face more socioeconomic difficulties, which can make food insecurity worse.

With a mean family size of 4.4 (SD = 2.0, range 1–12), many households may experience additional financial strains that come with having larger families.

Although there is variation in income levels, the majority of households (33.8%) make between 3001 and 5000 NIS per month. Additional income groups include 24.0% earning over 5000 NIS and 27.6% earning between 2001 and 3000 NIS. Nonetheless, 12.1% of households make between 1000 and 2000 NIS and a tiny percentage (2.5%) make less than 1000 NIS. According to these results, a sizeable section of the populace has poor incomes, which can greatly exacerbate food insecurity.

Food insecurity is more likely to be associated with economic access than with reliance on outside aid, as evidenced by the fact that the majority of households (94.4%) do not receive food aid. The fact that only 5.6% of households receive food aid indicates that most do not rely significantly on outside sources to satisfy their food needs. Finally, the percentage of rented households (12.2%) may indicate extra financial strains that could

lead to food insecurity, whereas 87.8% own their homes, which may be a sign of economic stability.

Table 4

Socio-Economic and Demographic Characteristics of the Households (n=720)

Characteristics	Number (%)	Mean (SD), Range
Age		39.2 (13.4), 18-87
less than 40 years	389(54.0)	
40- 60 years	283(39.3)	
more than 60 years	48(6.7)	
Education level		
Illiterate	8(1.1)	
Primary	83(11.5)	
Secondary	178(24.7)	
University	451(62.6)	
Area of the West Bank		
South	250(34.7)	
Middle	162(22.5)	
North	308(42.8)	
Locality type		
City	393(54.6)	
Village	259(36.0)	
Camp	68(9.4)	
Number of family members		4.4(2.0), 1-12
Family income (NIS)		
Below 1000	18(2.5)	
1000-2000	87(12.1)	
2001-3000	199(27.6)	
3001-5000	243(33.8)	
Above 5000	173(24.0)	
Food aid		
Yes	40(5.6)	
No	680(94.4)	
Home ownership		
Owned	632(87.8)	
Rented	88(12.2)	

3.3 Nutritional status assessment of the mothers

The population's nutritional status can be inferred from the anthropometric measurements of the 720 homes. The average BMI of the household members is 27.3 (SD = 5.8), which is a comparatively high average BMI for the entire population. A considerable percentage of people are classified as overweight or obese, according to

the BMI distribution. In particular, 27.9% of people are considered fat, while 33.6% are overweight.

These results point to a significant prevalence of overweight in the homes, which may be a sign of sedentary lifestyles or poor eating habits. Conversely, a lower proportion of people are either underweight (1.5%) or normal weight (36.9%), suggesting that both undernutrition and overnutrition are prevalent in the community as shown in table 5. This wide range of BMI classifications emphasizes the necessity of public health initiatives that target both extremes, especially when it comes to preventing obesity and promoting a healthy diet.

Table 5

Anthropometric measures of the Households (n=720)

Anthropometric measures	n(%)	Mean (SD)
BMI		27.3(5.8)
Underweight	11(1.5)	
Normal	266(36.9)	
Overweight	242(33.6)	
Obese	201(27.9)	

In addition, table 6 shows the energy, macro-and micronutrient intakes among the study participants. The results indicated that mothers ≥18 years had mean of energy (kcal) (1947.2 ±470.2) that is very close to the Recommended Dietary Allowances for females≥ 18(51), protein (gram) (74.3 ± 25.2), carbohydrate (gram) (263.0 ± 78.6) which is about the double of the RDAs recommended for females aged 18 and more(51), fat (gram) (69.2 ± 25.5), iron (mg) (12.6 ± 7.6) that is less than the recommended RDAs for women more than 18-50(51)as shown in figure (4).

Figure 4

Percentage of dietary intake /RDAs

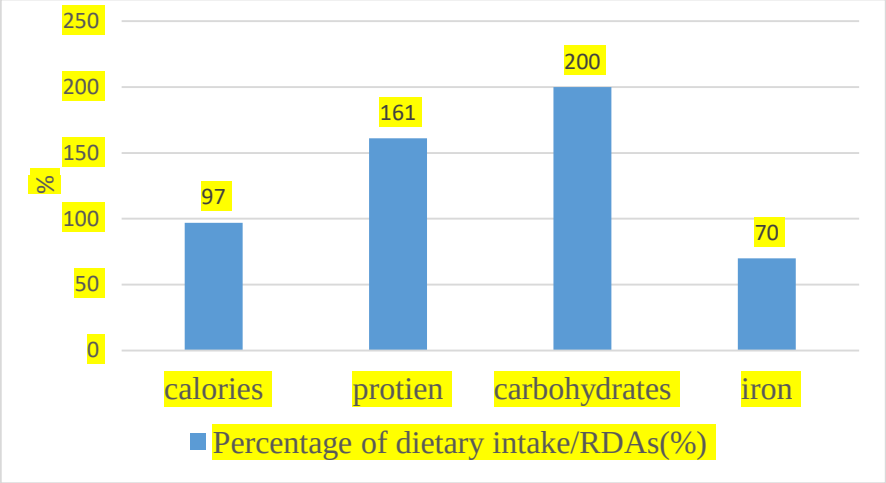


Table 6

Dietary intake of the household mothers

Variables	Mean (SD)	RDAs*	Percentage of dietary intake/RDAs (%)
1. Calories	1947.2(470.2)	2000 kcal	97
2. Protein	74.3(25.2)	46 mg	161
3.Carbohydrates	263.0(78.6)	130 mg	200
4.Fat	69.2(25.5)	n.d	
5. Iron	12.6(7.6)	18 mg	70

3.4 Radimer/Cornell Hunger and Food Insecurity

The Radimer/Cornell Hunger and Food Insecurity paradigm is used to analyze hunger and food insecurity in Table 7. The information shows different levels of food insecurity among the population and is based on responses from both households and individuals.

Most respondents expressed no worries about running out of food or the supplies needed to cook at the household level. In particular, 88.5% of families reported that food or raw materials purchased for the household do not run out quickly and that they do not lack the cash to replenish them, and 79.2% of homes have no worries about food running out before they have enough money to buy more. Additionally, 86.0% of households reported no need for eating the same meals for numerous days due to a lack of resources, and 90.0% of households reported having enough food to prepare meals consistently.

At the individual adult level, food security was very noticeable, with 95.8% of adults reporting never went hungry because they did not have enough money for food, and 94.3% of adults never being unable to eat enough because of financial limitations. Due to a shortage of funds, a significant portion (95.0%) also reported never eating less than they believed was essential.

In terms of food insecurity at the individual child level, 92.5% of mothers said they were never unable to give their kids a complete meal because of financial limitations, and 94.9% reported that their kids never lacked food. Additionally, 96.3% of respondents never had to deal with their kids being hungry due to insufficient funds.

Based on these responses, the following categories were created to represent the severity of food insecurity as in table 8:

- Households that reported food security at all comprised 86.9% of the total.
- 8.3% of households experienced household food insecurity (mild food insecurity), which is defined as food insecurity at the household level but not at the person or child level.

- 1.4% of families had adults who reported food insecurity but no children, indicating individual food insecurity (moderate food insecurity).

- 3.3% of households experienced extreme food insecurity, or child hunger, where children's access to food was severely limited.

While 13.1% of households faced some level of food insecurity, 86.9% of studied households were categorized as food secure overall. These results highlight how common food insecurity is, especially when it comes to children's access to sufficient food and resources. The significant percentage of households that are food insecure emphasizes the necessity of focused interventions and assistance, particularly for families that are at risk.

Table 7

Radimer/Cornell Hunger and Food Insecurity

No.	Question	Not True n (%)	Sometimes True n (%)	Always True n (%)
	A. Household level			
1.	I worry that if the food or raw materials for cooking will run out before I could have more money to buy food.	570(79.2)	132(18.3)	18(2.5)
2.	Food or raw materials for cooking that I bought for my family at home is always run out fast and I do not have the money to buy food again.	637(88.5)	77(10.7)	6(0.8)
3.	I do not have enough food or raw materials to cook or prepare a family meal (for the tomb of the morning, noon or night) and I did not have enough money to buy food.	648(90.0)	68(9.4)	4(0.6)
4.	We eat the same thing for several days in a row because we only have a few different kinds of food on hand and do not have money to buy more.	619(86.0)	93(12.9)	8(1.1)
	B. Individual level (Adult)			
5.	I was not able to eat properly or eat to satiety because I do not have enough money to buy food.	679(94.3)	41(5.7)	0(0.0)
6.	I am often hungry but I do not eat because I do not have enough money to buy food.	690(95.8)	30(4.2)	0(0.0)
7.	I only eat less than I think I should eat because I do not have enough money to buy food.	684(95.0)	35(4.9)	1(0.1)
	C. Individual level (Child)			
8.	I am not able to provide a balanced meal to my children because I do not have enough money to provide food.	666(92.5)	52(7.2)	2(0.3)
9.	My children do not eat enough or always lack of food because I am not able to buy enough food.	683(94.9)	36(5.0)	1(0.1)
10.	I know sometimes my children are hungry, but I cannot do anything because I am not able to buy food in excess of what I always buy	693(96.3)	25(3.5)	2(0.3)

To classify the households and the individuals by severity of food insecurity(52), we did as follows:

- Food secure: negative answers (not true) to all hunger and food insecurity items
- Household food insecure (mild food insecurity): positive answers ('sometimes true' or 'often true') to one or more household-level item(s) (1-4) but not to adult or child-level items.
- Individual food insecure (moderate food insecurity): Positive answers to one or more adult-level item(s) (5-7) or the item about the quality of children's diet (8), but not to items about the quantity of children's intake (9-10).
- Child hunger (severe food insecurity): Positive answers to items about the quantity of children's intake (9-10).

Table 8

Classification of households according to food security status and household food insecurity levels in Palestine

	Levels of household food insecurity	Frequency	%
1	Household food secure	626	86.9
2	Household food insecure (mild food insecurity)	60	8.3
3	Individual food insecure (moderate food insecurity)	10	1.4
4	Child hunger (severe food insecurity)	24	3.3
	Overall food security status	Frequency	%
1	Food secure	626	86.9
2	Food insecure	94	13.1

3.5 Associations between food insecurity and main household characteristics

Significant variations in food security according to different socioeconomic categories are revealed in Table 9, which looks at the relationships between food insecurity and important household characteristics.

Age: Age and food security were significantly correlated ($X2 = 10.144$, $p = 0.006$). While only 40.4% of food-insecure households under 40, this age group accounted for most food-secure households (56.1%). On the other hand, the food-insecure families were more likely to be between the ages of 40 and 60 (54.3%) than those of food-secure households (37.1%).

Education level: Food security and education level were strongly correlated (X2 = 28.762, p = 0.000). Compared to just 10.4% of food-secure households, a larger percentage of food-insecure households had lower levels of education, with 25.5% of food-insecure mothers being illiterate or having only completed primary school. Just 41.5% of households experiencing food insecurity had attained a university degree, compared to 65.8% of households experiencing food security.

West Bank Area: Food security varied significantly by geographic region as well (X2 = 8.378, p = 0.015). Compared to 33.1% of food-secure households, a larger percentage of food-insecure households (45.7%) lived un the South. On the other hand, food insecurity was less common in the Middle and North.

Another important factor affecting food security was locality type (X2 = 16.189, p = 0.000). Compared to households in villages (35.7%) or camps (7.8%), urban households had a higher likelihood of being food secure (56.4%). Nonetheless, the largest percentage of food insecure households among all neighborhood types was found in cities (42.6%).

Family income: There was a significant correlation between food security and income level (X2 = 121.348, p = 0.000). Compared to just 1.6% of food-secure homes, a sizable portion of food-insecure households had lower incomes, with 8.5% making less than 1000 NIS. The percentage of households experiencing food insecurity declined as income rose. Compared to 27.2% of households with incomes over 5000 NIS, just 3.2% of households experiencing food insecurity did so.

Food security was substantially correlated with receiving food aid (X2 = 22.295, p = 0.000). 16% of food-insecure households needed outside help, compared to just 4% of food-secure homes that got food aid.

Homeownership: Food security and homeownership did not significantly correlate (X2 = 2.321, p = 0.128). Both food-secure (88.5%) and food-insecure (83.0%) households were more likely to be homeowners.

These results illustrate the intricate socioeconomic drivers of food access by showing a robust correlation between food insecurity and variables like age, education, income, and locale type.

Table 9

Associations between food insecurity and main household's characteristics

Characteristics				
	Food secure (n=626) n (%)	Food insecure (n=94) n (%)	X^2 (df)	P value
Age				
Less than 40 years	351(56.1)	38(40.4)	10.144(2)	0.006
40-60 years	232(37.1)	51(54.3)		
More than 60 years	43(6.9)	5(5.3)		
Education level				
Illiterate	6(1.0)	2(2.1)	28.762(3)	0.000
Primary	59(9.4)	24(25.5)		
Secondary	149(23.8)	29(30.9)		
University	412(65.8)	39(41.5)		
Area of the West Bank				
South	207(33.1)	43(45.7)	8.378(2)	0.015
Middle	150(24.0)	12(12.8)		
North	269(43.0)	39(41.5)		
Locality type				
City	353 (56.4)	40(42.6)	16.189(2)	0.000
Village	224(35.8)	35(37.2)		
Camp	49(7.8)	19(20.2)		
Family income (NIS)				
Below 1000	10(1.6)	8(8.5)	121.348(4)	0.000
1000-2000	49(7.8)	38(40.4)		
2001-3000	167(26.7)	32(34.0)		
3001-5000	230(36.7)	13(13.8)		
Above 5000	170(27.2)	3(3.2)		
Food aid				
Yes	25(4.0)	15(16.0)		
No	601(96.0)	79(84.0)	22.295(1)	0.000
Home ownership				
Owned	554(88.5)	78(83.0)	2.321(1)	0.128
Rented	72(11.5)	16(17.0)		

3.6 Association between Household Food security and nutritional status

With an emphasis on dietary consumption and body mass index (BMI) across food-secure and food-insecure families, Table 10 illustrates the relationship between household food security and nutritional status.

Dietary intake: The average intake of calories, protein, carbs, and fat did not change significantly between households that were food insecure and those that were not. With a t-value of 0.044 and a p-value of 0.965, there was no significant difference between the mean calorie intake of food-secure families (1947.5 kcal; SD = 448.5) and food-insecure households (1945.3 kcal; SD = 501.2). With a t-value of 0.256 and a p-value of 0.798, the protein consumption of food-secure families was 74.3g (SD = 25.2), whereas that of food-insecure households was 75.0g (SD = 29.0). With p-values of 0.297 and 0.225, respectively, the consumption of fat (69.6g vs. 66.2g) and carbohydrates (261.9g vs. 270.4g) did not differ significantly either.

However, there was a substantial correlation between food security and body mass index (BMI) (X2 = 21.523, p = 0.000). Those living in food-insecure homes were more likely to be underweight (4.3% vs. 1.1%) and obese (43.6% vs. 25.6%). On the other hand, a higher percentage of people with a normal BMI (39.1% vs. 22.3%) and overweight people (34.2% vs. 29.8%) lived in food-secure homes.

These results imply that whereas food-secure and food-insecure households consume similar amounts of food, their BMIs varied significantly, with food-insecure households having greater rates of underweight and obesity.

Table 10

Association between Household Food security and nutritional status

Variables	Food secure (n=626)	Food insecure (n=94)		
	M (SD)	M(SD)	t test	P value
Dietary intake				
Calories	1947.5(448.5)	1945.3(501.2)	0.044	0.965
Protein	74.3(25.2)	75.0(29.0)	0.256	0.798
Carbohydrate	261.9(72.2)	270.4(84.6)	1.044	0.297
Fat	69.6(25.5)	66.2(26.6)	1.214	0.225
Iron	12.4(6.1)	14.3(10.0)	1.797	0.075
	n (%)	n (%)	X^2 (df)	P value
Body Mass Index				
Underweight	7(1.1)	4(4.3)	21.523(3)	0.000
Normal	245(39.1)	21(22.3)		
Overweight	214(34.2)	28(29.8)		
Obese	160(25.6)	41(43.6)		

3.7 Nutrition-related KAP

The relationship between nutrition-related knowledge, attitudes, and practices (KAP) regarding iron-deficiency anemia (IDA) and food security status is shown in Table C.1 in Appendix C.

Knowledge of nutrition: Most participants (91.5%) were aware of the overall symptoms of IDA, and there was no discernible difference between homes that were food secure (92.0%) and those that were not (88.3%). Food-insecure families had a lower percentage of people aware of IDA causes (81.9%) than food-secure households (90.4%), indicating a significant difference in awareness about the causes of IDA ($X2 = 6.183$, $p = 0.013$). Although for knowledge of foods that increase iron absorption ($X2 = 2.956$, $p = 0.086$), where food-secure households had a slightly higher percentage of correct responses (65.5% vs. 56.4%), knowledge about iron-rich foods and factors that affect iron absorption did not significantly differ across food security status.

Food-insecure families had slightly higher negative opinions about their perceived susceptibility to IDA (50.0% likely) than food-secure households (37.2%), according to nutrition-related attitudes. Food security status did not, however, significantly alter general views toward cooking meals perceived benefits using foods high in iron or dietary preferences. On the other hand, significantly 18.2% of food-secure households, 41.5% of food-insecure households reported percieved difficulties in meal preparation. Overall, both groups had good attitudes regarding IDA; 51.4% of homes that were food secure and 58.5% of households that were food insecure had positive sentiments; however, the difference was not statistically significant ($p = 0.437$).

Nutrition-related behaviors: The majority of both food-secure (88.3%) and food-insecure (83.0%) families reported good habits, and there was no significant difference in food-intake practices linked to iron-rich foods ($p = 0.141$). There were no discernible changes in the practices of drinking tea, coffee, or foods high in vitamin C. With 71.1% and 69.1% of homes, respectively, practicing excellent behaviors, food-secure and food-insecure households generally showed similar practices; however, this difference was not statistically significant ($p = 0.819$).

In summary, food security status was linked to understanding the causes of IDA, but it did not look as if to have a significant influence on attitudes or nutrition-related behaviors. This suggests that other factors might have an impact on these areas of nutrition education and behavior.

Chapter Four

Discussion and Conclusion

4.1 Introduction

In this study, 720 places in the West Bank were studied to determine the socioeconomic, demographic, nutritional status, knowledge, attitudes, and practices (KAP) aspects related to household food security. The results demonstrated significant differences in food security status between various demographic groups, highlighting the complex relationships between variables affecting household food access and the necessity of interdisciplinary approaches to address this important public health issue.

4.2 Discussion

4.2.1 Socio-Economic and Demographic Factors

The findings showed that families have mothers between the ages of 40 and 60 experienced a significantly higher rate of food insecurity (54.3%) than households with mothers under 40 (40.4%) or elderly (>60, 5.3%). The financial strain of middle age, which includes the cost of healthcare, other family responsibilities, and the responsibility of raising children, may be the cause of this tendency. On the other hand, elderly people might benefit from social welfare programs or have fewer financial responsibilities, while younger households might have fewer dependents or different coping strategies. These results are consistent with studies conducted by El Bilbeisi et al., Negash et al., and Disassa and Ashenafi, that demonstrate how family members' ages affect their access to food and financial security (13, 14, 29).

One of the most important factors influencing food security is education. Food insecurity was substantially higher in households with low levels of education (illiterate or only having a primary education) (27.6%) than in households with secondary or higher education where 89.6% are food secure. In addition to improving job opportunities, education gives people the resource management and decision-making abilities necessary to ensure food security. This correlation is consistent with research by Tilahun et al. (2021); Banu et al. (2023) and Negash et al. (2022), which emphasizes how education can prevent food insecurity in low-income environments(14, 33, 53).

The highest rates of food insecurity were found in the southern West Bank (45.7%), followed by the northern region (41.5%) and the central region (12.8%). Geographical variations were also noticeable. These discrepancies could be caused by regional differences in social support networks, restricted agricultural output, and unequal economic development. The food safety differs significantly in according to the locale, households were those in refugee camps (7.8%), followed by those in villages (35.8%) and cities (56.4%). Achieving food security faces significant challenges in refugee camps, which are frequently marked by poor living conditions, unemployment, and restricted access to resources. This result agrees with the study by Bilbeisi et al., 2021 and Bilbeisi et al., 2022 in the Gaza Strip (25, 54).

Income was still another important factor. The prevalence of food insecurity was highest among households with incomes under 2000 NIS (48.9%), indicating a clear correlation between income and the capacity to purchase enough food. Food aid may not adequately address the structural and systemic causes that sustain food insecurity, as seen by the significantly higher rates of food insecurity (16%) among households that received aid compared to those that did not (4.0%). This result agrees with the study by Bilbeisi et al., 2021 and Bilbeisi et al., 2022 in the Gaza Strip and raises concerns about the sustainability and sufficiency of food assistance programs, emphasizing the need to supplement help with long-term fixes to increase economic stability and self-sufficiency (4, 25).

4.2.2 Nutritional status assessment of the mothers

The nutritional status study's results offer a perceptive look at the complex connection between obesity and food insecurity. Obesity rates were significantly greater in households that are food-insecure (43.6%) than in food-secure counterparts (25.6%). This result is consistent with Oh et al. (2019) and Negash et al. (2022), despite having less access to enough food, people or households that face food insecurity are more likely to become obese (14, 31).

Multiple elements contribute to the underlying mechanism of this inconsistency. Due to limited resources, food-insecure households frequently have to count on less expensive, high-energy, and low-nutrient meals. Despite being high in calories, these meals are deficient in important vitamins and minerals, and over time, they may cause weight gain

and obesity. Furthermore, binge eating and irregular eating patterns are frequently brought on by food insecurity, which may increase calorie intake (55).

Negash et al. (2022); Oh et al. (2019) and Weerasekara et al. (2020) discussed how food insecurity may result in poor dietary choices that worsen health inequities, and the results of this study support their findings. People may choose high-calorie, low-nutrient foods as a result of the emotional and psychological strain that comes with food insecurity as well as the financial limitations it places on people. Higher risks of obesity, diabetes, and cardiovascular diseases may come from this imbalance between calorie consumption and nutritional quality (14, 30, 31).

The study found no significant changes in the intake of macronutrients, such as calories, protein, carbs, and fats, even though the obesity rates in food-insecure and food-secure homes differed significantly. This may suggest that although food insecure people may eat comparable amounts of food in terms of macronutrients, their diets are nevertheless of low quality. For example, access to nutrient-dense foods that are essential for general health, like fruits, vegetables, lean meats, and whole grains, may be restricted due to food insecurity. As a result, although the two groups may consume approximately the same number of calories, food-secure households may consume a greater number of micronutrients, particularly important vitamins and minerals (56).

Lack of micronutrient-rich foods can result in deficits in vital nutrients like iron, zinc, and vitamin A, which can cause a variety of health problems like anemia and compromised immune function(10). For this reason, diet diversity must be studied. One significant limitation of the current study is that it did not study dietary diversity and we do not have any laboratory tests about the hemoglobin level of the study mothers.

4.2.3 Knowledge, Attitudes, and Practices (KAP) Related to Nutrition

4.2.3.1 Knowledge Gap on Iron-Deficiency Anemia (IDA)

Compared to food-secure houses, food-insecure households showed a substantially lower level of knowledge (81.9% vs. 90.4%) about the causes of IDA, this is consistent with Beitze et al., 2024; Weerasekara et al., 2020; and Yeganeh et al., 2018 but not consistent with Bayked et al., 2024. Limited access to health education materials and information, which is especially common in underprivileged and marginalized populations, is probably the cause of this knowledge gap. According to earlier studies,

individuals who are food insecure frequently have no access to nutrition education programs, which makes it difficult for them to comprehend the dietary needs required to avoid deficiencies like IDA. This knowledge gap is exacerbated by limited access to health care, nutrition outreach initiatives, and formal education (30, 32, 36, 37).

Lack of knowledge regarding IDA prevention might result in poor eating habits that cause people, particularly mothers, to not get enough iron in their diets(57). This is especially troubling because IDA is common in food-insecure populations and has wide-ranging impacts on immune system performance, cognitive development, and general health(8). The high prevalence of iron deficiency and anemia seen in groups experiencing food insecurity may be attributed in part to the lack of awareness of IDA (57).

4.2.3.2 Attitudes toward Iron-Rich Meals

Additionally, compared to 18.2% of food-secure households, 41.5% of food-insecure households reported difficulties in meal preparation, indicating less positive attitudes toward cooking iron-rich meals, which this result agrees with (Disassa and Ashenafi, 2022; Weerasekara et al., 2020)(29, 30). In the other hand, the result does not agree with Sienso et al. (2022) and Bayked et al. (2024) (17, 29, 32). These problems have several faces. Financial obstacles are important since iron-rich foods, like lean meats, green vegetables, and legumes, can be costly and out of reach for low-income families. Furthermore, geographic location, restricted availability in local markets, or transportation problems all of which disproportionately impact rural and marginalized urban populations may limit the access of food-insecure households to these goods (4, 10).

The problem is made worse by a lack of knowledge about reasonably priced foods high in iron. Many times, families experiencing food insecurity might not prioritize or even be aware of affordable ways to incorporate foods high in iron into their meals. Furthermore, cultural customs, dietary choices, and convenience views all influence attitudes about cooking these meals. For instance, nutrient-dense meals take more time, effort, and perhaps more resources to make than ready-to-eat processed foods, which are frequently high in harmful fats and deficient in vital micronutrients.

4.2.3.3 Behavioral Barriers to Healthier Dietary Practices

Families experiencing food insecurity frequently encounter a variety of behavioral barriers that hinder them from implementing better eating habits. According to Disassa and Ashenafi (2016); Weerasekara et al. (2020); and Tilahun et al. (2021), these barriers may include a lack of time for food preparation, a lack of cooking and meal planning abilities, and the psychological effects of food insecurity, which can make it challenging to concentrate on long-term health objectives. When food is limited, for example, the immediate focus is frequently on quantity rather than quality, and the nutritional worth of meals may receive less attention, particularly in households that are dealing with some stressors.

Food insecurity is made worse by a cycle of inadequate nutrition brought on by these behavioral constraints as well as practical and financial difficulties. The dietary habits of food-insecure households may continue to contribute to negative health outcomes, like iron deficiency and accompanying anemia unless steps are taken to interrupt this cycle.

4.3 Conclusion

Food insecurity in the West Bank is complex, as this study shows, with notable socioeconomic, demographic, nutritional, and KAP differences between households. The main risk factors for food insecurity were found to be middle-aged family, lower educational attainment, geographical disparities, refugee status, and poor income. Income remained a crucial factor which highlight a distinct link between income levels and the ability to afford sufficient food.

A lack of understanding about how to prevent iron deficiency anemia (IDA) can lead to unhealthy eating practices, causing individuals—especially mothers—to not consume adequate iron in their diets. This is particularly concerning since IDA is prevalent in populations struggling with food insecurity. The high incidence of iron deficiency and anemia among those facing food insecurity may partly stem from their lack of knowledge about IDA. The issue is exacerbated by a lack of awareness regarding budget-friendly foods rich in iron. Often, families facing food insecurity may not consider or realize affordable options for adding iron-rich foods to their diets. In addition, cultural traditions, dietary preferences, and convenience perceptions all shape

attitudes toward preparing these meals. For example, preparing nutritious meals typically requires more time, effort, and possibly more resources compared to ready-to-eat processed foods, which are often high in unhealthy fats and lacking in essential micronutrients.

The contradictory link between obesity and food insecurity, as well as the disparity in attitudes and knowledge about nutrition, highlight the intricate interactions between behavioral and economic factors that influence food security outcomes.

4.4 Recommendations

1. On governmental scale: For households experiencing food insecurity, increase employment prospects and resource management by offering literacy and vocational training.

2. Create culturally relevant resources to offer low-cost strategies for including a variety of foods high in iron into a person's diet.

3. Prioritize infrastructure upgrades and economic growth, especially in neglected regions like the southern West Bank and refugee camps.

4. Encourage the expansion of access to reasonably priced, nutrient-dense foods, the reduction of income disparity, and the improvement of public health education.

5. On community and municipalities scale: Enhance food assistance initiatives e.g. food pantries by including fortified foods and fresh vegetables while removing structural obstacles to access.

6. Furthermore, the aid programs in the West Bank should focus on households that are severely food insecure and lack supportive non-financial resources.

7. To sustainably improve food security, it is essential to establish initiatives that support vulnerable households, such as income-generating projects, and to increase resources dedicated to effective economic empowerment programs.

8. Increasing the proportion of resources specialised on social protection allocated to these programs and broadening the scope of receivers is anticipated to assist underprivileged households in escaping the cycle of poverty and food insecurity.

9. Conduct extensive research over the long term that emphasizes the importance of dietary variety and quality to explore the links between food security, nutrition, and health.

4.5 limitations

In this study of the association of household food security and knowledge, attitude, and practices related to iron deficiency anemia on nutritional status of mothers aged more 18 in Palestine, the main limitation of the study that we didn’t have lab tests to assess the haemoglobin concentrations for the mothers participated in the study. That can make interpretation of the results challenging.

List of Abbreviations

Abbreviation	Meaning
WHO	World health organisation
KAP	Knowledge, attitude and behaviour
FAO	Food and agriculture organisation
IDA	Iron deficiency anemia
BMI	Body mass index
SDG	Sustainable Development Goals (SDG)

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Appendices

Appendix A

Questionnaire in English

Questionnaire

Association of Household Food Insecurity with Nutritional Status and Nutrition-Related Knowledge, Attitudes, and Practices among mothers aged >18 in Palestine

Dear participant

You are invited to join the above-mentioned research study. You have been selected as a participant because you meet the participation criteria. This study aims to: (1) identify the level of household food insecurity in West Bank; (2) assess nutrition-related knowledge, attitudes and practices (KAP) related to iron deficiency anemia; (3) investigate the association of households food insecurity with dietary intakes, anthropometric measures and nutrition-related KAP of mothers.

The interview took about 30 minutes, all the information we obtain were kept strictly confidential and your answers and your name would not be revealed, and no information that would enable the identification of any participant would be published. Also, you don't have to answer any question you don't want to, and you can stop the interview at any time.

I would like you to answer the questions honestly, feel free to answer questions at your own pace.

Do you agree to voluntarily participate in this interview? ☐ **Yes** ☐ **No** If

the answer is yes, continue to the next question. If the answer is no, stop the interview.

Do you have any question before we start?

Can I start now?

We thank you for your kind cooperation and appreciate your positive decision to participate in the research

Socio-Economic and Demographic Characteristics of the Households		
1.	**Name**	……
2.	**Age (year)**	…….
3.	**Governorate**	
4.	**The nature of the living area**	☐ City ☐ Village ☐ Camp ☐ Other.....
5.	**Educational level**	☐ Illiterate ☐ Primary ☐ Prep ☐ Secondary ☐ University
6.	**Number of family members**	……
7.	**Family income (NIS)**	☐ > 1000 ☐ 1000-2000 ☐ 3000 - 2001 ☐ < 3000
8.	**Does the family receive food aid?**	☐ Yes ☐ No
9.	**Home ownership**	☐ Owned ☐ Rented
10.	**Work status**	☐ Has work ☐ Do not has work
11.	**Marital Status**	☐ Single ☐ Married ☐ Divorced ☐ widowed

Radimer / Cornell Hunger and Food Insecurity Items

No.	Question	Not True	Sometimes True	Always True
	A. Household level			
1.	I worry that if the food or raw materials for cooking will run out before I could have more money to buy food.			
2.	Food or raw materials for cooking that I bought for my family at home is always run out fast and I do not have the money to buy food again.			
3.	I do not have enough food or raw materials to cook or prepare a family meal (for the tomb of the morning, noon or night) and I did not have enough money to buy food.			
4.	We eat the same thing for several days in a row because we only have a few different kinds of food on hand and do not have money to buy more.			
	B. Individual level (Adult)			
5.	I am often hungry but I do not eat because I do not have enough money to buy food.			
6.	I only eat a little of what I should eat because I do not have enough money to buy food.			
7.	I was not able to eat properly or eat to satiety because I do not have enough money to buy food.			
	C. Individual level (Child)			
8.	I am not able to provide a balanced meal to my children because I do not have enough money to provide food.			
9.	My children do not eat enough or always lack of food because I am not able to buy enough food.			
10.	I know sometimes my children are hungry, but I cannot do anything because I am not able to buy food in excess of what I always buy			

Socio-demographic questionnaire for mothers (> 18 years)		
1.	**Name**	…….
2**.**	**Age (year)**	…….
3**.**	**Governorate**	
4**.**	**The nature of the living area**	☐ City ☐ Village ☐ Camp ☐ Other
5**.**	**Educational level**	☐ Illiterate ☐ Primary ☐ Prep ☐ Secondary ☐ University
Anthropometric measurements		
1.	**Height (meter)**	…….
2.	**Weight (kg)**	…….

KAP: Iron-deficiency anaemia

Knowledge

1. Have you heard about iron-deficiency anemia?

☐ Yes ☐ No ☐ Don't know/no answer

If Yes: Can you tell me how you can recognize someone who has anaemia?

☐ Less energy/weakness ☐ Paleness / pallor ☐ Spoon nails / bent nails

☐ More likely to become sick (less immunity to infections) ☐ Other ☐ Don't know

2. What are the health risks for infants and young children of a lack of iron in the diet?

☐ Delay of mental and physical development ☐ Other ☐ Don't know

3. What are the health risks for pregnant women of a lack of iron in the diet?

☐ Risk of dying during or after pregnancy ☐ Difficult delivery ☐ Other ☐ Don't know

4. What causes anemia?

☐ Lack of iron in the diet/eat too little, not much ☐ Heavy bleeding during menstruation ☐ Other

☐ Sickness/infection (malaria, hookworm infection, other infection such as HIV/AIDS) ☐ Don't know

5. How can anaemia be prevented?

☐ Eat/feed iron-rich foods/having a diet rich in iron ☐ Take/give iron supplements if prescribed

☐ Treat other causes of anemia (diseases and infections), seek health-care assistance ☐ Other ☐ Don't know

☐ Continue breastfeeding (for infants 6–23 months old) ☐ Eat / give vitamin-C-rich foods during or right after meals

6. Can you list examples of foods rich in iron?

<u>Organ meat</u>

☐ Liver ☐ Kidney ☐ Heart

<u>Flesh meat</u>

☐ Beef ☐ Lamb ☐ Goat ☐ Rabbit ☐ Chicken ☐ Duck

<u>Fish and seafood</u>

☐ Fresh fish ☐ Dried fish ☐ Canned fish ☐ Prawns ☐ Shrimps ☐ Seafood

7. When taken during meals, certain foods help the body absorb and use iron. What are those foods?

☐ Vitamin-C-rich foods, such as fresh citrus fruits (orange, lemons, etc.) ☐ Other ☐ Don't know

8. Some beverages decrease iron absorption when taken with meals. Which ones?

☐ Coffee ☐ Tea ☐ Other ☐ Don't know

9. I would like to ask you about particular foods you may eat on their own or as part of a dish. Yesterday, during the day and night, did you eat any of the following?

Organ meat

Liver ☐ Yes ☐ No **Kidney** ☐ Yes☐ No **Heart**☐ Yes ☐ No

Flesh meat

Beef ☐ Yes ☐ No **Lamb** ☐ Yes ☐ No **Goat**☐ Yes ☐ No

Rabbit ☐ Yes ☐ No **Chicken** ☐ Yes ☐ No **Duck** ☐ Yes ☐ No **Fish and seafood**

Fresh fish ☐ Yes ☐ No **Dried fish** ☐ Yes ☐ No **Canned fish** ☐ Yes ☐ No

Prawns ☐ Yes ☐ No **Shrimps** ☐ Yes ☐ No **Seafood** ☐ Yes ☐ No

10. Do you usually eat fresh citrus fruits, such as lemons, grapefruit, etc., or drink juice made from them?

☐ Yes ☐ No ☐ Don't know / no answer

If Yes: Every day? ☐ Yes ☐ No ☐ Don't know / no answer

11. When do you usually eat fresh citrus fruits?

☐ Before a meal ☐ During the meal ☐ After a meal ☐ Other ☐ Don't know/no answer

12. Do you usually drink coffee or tea?

☐ Yes ☐ No ☐ Don't know

If Yes: Every day? ☐ Yes ☐ No ☐ Don't know

13. When do you usually drink coffee or tea?

☐ Two hours or more before a meal ☐ Right before a meal ☐ During the meal

☐ Right after a meal ☐ Two hours or more after a meal ☐ Other ☐ Don't know/no answer

Attitudes

Iron-deficiency anemia - Perceived susceptibility

14. How likely do you think your child is to be iron-deficient/anemic? OR How likely do you think you are to be iron-deficient / anemic?

☐ 1. Not likely ☐ 2. You're not sure ☐ 3. Likely

If Not likely: Can you tell me the reason why it is not likely? ……...
Iron-deficiency anemia - Perceived severity
15. How serious do you think iron-deficiency/anemia is? ☐ 1. Not serious ☐ 2. You're not sure ☐ 3. Serious
Attitudes towards an ideal or desired nutrition-related practice
Preparing meals with iron-rich foods - Perceived benefits
16. How good do you think it is to prepare meals with iron-rich foods such as beef, chicken or liver? ☐ 1. Not good ☐ 2. You're not sure ☐ 3. Good
Preparing meals with iron-rich foods - Perceived barriers
17. How difficult is it for you to prepare meals with iron-rich foods? ☐ 1. Not difficult ☐ 2. So-so ☐ 3. Difficult
Self-confidence
18. How confident do you feel in preparing meals with iron-rich foods? ☐ 1. Not confident ☐ 2. Ok / so-so ☐ 3. Confident
Attitudes towards food preference
19. How much do you like the taste of [iron-rich food item or meal]? ☐ 1. Dislike ☐ 2. You're not sure ☐ 3. Like

First day: 24-hour dietary recall

Determine what was yesterday:

☐ Saturday	☐ Sunday	☐ Monday	☐ Tuesday	☐ Wednesday	☐ Thursday	☐ Friday

Would you describe the food that you ate yesterday as atypical of your habitual food intake? ☐ Yes ☐ No

No.	Food Name	Time	Occasion (Breakfast – Launch – Dinner –Other)	Source of food (Homemade – Restaurant – Supermarket – Other)	Amount (According To Kitchen Staff)

Second day: 24-hour dietary recall

Determine what was yesterday:

☐ Saturday	☐ Sunday	☐ Monday	☐ Tuesday	☐ Wednesday	☐ Thursday	☐ Friday

Would you describe the food that you ate yesterday as atypical of your habitual food intake? ☐ Yes ☐ No

No.	Food Name	Time	Occasion (Breakfast – Launch – Dinner – Other)	Source of food (Homemade – Restaurant – Supermarket – Other)	Amount (According To Kitchen Staff)

Appendix B

Questioner in Arabic

العلاقة بين انعدام الأمن الغذائي في الأسر والحالة التغذوية والمعرفة والمواقف والممارسات المتعلقة بالتغذية بين الأمهات فوق سن 18 عامًا في فلسطين

عزيزي المشارك

أنت مدعو للانضمام إلى دراسة البحث المذكورة أعلاه. لقد تم اختيارك كمشارك لأنك تلبي معايير المشاركة. تهدف هذه الدراسة إلى: (1) تحديد مستوى انعدام الأمن الغذائي في الأسر في الضفة الغربية؛ (2) تقييم المعرفة والمواقف والممارسات المتعلقة بالتغذية (KAP) المتعلقة بفقر الدم الناجم عن نقص الحديد؛ (3) التحقيق في العلاقة بين انعدام الأمن الغذائي في الأسر والمدخول الغذائي والقياسات الأنثروبومترية والمعرفة والمواقف والممارسات المتعلقة بالتغذية لدى الأمهات.

ستستغرق المقابلة حوالي 30 دقيقة، وستظل جميع المعلومات التي نحصل عليها سرية تمامًا ولن يتم الكشف عن إجاباتك واسمك، ولن يتم نشر أي معلومات من شأنها تمكين تحديد هوية أي مشارك. أيضًا، ليس عليك الإجابة على أي سؤال لا تريد الإجابة عليه، ويمكنك إيقاف المقابلة في أي وقت.

أود منك أن تجيب على الأسئلة بصراحة، فلا تتردد في الإجابة على الأسئلة بالسرعة التي تناسبك.

هل توافق على المشاركة طواعية في هذه المقابلة؟ □ نعم □ لا

إذا كانت الإجابة بنعم، انتقل إلى السؤال التالي. إذا كانت الإجابة لا، أوقف المقابلة.

هل لديك أي سؤال قبل أن نبدأ؟

هل يمكنني أن أبدأ الآن؟

نشكرك على تعاونك الكريم ونقدر قرارك الإيجابي بالمشاركة في البحث

القسم الأول – المعلومات الديموغرافية

1. الإسم
2. الجنس 1-ذكر 2-أنثى
3. العمر
4. المحافظة
5. طبيعة مكان السكن 1-مدينة 2-قرية 3-مخيم
6. مستوى التعليم 1-أمي 2-تعليم أساسي 3- تعليم ثانوي 4-جامعي
7. عدد أفراد الأسرة
8. دخل الأسرة 1-اقل من الف شيكل 2- من 1000-2000 شيكل 3-2000-3000 شيكل 4- من 3000-5000 شيكل 5-أكثر من 5000
9. هل تتلقى العائلة مساعدات غذائية 1-نعم 2-لا
10. ملكية السكن 1-بيت ملك 2- بيت مستأجر
11. طبيعة العمل 1-أعمل 2- لا أعمل
12. الحالة الشحصية 1-أعزب 2-متزوج 3- مطلق 4- أرمل

القياسات الجسمية				
الرقم	القياس	القياس الأول	القياس الثاني	المتوسط الحسابي
1.	الوزن (كغم)			
2.	الطول (سم)			

أداة رايدمير \ كورنيل للجوع و الأمن الغذائي

رقم السؤال | السؤال | غير صحيح | أحيانا | دائما صحيح

أ-على مستوى المنزل

1) أشعر بالقلق من أن ينفذ الطعام أو المواد الغذائية الازمة للطبخ قبل أن أحصل على المال اللازم لشرائها
2) الطعام و المواد الغذائية اللازمة للطبخ التي اشتريها للعائلة دائما تنفذ بسرعة و لا أملك المال لشرائها مرة أخرى
3) لا يوجد عندي في المنزل كميات كافية من الطعام و المواد الغذائية اللازمة للطبخ لتحضير وجبات طعام للعائلة خلال النهار (من الفطور للعشاء) و لا أملك المال لشرائها
4) نأكل نفس الطعام لعدة أيام متواصلة لأنه لدينا أصناف قليلة متوفرة من الطعام و ليس لدينا المال لشراء المزيد

ب-المستوى الفردي –للبالغين

5) أشعر بالجوع بشكل متكرر لأنه لا يوجد معي مال كافي لشراء الطعام
6) أتناول طعام أقل من احتياجي الحقيقي لأني لا أملك المال الكافي لشراء الطعام
7) لم يكن عندي المقدره على الأكل بشكل صحيح أو الأكل حتى الشبع لأنه لا يوجد لدي المال الكافي لشراء الطعام

ج-المستوى الفردي – الاطفال-

8) لا أستطيع توفير و جبات طعام متوازنة لأطفالي لأنه لا يوجد لدي المال الكافي لتوفير الطعام

9) لا يتناول طفلي كمية طعام كافية أو هناك نقص في الطعام دائما لأني لا أملك المال لشراء الطعام

10) أعلم أن أطفالي يكونوا جائعين في بعض الأحيان ولكن لا أستطيع ان أفعل شيء لأنه لا أستطيع أن أشتري كميات طعام أكبر مما أشتريه.

المعرفة والمواقف والممارسات حول: فقر الدم الناجم نقص الحديد

المعرفة

1. **هل سمعت عن فقر الدم الناجم عن نقص الحديد؟**

☐ نعم ☐ لا ☐ لا أعرف / لا إجابة

إذا كانت الإجابة نعم: هل يمكن أن تخبرني كيف يمكنك التعرف على شخص مصاب بفقر الدم؟

☐ طاقة / ضعف أقل ☐ شحوب / شحوب ☐ أظافر ملعقة / أظافر مثنية

☐ أكثر عرضة للإصابة بالمرض (أقل مناعة للعدوى) ☐آخر ☐لا أعرف

2. **ما هي المخاطر الصحية التي يتعرض لها الرضع والأطفال الصغار بسبب نقص الحديد في النظام الغذائي؟**

☐ تأخر النمو العقلي والجسدي ☐ آخر ☐ لا أعرف

3. **ما هي المخاطر الصحية التي تتعرض لها المرأة الحامل من نقص الحديد في النظام الغذائي؟**

☐ خطر الوفاة أثناء الحمل أو بعده ☐ ولادة صعبة ☐ آخر ☐ لا أعرف

4. **ما الذي يسبب فقر الدم؟**

☐ نقص الحديد في النظام الغذائي / تناول القليل جدًا وليس كثيرًا ☐ نزيف حاد أثناء الحيض

☐ آخر ☐ المرض / العدوى (الملاريا ، عدوى الدودة الشصية ، عدوى أخرى مثل فيروس نقص المناعة البشرية / الإيدز)

☐ لا أعرف

5. كيف يمكن منع فقر الدم؟

☐ تناول الأطعمة الغنية بالحديد / اتباع نظام غذائي غني بالحديد ☐ أخذ / تناول مكملات الحديد إذا وصفت

☐ علاج الأسباب الأخرى لفقر الدم (الأمراض والالتهابات) ، واطلب المساعدة من الرعاية الصحية ☐ آخر

☐ لا أعرف ☐استمرار الرضاعة الطبيعية (للرضع من عمر 6 إلى 23 شهرًا)

☐ تناول / إعطاء الأطعمة الغنية بفيتامين سي أثناء أو بعد الوجبات مباشرة

6. هل يمكنك سرد أمثلة للأطعمة الغنية بالحديد؟

لحوم الأعضاء الداخلية للذبيحة (معلاق)

☐ الكبد ☐ الكلى ☐القلب

اللحوم الحمراء او البيضائ

☐ لحم الضأن ☐ الماعز ☐ الدجاج ☐ البط ☐ البقر

سمك و مأكولات بحرية

☐ أسماك طازجة ☐ أسماك مجففة ☐ أسماك معلبة ☐ الجمبري ☐روبيان ☐ مأكولات بحرية

7. عند تناول بعض الأطعمة أثناء الوجبات ، تساعد بعض الأطعمة الجسم على امتصاص الحديد واستخدامه. ما هي تلك الأطعمة؟

☐ الأطعمة الغنية بفيتامين سي ، مثل الحمضيات الطازجة (البرتقال والليمون وغيرها). ☐آخر

☐ لا أعرف

8. تقلل بعض المشروبات من امتصاص الحديد عند تناولها مع الوجبات. اي واحدة؟

☐ قهوة ☐ شاي ☐ آخر ☐لا أعرف

9. أود أن أسألك عن أطعمة معينة قد تتناولها بمفردها أو كجزء من طبق.

بالأمس ، خلال النهار والليل ، هل أكلت أيًا مما يلي؟

لحوم الأعضاء الداخلية للذبيحة (معلاق)

الكبد □ نعم □ لا الكلى □ نعم □ لا القلب □ نعم □ لا

اللحوم الحمراء و البيضاء

لحم بقر □ نعم □ لا لحم خروف □ نعم □ لا ماعز □ نعم □ لا أرنب □ نعم □ لا

دجاج □ نعم □ لا بطة □ نعم □ لا

سمك و مأكولات بحرية

أسماك طازجة □ نعم □ لا أسماك مجففة □ نعم □ لا أسماك معلبة □ نعم □ لا

روبيان □ نعم □ لا الجمبري □ نعم □ لا مأكولات بحرية□ نعم □ لا

10.هل تأكل عادة الفواكه الحمضية الطازجة ، مثل الليمون والجريب فروت وغيرها ، أو تشرب العصير المصنوع منها؟

□ نعم □ لا □ لا أعرف / لا إجابة

إذا نعم: يوميا؟ □ نعم □ لا □ لا أعرف / لا إجابة

11.متى تأكل عادة الفواكه الحمضية الطازجة؟

□ قبل الوجبة □ خلال الوجبة □ بعد وجبة الطعام □ آخر □لا أعرف / لا إجابة

12.هل تشرب القهوة أو الشاي عادة؟

□نعم □ لا □ لا أعرف / لا إجابة

إذا نعم: يوميا؟ □ نعم □ لا □ لا أعرف / لا إجابة

13.متى عادة تشرب القهوة أو الشاي؟

□ ساعتين أو أكثر قبل الوجبة □ قبل الوجبة مباشرة □ خلال الوجبة □ بعد الوجبة مباشرة

□ ساعتين أو أكثر بعد الوجبة □ آخر □ لا أعرف / لا إجابة

المواقف

فقر الدم الناجم عن نقص الحديد – القابلية المتوقعة

14.ما مدى احتمالية إصابة طفلك بنقص الحديد / فقر الدم في اعتقادك؟ أو ما مدى احتمالية إصابتك بنقص الحديد / فقر الدم في اعتقادك؟

☐ غير محتمل ☐ أنت غير متأكد ☐ محتمل

إذا لم يكن من المحتمل: هل يمكن أن تخبرني عن سبب عدم احتمال حدوث ذلك؟

....

فقر الدم الناجم عن نقص الحديد – الشدة المتصورة

15.ما مدى خطورة نقص الحديد / فقر الدم في رأيك؟

☐ ليست خطيرة ☐ غير متأكد ☐ جدي

القناعات اتجاه الممارسة المثالية أو المرغوبة المتعلقة بالتغذية

تحضير وجبات الطعام الغنية بالحديد – الفوائد المرجوة

16.في رأيك ، ما مدى جودة تحضير وجبات من الأطعمة الغنية بالحديد مثل لحم البقر أو الدجاج أو الكبد؟

☐ليس جيدًا ☐ لست متأكدًا ☐ جيد

تحضير وجبات الطعام الغنية بالحديد – العوائق المتصورة

17.ما مدى صعوبة تحضير وجبات الطعام الغنية بالحديد بالنسبة لك؟

☐ ليس صعب ☐ بدرجة متوسطة ☐ صعب

الرضى الشخصي

18.ما مدى رضاك عن إعدادك لوجبات الطعام الغنية بالحديد؟

☐ غير راضي ☐ راض بدرجة متوسطة ☐ راض

المواقف اتجاه الطعام المفضل

19.ما مدى إعجابك بمذاق [عنصر أو وجبة طعام غنية بالحديد]؟

☐ لم يعجبنى ☐ أنت غير متأكد ☐ اعجبني

اليوم الأول: استذكار وجبات الغذاء لليوم السابق

حدد، ماذا كان الأمس:

☐ السبت ☐ الاحد ☐ الاثنين ☐ الثلاثاء ☐ الاربعاء ☐ الخميس ☐ السبت

الرقم	اسم الطعام	الوقت	وجبات (فطور غداء عشاء – آخرى)	مصدر الغذاء) تحضير بيتي – مطعم – سوبر ماركت – أخرى)	كمية (بالاعتماد على أواني المطبخ : ملعقه غرفه . كاسه . صحن)

اليوم الثاني: استذكار وجبات الغذاء لليوم السابق

حدد، ماذا كان الأمس:

☐ السبت ☐ الاحد ☐ الاثنين ☐ الثلاثاء ☐ الاربعاء ☐ الخميس ☐ السبت

الرقم	اسم الطعام	الوقت	وجبات (فطور غداء عشاء – آخرى)	مصدر الغذاء) تحضير بيتي – مطعم – سوبر ماركت – أخرى)	كمية (بالاعتماد على أواني المطبخ : ملعقه غرفه . كاسه . صحن)

Appendix C

Tables of Study

Table C.1

Nutrition-related KAP (Module 6: Iron-deficiency anemia) by food security status

Variables	Total N= 720 (100%)	Food secure (n=626)	Food insecure (n=94)		
		n (%)	n (%)	X^2 (df)	P value
Nutrition-related knowledge					
Question 1: General signs of IDA					
Know	659(91.5)	576(92.0)	83(88.3)	1.455(1)	0.228
Do not know	61(8.5)	50(8.0)	11(11.7)		
Question 2: Consequences of IDA for infants and young children					
Know	413 (57.4)	363 (58.0)	50(53.2)	0.769(1)	0.381
Do not know	307 (42.6)	263(42.0)	44 (46.8)		
Question 3: Consequences of IDA for pregnant women					
Know	475(66.0)	415(66.3)	60(63.8)	.221(1)	0.638
Do not know	245(34.0)	211(33.7)	34(36.2)		
Question 4: Causes of IDA					
Know	643(89.3)	566(90.4)	77(81.9)	6.183(1)	0.013
Do not know	77(10.7)	60(9.6)	17(18.1)		
Question 5: Prevention of anemia					
Know	657(91.3)	575(91.9)	82(87.2)	2.184(1)	0.139
Do not know	63(8.8)	51(8.1)	12(12.8)		
Question 6: Iron-rich foods - easily absorbed					
Know	105(14.6)	93(14.9)	12(12.8)	0.287(1)	0.592
Do not know	615(85.4)	533(85.1)	82(87.2)		
Question 7: Foods that increase iron absorption					
Know	463(64.3)	410(65.5)	53(56.4)	2.956(1)	0.086
Do not know	257(35.7)	216(34.5)	41(43.6)		
Question 8: Foods that decrease iron absorption					
Know	85(11.8)	69(11.0)	16(17.0)	2.825(1)	0.093
Do not know	635(88.2)	557(89.0)	78(83.0)		
The overall knowledge					
High knowledge	61(8.5)	52(8.3)	9(9.6)	2.925(2)	0.232
Moderate knowledge	418(58.1)	371(59.3)	47(50.0)		
Low knowledge	241(33.5)	203(32.4)	38(40.4)		
Nutrition-related attitudes					
Question 1: Attitudes towards IDA - Perceived susceptibility					
Likely	280(38.9)	233(37.2)	47(50.0)	5.620(2)	0.060
Not sure	208(28.9)	186(29.7)	22(23.4)		
Not likely	232(32.2)	207(33.1)	25(26.6)		
Question 2: Attitudes towards IDA - Perceived severity					
serious	597(82.9)	525(83.9)	72(76.6)	5.926(2)	0.052

Not sure	72(10.0)	56(8.9)	16(17.0)		
Not serious	51(7.1)	45(7.2)	6(6.4)		
Question 3: Attitudes towards preparing meals with iron-rich foods - perceived benefits					
Good	615(85.4)	541(86.4)	74(78.7)	4.824(2)	0.090
Not sure	82(11.4)	65(10.4)	17(18.1)		
Not good	23(3.2)	20(3.2)	3(3.2)		
Question 4: Attitudes towards preparing meals with iron-rich foods - perceived barriers					
Difficult	36(5.0)	27(4.3)	9(9.6)	26.475(2)	0.000
So	117(16.3)	87(13.9)	30(31.9)		
Not difficult	567(78.8)	512(81.8)	55(58.5)		
Question 5: Self-confidence; how confident do you feel in preparing meals with iron-rich foods?					
Confident	506(70.3)	447(71.4)	59(62.8)	3.053(2)	0.217
So So	173(24.0)	144(23.0)	29(30.9)		
Not Confident	41(5.7)	35(5.6)	6(6.4)		
Question 6: Attitudes towards food preferences - the taste of iron-rich food item or meal					
Like	599(83.2)	520(83.1)	79(84.0)	0.398(2)	0.819
Not Sure	98(13.6)	85(13.6)	13(13.8)		
Dislike	23(3.2)	21(3.4)	2(2.1)		
The overall attitudes					
Positive attitude	377(52.4)	322(51.4)	55(58.5)	1.656(2)	0.437
Fair attitude	333(46.3)	295(47.1)	38(40.4)		
Negative attitude	10(1.4)	9(1.4)	1(1.1)		
Nutrition-related practices					
Question 1: Food-intake practices-iron-rich foods					
Yes	631(7.6)	553(88.3)	78(83.0)	2.167(1)	0.141
No	89(12.4)	73(11.7)	16(17.0)		
Question 2: Consumption of vitamin-C-rich fruits					
Yes	650(90.3)	566(90.4)	84(89.4)	0.103(1)	0.748
No	70(9.7)	60(9.6)	10(10.6)		
Question 3: Consumption of coffee/tea					
Yes	638(88.6)	552(88.2)	86(91.5)	0.888(1)	0.346
No	82(11.4)	74(11.8)	8(8.5)		
The overall practices					
Good practices	510(70.8)	445(71.1)	65(69.1)	0.400(2)	0.819
Moderate practice	180(25.0)	156(24.9)	24(25.5)		
Poor practices	30(4.2)	25(4.0)	5(5.3)		

جـامعـــة النجاح الوطنية

كليـــة الدراســـات العليـــا

ارتباط انعدام الأمن الغذائي الأسري والمعرفة والمواقف والسلوكيات المتعلقة بالتغذية بالحالة التغذوية للأمهات البالغات من العمر 18 سنة وأكثر في فلسطين: دراسة وطنية

إعداد

إيمان عبد الله صلاحات

إشراف

د. منال بدرساوي

قدمت هذه الرسالة استكمالا لمتطلبات الحصول على درجة الماجستير في التغذية وتكنولوجيا الغذاء، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس– فلسطين.

2025

ارتباط انعدام الأمن الغذائي الأسري والمعرفة والمواقف والسلوكيات المتعلقة بالتغذية بالحالة التغذوية للأمهات البالغات من العمر 18 سنة وأكثر في فلسطين: دراسة وطنية

إعداد

إيمان عبد الله صلاحات

إشراف

د. منال بدرساوي

الملخص

الخلفية: لقد تحسن الفهم العالمي للعلاقة بين انعدام الأمن الغذائي وتغذية الأم، حيث أكد الباحثون على ضرورة تقييم ليس فقط مدى توفر الغذاء ولكن أيضًا جودة الغذاء ومحتواه الغذائي. وعلاوة على ذلك، أصبحت الحاجة إلى النظر في الجوانب الاجتماعية والثقافية للغذاء، مثل سلوكيات النساء ومواقفهن ومعارفهن المتعلقة بالتغذية، واضحة بشكل متزايد. يتطلب تطوير علاجات ناجحة لتعزيز تغذية الأم، وبالتالي تحسين نتائج صحة الطفل، مراعاة هذه الجوانب. المعرفة والمواقف المتعلقة بالتغذية ضرورية للتغييرات الغذائية نحو نمط غذائي أكثر صحة. ولهذا السبب، تعد المعرفة والمواقف والممارسات المتعلقة بالتغذية من العوامل الرئيسية في تحقيق الأمن الغذائي والتغذوي للأسر.

الهدف: دراسة العلاقة بين انعدام الأمن الغذائي في الأسرة والمدخول الغذائي والمعرفة والمواقف والممارسات المتعلقة بالتغذية (KAP) بين الأمهات في سن ≤ 18 عامًا في الضفة الغربية، فلسطين.

المنهجية: تم استخدام تصميم مقطعي في الدراسة التي أجريت في الأسر في الضفة الغربية/ فلسطين. الفئة المستهدفة في الأسر المقيمة في الضفة الغربية هي الأمهات اللواتي تبلغ أعمارهن ≤ 18 عامًا. تم أخذ العينات العنقودية الطبقية بحجم عينة إجمالي بلغ 720 أسرة.

النتيجة: تم العثور على العديد من الخصائص الاجتماعية والاقتصادية في 720 أسرة في الضفة الغربية تم مسحها؛ كانت غالبية أرباب الأسر تحت سن 40 عامًا، وكان 62.6٪ منهم حاصلين على شهادة جامعية. كان متوسط حجم الأسرة 4.4، و33.8٪ من الأسر تكسب ما بين 3001 و5000 شيكل شهريًا، و5.6٪ فقط من الأسر تلقت مساعدات غذائية. عانت 13.1٪ من الأسر من انعدام الأمن الغذائي، غالبًا نتيجة للصعوبات المالية، وكان لدى 3.3٪ من هذه الأسر أطفال جائعون. كانت نسبة ضئيلة (1.5٪) تعاني من نقص الوزن، في حين كانت الأغلبية (61.5٪) تعاني من زيادة الوزن أو السمنة، مما يشير إلى الحاجة إلى علاجات غذائية. وقد ارتبطت عوامل مثل التعليم والدخل والموقع والاعتماد على المساعدات الغذائية بانعدام الأمن الغذائي، مما يؤكد الحاجة إلى تقديم مساعدات موجهة للسكان المحرومين.

الخلاصة: إن انعدام الأمن الغذائي في الضفة الغربية معقد، كما تظهر هذه الدراسة، مع وجود اختلافات ملحوظة في الجوانب الاجتماعية والاقتصادية والديموغرافية والتغذوية والمعارف والمواقف بين الأسر. وقد تبين أن عوامل الخطر الرئيسية لانعدام الأمن الغذائي هي رؤساء الأسر في منتصف العمر، وانخفاض التحصيل التعليمي، والتفاوتات الجغرافية، ووضع اللاجئين، وضعف الدخل.

الكلمات المفتاحية: حالة الأمن الغذائي للأسرة، والحالة التغذوية، والمدخول الغذائي، وفقر الدم الناجم عن نقص الحديد، والمعارف والمواقف والممارسات المتعلقة بالتغذية.