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Evaluation of Iron Deficiency Anemia Management among Preschool Children Attending UNRWA Health Centers in the Gaza Strip: A Mixed-Study Approach

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Dedication

This thesis is proudly dedicated to my beloved parent who always have confidence in me and taught me to value myself.

To the light of my eyes, my husband and daughters who have been a source of unlimited support, encouragement and love.

To all my friends and family who gave me everything they can and stand with me in all my circumstances.

I would also like to dedicate this work to my supervisor

Dr. Mohammed Ellulu who gives me the faith and passion to complete this study.

To all I dedicate this work

Declaration

I certify that this thesis submitted for the degree of master is the result of my own work research, except where otherwise acknowledged and neither this thesis nor any of its parts had been submitted for higher degree to any other university or institution.

Signature: 

Walaa Sabri Ashour Salama

Date: 2/8/2023

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With sincere respect

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Abstract

Iron deficiency anemia is considered the most common type of nutrient deficiency with a widespread public health concern affecting about 2 billion people in the world. Several studies conducted recently in the Gaza Strip (GS) revealed that a greater deterioration than previously in macro- and micronutrient levels among preschool children was being observed despite the implementation of large-scale programs targeted toward anemia management. This study aims to evaluate iron deficiency anemia management programs among preschool refugee children attending the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) in the GS.

A mixed-methods design was used, involving both quantitative and qualitative data. The study began in February 2022, and it was completed in March 2023.The face-to-face interview questionnaire was used to collect quantitative data from mothers of anemic children under the age of five who received child health care services at UNRWA health care centers. In total, 400 mothers participated in the quantitative part of this study with a 100% response rate, and 100 child medical records were selected through systematic sampling technique and were reviewed, as well. Regarding the qualitative aspect, a non-probability purposive sample involving nine focus group discussions, comprising three with mothers of anemic children under the age of five who had recovered from anemia, three with mothers of anemic children under the age of five who had not yet recovered from anemia, and three with healthcare providers. Additionally, four key informative interviews were conducted with health managers working in the UNRWA health program. A consent form was created in accordance with the values of the Helsinki Ethical Declaration to ensure that participants' rights are safeguarded. The Statistical Package of Social Science software (SPSS) was used for the quantitative data entry and analysis, while MAXQDA analysis was used to analyze the qualitative data.

Results of the study have shown that mothers of under-five anemic children had a high perception level of the threat of anemia in their young children with the average total percentage for perceived severity and perceived susceptibility were 72.2% and 65.2% respectively. Participants expressed a high percentage score for perceived benefits (78.4%) and a low percentage score for perceived barriers (45.8%) to integration in anemia management programs. From client's perspectives, the main barriers to IDA management were poor infant and young children feeding practices (71.6%), affordability of iron-rich diet (54.6%), acceptability of iron supplement drops derived from their side effects (54.6%), and communication gaps between health care providers and beneficiaries (40.4%). A total of 76.8% of participants expressed their readiness to embrace healthier behaviors if prompted by a cue or stimulus, while 72.6% showed self-efficacy toward taking health action to manage IDA among their young children. Results of the medical records review revealed a high level of compliance of health care providers to the existing UNRWA policy for management IDA in children including the implementation of screening, prophylaxis, and treatment technical guidelines but need further improvement in the quality of documentation of multi-disciplinary plan of care and in follow-up notes that tracking the progress in anemia management. UNRWA IDA prevention and control program was considered relevant, coherent, and effective but the impact of social determinants of health had affected anemia management, as well UNRWA's financial crisis had its effect on the efficiency and sustainability of the program.

Greater efforts are needed on health awareness about issues related to IDA prevention and management among young children in both community and clinic level measures to mitigate barriers to the service integration besides ensuring continuous in-service training and capacity-building of health staff as well as enhancing communication channels, monitoring, and effective supervision to provide more quality services. Further large-scale research studies are needed to evaluate anemia prevention and control programs provided by different stakeholders and to evaluate other strategies adopted by UNRWA such as food fortification, sanitation, and deworming programs.

Table of Contents

List of Tables

List of Figures

List of Annexes

List of Abbreviations

AHO	Area Health Officer
ANOVA	Analysis of Variance
BCC	Behavior Change Communications
CBC	Complete Blood Cell Count
CDC	Centers for Disease Control and Prevention
CI	Confidence Interval
DHS	Demographic and Health Survey
DOS	Department of Statistics
EMR	Eastern Mediterranean Region
FAO	Food and Agriculture Organization
FFD	Ferrous Fumarate Drops
FFHO	Field Family Health Officer
FGDs	Focus Group Discussions
FNO	Field Nurse Officer
FSD	Ferrous sulfate drops
GS	Gaza Strip
GSE	General Self-Efficacy Scale
Hb	Hemoglobin
HBM	Health Belief Model
HFIES	Household Food Insecurity Experience Scale
HHI	Hidden Hunger Index
IDA	Iron Deficiency Anemia
ILS	Israeli New Shekel
INACG	International Nutritional Anemia Consultative Group
IYCF	Infant and Young Child Feeding
JPFHS	Jordan Population and Family Health Survey
KIIs	Key Informative Interviews
LAC	Latin America and the Caribbean
MAD	Minimum Acceptable Diet
MCH	Mean Corpuscular Hemoglobin
MCHC	Mean Corpuscular Hemoglobin Concentration
MCV	Mean Corpuscular Volume
MDD	Minimum Dietary Diversity
MHPSS	Mental health psychosocial support services
MMF	Minimum Meal Frequency

MNDs	Multiple Micronutrient Deficiencies
MNPs	Micronutrient Powder Supplementation
MoH	Ministry of Health
NaFeEDTA	Sodium Ferric Ethylenediaminetetraacetate
NCD	Non Communicable Disease
NGOs	Non-Governmental Organizations
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OECD	Organization for Economic Cooperation and Development
OECD-DAC	Organization for Economic Co-operation and Development's-Development Assistance Committee
oPt	occupied Palestinian territory
OR	Odds Ratio
PCBS	Palestinian Central Bureau of Statistics
PHC	Primary Health Care
PMMS	Palestinian Military Medical Services
RDW	Red Cell Distribution Width
SD	Standard Deviation
SDGs	Sustainable Development Goals
SMO	Senior Medical Officer
SPSS	Statistical Package of Social Science
sTfR	serum Transferrin Receptors
UI	Uncertainty Interval
UN	United Nation
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
USAID	United State Agency for International Development
WB	West Bank
WFP	Word Food Programme
WHO	World Health Organization
ZnPP	Zinc Protoporphyrin

Chapter One

Introduction

1.1 Background

Anemia is defined as a low level of hemoglobin (Hb) in the blood, as evidenced by a reduced quality or quantity of red blood cells (World Health Organization-WHO-, 2021[a]). Iron deficiency anemia (IDA) is considered the most common type of nutrient deficiency with a widespread public health concern as it is associated with an increased risk of morbidity and mortality (Abubakar, Tillmann and Banerjee, 2015). According to the estimates of the WHO, about 2 billion people in the world suffer from anemia and about 600 million preschool and school-age children are anemic (WHO, 2021[a]). The WHO lists IDA as one of the 10 top risk factors in developing countries for lost years of healthy life (WHO, 2021[a]). Children with IDA have cognitive and psychomotor impairment and iron treatment improves outcomes in iron-deficient children (Wang et al., 2013). Anemia is a significant economic burden as well, accounting for 68.4 million years lived with a disability which is estimated to be around 8.8% of total disability years and resulted in decreased work productivity in adults (Kassebaum et al., 2014).

In the Gaza Strip (GS), according to recent local studies, approximately 50 percent of people assessed had very low levels of essential minerals and vitamins (Radi, 2021). According to the WHO standards, anemia among children in the GS is a moderate public health problem. According to the Word Food Programme (WFP)-Executive Board in the State of Palestine country strategic plan (2018–2022), depleted levels of iron were found in 28 percent of the population, with an estimated prevalence of mild anemia in children aged 6–59 months averaging 20–24 percent, and moderate anemia at 8 percent (WFP, 2017). Thus, in the GS, like elsewhere, because anemia has many causes in addition to iron deficiency, many types of programs in the health sector and other social sectors have the potential to contribute to anemia prevention and control.

The United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA) is one of the main Palestinian healthcare providers that provides free access to Primary Health Care (PHC) services to 1.4 million Palestinian refugees through 22 PHC centers in the GS (UNRWA, 2021). UNRWA's health strategy for the prevention and

treatment of IDA is based on the WHO guidelines which advocates the approaches based on iron and folic acid preparations provided to vulnerable groups besides the promotion of public health measures for prevention and control of IDA. In addition, the UNRWA health program provides guidelines for the treatment of IDA for Palestinian refugee children, which consist of mandatory anemia screening and subsequent treatment as recommended by the WHO (UNRWA, 2020).

The researcher anticipations by conducting this study are to evaluate UNRWA IDA management programs among preschool children attending UNRWA's health centers in the GS. Providers and policy makers would benefit from the evaluation of healthcare services in improving performance as part of a continuous quality improvement cycle (Reeve, Humphreys and Wakerman, 2015). Besides, this could pave the way for additional studies to examine this matter more thoroughly and contribute to increasing knowledge about this health issue, assisting decision-makers in estimating future needs and necessary services, and for proper strategic planning to take the necessary steps aimed to improve the health status of Palestinians in the GS.

1.2 Statement of the Problem

Micronutrient deficiencies and inadequacies constitute a global health issue. Around one-third of the world's population suffer from anemia with South Asia and Africa carrying more than 80% of the burden (Hwalla et al., 2017). In almost all developing countries, between one-third and one-half of the female and child populations are anemic (Chaparro and Suchdev, 2019). According to the WHO estimation, the prevalence among pregnant women and children under 2 years of age is typically more than 50 percent (WHO, 2021[a]). Thus, anemia is one of the most common diseases of childhood particularly in developing countries (Chaparro and Suchdev, 2019).

The literature reveals that childhood anemia has short and long- term negative impacts on health since it has been associated with growth retardation, a higher risk of infection, and delayed cognitive and motor development (Allali et al., 2017). Iron deficiency can also negatively affect cellular immunity, even before the child becomes anemic, and this can lead to an increase in illnesses such as diarrhea, respiratory disease and other infections. These effects can be reduced by iron supplementation or food fortification (Bundy et al., 2018). Therefore, improving the Hb level of preschool age children as early as possible before it

becomes severe or chronic could yield substantial benefits in cognitive, psychosocial development and overall health (Sundararajan and Rabe, 2021). As a result, interventional programs should be implemented to prevent and reduce the rates of anemia.

In the GS, although many attempts have been made over the past few decades to put programs in place to prevent iron deficiency, there has only been minimal overall success (Radi, 2021). In 2020, UNRWA found that the overall frequency of anemia was high among Palestinian refugee children in the GS as the overall prevalence of anemia, defined as Hb level <11.0 g/L, was 54.7 among children < 3 years of age while abnormal Hb result for children at one year was reported to be 77.2% (UNRWA, 2021). Likewise, according to the Palestine Ministry of Health (MoH) annual report in the GS (2020), it is estimated that about 70.2% of children between the ages 12-15 month registered in the ministry health care centers are suffering from IDA (MoH, 2020). Considering these high rates raised the concern whether the control strategies and policies for combating IDA are effectively implemented in the GS or not. Whether this slow progress is explained by a lack of scientific understanding of the prevalence, causes, or effects of iron deficiency or due to failure in the implementation of effective intervention programs, is not well known. Most studies conducted in the GS focus on determining the prevalence and associated factors of anemia among different age groups. While to the best of our knowledge, there is a dearth of studies that evaluated IDA management programs implemented to prevent and control IDA among Palestinian's refugee children. Thus, this study attempts to fill such information gap by providing illuminations about the extent of IDA policy implementation through the evaluation of IDA management programs among preschool children attending UNRWA health centers in the GS.

1.3 Justification of Study

Although evidence-based recommendations for reducing childhood anemia in high anemia prevalence countries are available, there is a dearth of information about the extent of effectiveness of intervention program and degree of successful in policy implementation to reduce anemia among vulnerable groups in the GS. Thus, this study has adopted a mixed design aiming to address this knowledge gap by examining the current information status. Additionally, the study seeks to identify successful aspects that can be utilized to create a supportive environment and culture for informed decision-making in the future.

To that end, the primary aim of this study is to evaluate IDA management programs taken to cut down the rates of anemia among refugee children attending UNRWA health centers in the GS. The research will be useful for different parties; for researchers it will add to body of knowledge; for community it will try to determine main barriers for application of childhood anemia policy; for health care system it will enhance more effective implementation of the current policy and search for other alternative options to reduce the prevalence of childhood anemia; for policy makers will help in strategic planning and conducting effective program according to the population needs and for practitioners as it will clarify the main obstacles that face our community in his battle against this universal problem.

1.4 Aim of the Study

The aim of the study is to evaluate IDA management programs among preschool children attending UNRWA Health Centers in the GS. The study is looking ultimately to provide policy makers and health care providers with recommendations that might help in reducing the prevalence of anemia among under-five refugee children which could contribute in reduction of the morbidity and mortality related to this disease besides the promotion of wellbeing and improving health outcome of Palestinian children.

1.5 Objectives of the Study

1. To assess mother perceptions about IDA among their children.
2. To identify how the mothers of anemic children react regarding the participation in IDA prevention and control health programs offered to them through UNRWA health centers in the GS.
3. To ascertain the degree of compliance of health care providers to the existing UNRWA policy for management of childhood IDA including the implementation of screening and treatment technical guidelines.
4. To appraise the degree of success in policy implementation programs to manage and control IDA among preschool children attending UNRWA health centers in the GS.
5. To develop recommendations that might help in improving IDA management programs among preschool children attending UNRWA health centers in the GS.

1.6 Context of the Study

1.6.1 Geographical and Demographical Context

The GS is part of occupied Palestinian territory (oPt) located on the south-eastern side of the Mediterranean Sea. According to Palestinian Central Bureau of Statistics (PCBS), by mid-2022 the estimated Palestinian population living in the oPt were 5.35 million, with 2.17 million of the reported population exists in the GS and accommodate in only 365 km^2 area of land (PCBS, 2022). Thus, the GS is considered as one of the most densely populated areas around the world with approximately 5,204 individuals per square kilometer (PCBS, 2018[a]). The current population is distributed across five Governorates: North Gaza, Gaza City, Mid Zone, Khan-Younis and Rafah, from north to south respectively. UNRWA-registered refugees comprise two-thirds (70%) or 1.52 million of the population of the GS (UNRWA, 2021). About 63.7% of the GS people live in urban areas, 5.1% in the rural areas, and 31.2% in refugee camps (PCBS, 2018[a]). There are eight refugees' camps distributed along the five governorates where almost 600,000 registered refugees settle on these camps, representing about 37% of the total population living in the GS (UNRWA, 2023). Gaza camps are characterized with high levels of poverty, poor infrastructure and lack of services.

Looking at the demographic distribution, almost half of the Palestinian society are children. Within the oPt children comprise 44% of the population, youth aged 18 to 29 comprise 22% while persons aged 60 years and older comprise 5% (PCBS, 2018[a]). The estimated number of children under 18 years is 2.35 million in Palestine by mid-2022, with 1.20 million males and 1.15 million females whereas the proportion of population aged under 5 years in GS was 15.1% (MoH, 2021) with the reported total number of children 0-5 years registered within UNRWA in the GS was 195,685 child (UNRWA, 2021). Growth rate of registered refugees in the GS according to the UNRWA annual health report 2021 was 3.8 % with an average family size 5.6 and dependency ratio 71.1 (UNRWA, 2021).

1.6.2 Socioeconomic Context

Gaza's poverty rate in 2011 was 38%; According to PCBS by the end of 2017, it had increased to 53% with 33.7% of the population was living in extreme poverty (PCBS, 2018[b]). At the end of the third quarter of 2022, PCBS stated that 81.5% of the population were living in poverty which is similar to what was reported by United Nations Development

Programme (UNDP) and United Nations Office for the Coordination of Humanitarian Affairs (OCHA) which indicated that between 70-80% of Gazans were living below poverty line (OCHA, 2022). 45% of the agricultural land in Gaza is out of production and unemployment affected 46.6%of the Gazans (48.1% for refugees in camps) (OCHA, 2022). The effects of the Coronavirus pandemic have caused a dramatic reduction in the Palestinian economy, since most economic activity have seen value-added setbacks, which has resulted in a noticeable drop in gross domestic product per capita and an increase in unemployment rates with new segments of the population entering the poverty cycle (PCBS, 2018[b]). Furthermore, 64.4% of Gazans households reported having severe or moderate food insecurity, and 40.7% of those reported having very severe food insecurity (WFP, 2022). People living in poverty often go hungry and have limited access to safe drinking water, adequate sanitation or healthcare services. About 70% of the citizens of the GS receive aid from UNRWA, which employs 13,000 people and provides assistance and protection for about 5.6 million Palestinians (UNRWA, 2023). United Nations Children's Fund (UNICEF) estimated that 125,967 children under 5-years of age (35%) are at risk of not meeting their full developmental potential due to poverty, poor nutrition, lack of access to basic services, and high levels of family and environmental stress and exposure to violence. This situation is often further intensified by inadequate care and learning opportunities (PCBS, 2015).

1.6.3 Environmental and Nutritional Context

The relationship between the environment and health is well established. In the GS, the high population density combined with severe poverty creates a high-risk environment for the spread of diseases and malnutrition related illnesses. Organization for Economic Cooperation and Development (OECD) classified Gaza as a "highly fragile" region where conditions are worsened by a devastating Israeli blockade that affects all aspects of life, including water, sanitation, hygiene, as well as healthcare and economic development (OECD, 2016). Likewise, UNICEF referred to the fact that the basic infrastructure in Gaza, including municipal and social services, water, sewage, and power, is struggling to keep up with the demands of the expanding population (PCBS, 2015). Additionally, WFP reported that 23% of households in Gaza had a sub-optimal food consumption score; 80% of these households receive some form of humanitarian aid (PCBS, 2015). These households do not consume enough iron-rich food groups, leading to a high risk of iron deficiency anaemia. Consequently, the coping strategies adopted by poor household for handling such situation

are to reduce the number of meals and the variety of foods consumed. UNICEF and UNFPA warned that a combined indicator that measures how much of the nutritional needs of the children are met, named “minimum acceptable diet”, is at a dangerously low level of only 14% (PCBS, 2015). Furthermore, WFP reported that the majority of households receive infant formula through relief agencies and more than 6% of infants have never been breastfed, and more than 55% of infants are not exclusively breastfed. Breastfeeding continuation occurs at very low rates, being 45% after one year and 12.5% after two years (WFP, 2022). Accordingly, the majority of people cannot achieve their daily calorie requirements due to food insecurity and rising poverty. Additionally, more than 90% of the water in Gaza, has been determined to be unsafe and unfit for human consumption (OECD, 2016). Moreover, the rising prices for basic goods and fuel had further amplified the hardship situation for a population facing chronic energy and water crises. Wheat flour prices climbed by 49% between July 2021 and July 2022 and by 33% from February to July 2022 (at the start of the Ukrainian conflict), consequently more households experienced food insecurity (OCHA, 2022). Due to this circumstances, UNRWA's emergency aid serves as a crucial social safety net for Palestinian refugees. In July 2022, the Multisectoral Needs Assessment was undertaken. It revealed that 73.2% of Gaza families have acknowledged receiving aid from UNRWA (OCHA, 2022).

1.6.4 Health Status

MoH utilizes a variety of health indicators to regularly evaluate its performance. These health indicators are measured on a regular basis to maintain a systematic monitoring and evaluation system, which includes effectiveness, efficiency, appropriateness, and impact of services given, and to offer sufficient information on the overall performance of the health sector (MoH, 2021). According to PCBS, it is estimated that the crude birth rate in Palestine in 2022 was 29.1 births per 1000 population. In the GS, 32.4 births per 1000 population were recorded while the crude death rate in the GS was 3.4 deaths for every 1000 of population with a growth rate 2.8 (PCBS, 2022). In 2019/2020, infant mortality for Palestinians in the oPt was 12 per 1000, higher for children born in refugee camps (17 per 1000), while the under-five mortality was 14 per 1000 and higher for boys (16 per 1000) than girls (12 per 1000) (PCBS, 2022). According to Palestine MoH annual report 2021, the reported under-five mortality rate in GS was 13.5 deaths per 1,000 live births with the reported infant mortality rate in GS was 10.6 per 1,000 live births (MoH, 2021[a]). The total fertility rate in

Palestine was 3.8, with a higher rate in GS 3.9 compared with 2.8 in West Bank (WB). The natural increase rate of population in Palestine was 2.4, with natural increase rate 2.2 in WB compared with 2.8 natural increase rate in GS. By 2020, the life expectancy in the oPt was 74.1 years with a higher number in the WB (74.4 years) in comparison to that in the GS (73.7 years) and with higher life expectancy for girls and women (75.3 years) than boys and men (73.3 years) (PCBS, 2022).

1.6.5 Health Care System

Palestinian health care system is complex since there are five primary healthcare service providers in the GS; MoH, UNRWA, Non-Governmental Organizations (NGOs), Palestinian Military Medical Services (PMMS), and commercial private for-profit service providers (MoH, 2020). MoH is the main health care provider in the governorates; it provides PHC, secondary and tertiary services for the whole population. MoH has 491 PHC clinics; in the GS there are 52 PHC clinics, and in WB there are 439 PHC clinics (MoH, 2021). Through a network of 140 primary healthcare centers spread over its five operational sectors; including Jordan, GS, WB, Lebanon, and Syria; the UNRWA Health Program provides comprehensive, vital, and important PHC services to Palestine refugees, besides paying for secondary and tertiary care as necessary. In the GS, there are 22 UNRWA PHC facilities (UNRWA, 2021). The NGO sector includes community health centers, facilities supported by international organizations and missionary hospitals. They have 192 PHC, which account for 26% of all PHC in Palestine; 112 are in the WB and 80 are in the GS (MoH, 2021). The PMMS also provide primary, secondary and tertiary health care services in co-operation with local and international organizations, there are 17 PHC centers administrated by PMMS in Palestine, 5 of these centers exist in the GS. The private for-profit health sector also provides the three levels of care through a wide range of practices (MoH, 2020). Despite the availability of a variety of healthcare providers, the required healthcare services are not adequately covered due to the growing burden on the healthcare system, which must address not only the current challenges of occupation, siege, and political divisions but also the growing demands for healthcare services brought on by the ongoing growth in population (PCBS, 2022). In addition, the conflicts, repeated hostilities, the continuous Israeli blockade imposed on the GS and the impact of COVID-19 have created additional stress and trauma on the existing overstretched health sector, as hospitals continue to lack the necessary physical infrastructure, medications, and supplies, which

makes it difficult for health care systems to maintain adequate access to equitable, affordable, comprehensive and quality health services. Consequently, due to the availability of drugs, the high standard of services, and the fact that most households cannot afford alternative options, UNRWA PHC services are fast becoming the sole dependable option for health care for most households (OCHA, 2022).

1.7 Operational Definitions

1.7.1 Anemia

Anemia is a condition in which the number and size of red blood cells, or the Hb concentration, falls below an established cut-off value, consequently impairing the capacity of the blood to transport oxygen around the body (Kumar and Clark, 2012). In accordance to the WHO, the cut off level to diagnose anemia depend in Hb level in specific age group. Therefore, anemia is considered when Hb levels fall below 11 g/dL in the aged 6 months to 5 years, 11.5 g/dL in children aged 5–12 years, and 12 g/dL in teenage girls aged 12 years and 13 g/dL in adolescent boy (WHO, 2021[a]).

1.7.2 Childhood Anemia

Pediatric or childhood anemia refers to a Hb or hematocrit level lower than the age-adjusted reference range for healthy children (Wang, 2016). In this study, the researcher used the term preschool children to express the age group less than five years old. According to the UNRWA guidelines, the threshold for diagnosing childhood anemia is Hb level <11 g/L (UNRWA, 2021).

1.7.3 Iron Deficiency Anemia (IDA)

The total body iron in a 70 kg person is about 4 g with 2.5 g of iron incorporated into the Hb (Kumar and Clark, 2012). IDA develops when body stores of iron drop too low to support normal red blood cell production. This occurs when the body's iron demand exceeds that of its supply**.** Inadequate dietary iron, impaired iron absorption, bleeding, or loss of body iron in the urine may be the cause (Wong, 2017). According to the UNRWA the term IDA is used interchangeably with anemia until proven otherwise.

1.7.4 Policy Evaluation

Policy evaluation is the systematic collection and analysis of information to make judgments about contexts, activities, characteristics, or outcomes of one or more domain(s) of the Policy Process. Evaluation may inform and improve policy development, adoption, implementation, and effectiveness, and builds the evidence base for policy interventions (Vedung, 2017).

Chapter Two

Literature Review and Conceptual Framework

2.1 Conceptual Framework

A conceptual framework is a procedure in which the research problem would best be explored, the specific direction the research will have to take, and the relationship between the different variables in the study (Huberman and Miles, 1994). Therefore, conceptual frameworks can be supposed as a system of concepts, assumptions, and beliefs that support and guide the research plan through offering a logical structure of connected concepts to provide a picture or visual display of how ideas in a study relate to one another within the theoretical framework (Luse, Mennecke, and Townsend, 2012).

The researcher adopted the Health Belief Model (HBM) as a conceptual framework, to provide a sound theoretical basis for understanding the factors that influence IDA management decisions. HBM gives a better information to evaluate the relationship between health-related beliefs or factors and the child caregiver's behaviors (Strecher and Rosenstock, 1997). Using this model, mode of IDA management, mothers of anemic child choices and its determining factors were explored within six core domains in the HBM, namely: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and perceived self-efficacy. Each domain has different variables.

In addition to these six core domains, there are other relevant variables whose components interact with the core domain's components dynamically.

Domains and variables that were well-thought-out in this study are illustrated in the following figure which was developed by the researcher, and adopted HBM taking in consideration to study these interrelated factors by using a mixed approach:

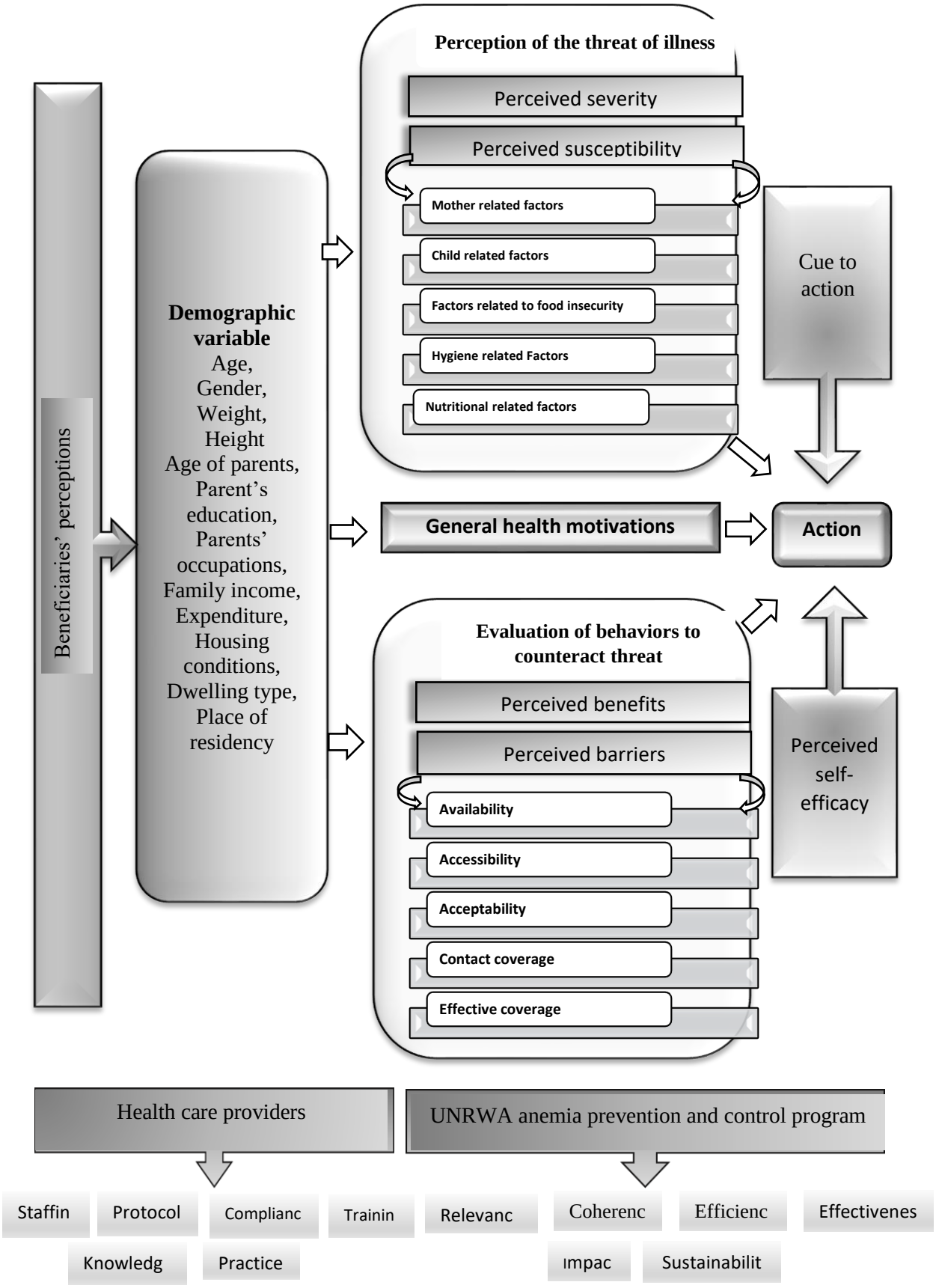

Figure (2.1): Conceptual framework of the study

The following domains and variables were taken into account in this study:

2.1.1 Socio-Demographic Factors

These are the factors related to social and economic conditions of the child and his family and includes the age, gender, weight, and height of the anemic child; the age of his parents; parent's education; parents' occupations; family income and expenditure; housing conditions in terms of dwelling type and place of residency of the child family.

2.1.2 Perceived Severity

Perceived severity is defined as one's belief in the intensity of the medical condition and its undesirable outcomes (Strecher and Rosenstock, 1997). Most mothers have a tendency of taking their children to hospital early upon recognizing life-threatening conditions for example fever and convulsions. On the contrary, anemia does not present with danger signs in its early stage and this can make mothers not to perceive it as a serious condition. On the other side, if it is believed that there are very serious or intolerable complications associated with IDA or of not using anemia prevention and control program, health care providers as well as caregivers would be more likely to be more adherent to IDA management protocols, to reduce the child risk.

2.1.3 Perceived Susceptibility

This domain describes factors related to person's belief in the vulnerability to some medical condition. The more a person believes is at great risk, the more likely that the person will adopt a particular health-related behaviour to minimize such risk. Mothers may not perceive that their children are at risk of anemia and they may not appreciate the importance of giving their children required nutrition to prevent anemia which can lead to the development of IDA and its complications. Thus, several issues related to the perception of child susceptibility to IDA were explored by this study, including the followings:

2.1.3.1 Mother Related Factors

This domain describes factors related to mother health condition and diseases as chronic illness that affect her ability in taking care of her child, number of children the mother should care for, space between her pregnancies, mother Hb level when she was pregnant with her

anaemic child, history of any adverse events came about while she was pregnant with her child as these factors could indirectly affect the child health and his Hb level.

2.1.3.2 Child Related Factors

Child related factors are those factors related to child health conditions that could contribute to anaemia development, such as chronic diarrheal disease in children which can causes malabsorption and undernutrition that would affect red blood cell production as well. Other chronic diseases cause anaemia due to inflammation or swelling of tissues and result in anaemia of chronic diseases.

2.1.3.3 Hygiene Related Factors

The advantages of improved hygiene and sanitation are well-documented and widely acknowledged as a cost-effective, simple-to-implement, practical, and useful public health strategy for the prevention of infection and controlling the transmission of pathogens that can be considered as one of the primary causes of IDA among children under five years old. Many international policy documents have supported the significance of ensuring optimal sanitation and hygiene practices. Thus, this domain describes factors related to hygiene and sanitation including whether household have improved latrine (toilet), utilize a good type of toilet facility, have improved handwashing facility with water and soap and whether child and his family take the deworming medication in regular base.

2.1.3.4 Nutritional Related Factors

Adequate nutrition during infancy and early childhood is critical to the development of children's full human potential. For the first six months of life, exclusive breastfeeding is essential and sufficient. However, it is advised to begin nutritionally-adequate, safe, age-appropriate complementary feeding after the six months of age because breast milk is no longer enough to meet infant's nutritional requirements. Child nutritional status affect blood level as under nutrition can cause poor red blood cell production while improving the food habit and eating healthy nutrient rich food can prevent the occurrence of anemia. In addition, the proportions of chemicals that either increase or decrease dietary iron absorption have a significant impact on how much iron is absorbed from food. When drunk with a meal or soon after, tea and coffee reduce the body's ability to absorb iron. Heme-food sources; mostly red meats; contain iron that is highly absorbable and help other food sources with lower iron

bioavailability absorb iron more readily. As well, vitamin C (ascorbic acid) is a potent booster of iron absorption from non-meat foods when taken with a meal (UNRWA, 2020). Minimum Dietary Diversity (MDD) and Minimum Meal Frequency (MMF), which make up Minimum Acceptable Diet, are two sub-indicators that are crucial for understanding how children's diets are adequate.

2.1.3.5 Factors Related to Food Insecurity

Food and Agriculture Organization (FAO) defined food security as a "situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 1996)**.** Conversely, food insecurity can be considered as the disruption of food intake or eating patterns due to lack of money or other resources.

This domain describes factors related to social and economic conditions of the family as poor are at greater risk of anaemia due to lack of income and other resources that prevents them from consuming a diet with adequate, well absorbed iron. The researcher adopted the Household Food Insecurity Experience Scale (HFIES) which is a method developed by the United Nations FAO to provide an internationally comparable estimate of the severity of food insecurity experience. It consists of eight questions about respondents' access to adequate food, focusing on self-reported experiences associated with difficulties accessing food.

2.1.4 Perceived Barriers

Perceived Barriers refers to an individual's perception of the difficulties stopping them from following a specific health-related behaviour. Thus, this domain describes the perceived barriers related to the availability and affordability of iron rich sources for the anemic child. Because iron is a highly income elastic micronutrient, thus when family incomes rise, families tend to buy more meat, which contains heme-iron that is better absorbed than the iron in most plant products (nonheme iron) (Powers et al., 2020). In addition, lack of income may prevent the poor households from utilizing health services and lead to poor sanitation conditions and practices.

Moreover, barriers due to dearth of accurate information about achieving and maintaining a healthy diet rich in iron can prevent mothers from practicing preventive measures and from

preparing iron rich food to their children. Therefore, maternal and child health care services are an appropriate site for delivering anemia interventions.

Access to health care services is the possibility of reaching health care facility and obtaining the required service and information. It includes access to information, financial access and affordability of service, physical access, availability of the skilled health provider and access to medication. These factors affect the enrollment of mothers and their children to services to get the needed mother and child care.

In order to understand shortcomings in potential coverage the researcher use the Tanahashi model. The Tanahashi model consists of five distinct and vital stages required in sequential order to predict effective coverage of health services (Tanahashi, 1978). The model emphasizes that the first step toward achieving universal effective coverage is the availability of essential goods and human resources (availability coverage). This is followed by the development of strategies aimed at reducing barriers to health intervention accessibility (accessibility coverage). Tanahashi suggested that after coverage for accessibility and availability is in place, additional aspects like affordability, values, and beliefs be taken into consideration to boost a population's desire to adopt an intervention (acceptability of coverage). The population's first and ongoing interactions with service providers and necessities (contact coverage), which will lead to quality coverage (effectiveness coverage), also have an impact on integration in the services. At each coverage level, a number of health system variables interact to affect how services are integrated (Tanahashi, 1978).

2.1.5 Perceived Benefits

The awareness that a certain health behaviour can have a favourable impact on outcomes is known as perceived benefits. Benefits of child health as well as an expectation of fulfilment and satisfaction with the offered health care have been recognized as crucial variables in IDA management decision-making.

2.1.6 Cues to Action

Cues to action are the elements that guide people in making decisions about their health. Advice from relatives, friends, health care professionals, as well as an awareness of the rights of women to have a choice in therapy decisions (autonomy), to consider alternative treatment approaches based on individual values and preferences, highlighting the sense of parent-child connection (relatedness), have the ability to successfully give iron therapy

(competence) are crucial factors guiding the maternal decision on her child IDA management.

In addition, social and behavior change communication is an interactive approach to any intervention that develops communication strategies, promotes positive behaviors that are appropriate for people settings, and creates a supportive environment that enables people to initiate, sustain, and maintain positive and desirable behavior outcomes (Kennedy et al., 2018). Thus, exposure to mass media, common prints and electronic media, newspaper and listening to the radio or watching television are important because these sources provide mode of communication on health-related topics. Health-related messages can encourage women to improve nutrition for their under-five children hence preventing nutritional deficiencies in which anemia is one of them and it can also help mothers to recognize signs and symptoms of anemia early and seek medical attention promptly.

2.1.7 Perceived Self-Efficacy

Self-efficacy is defined as the conviction that one can successfully execute the behavior required to produce the outcomes (Bandura, 2006). This refers to the level of a person's confidence in his or her ability to successfully perform a behaviour. Perceived self-efficacy facilitates goal-setting, effort investment, persistence in the face of barriers and recovery from setbacks. It can be regarded as a positive resistance resource factor (Bandura, 2006).

The researcher adopted The General Self-Efficacy Scale (GSE) to describe factors related to perceived self-efficacy to reflect the belief and degree of confidence that one can perform innovative and difficult tasks. The scale is unidimensional, consist of ten items that refers to degree of successful in coping strategies that adopted by individuals in face of barriers and other challenges that could attribute to success in adoption a health behavior (Jerusalem and Schwarzer, 1992).

2.1.8 Service Delivery

UNRWA anemia prevention and control program is also influenced by a health care provider’s attitude, beliefs, and understanding of the disease. By having a well-integrated health care system, having excellent communication skills and with appropriate compliance with technical instructions, health staff can further affect the patient's view. Each of these

variables affects the service's delivery, which affects the effectiveness of the IDA prevention and control services that are being provided.

2.1.9 Evaluation of UNRWA Anemia Prevention and Control Program

Evaluation gives vital information about the health system's ability to effectively and efficiently promote population health, and performance assessment is essential in guiding various stakeholders in their decision-making (Vedung, 2017). The six assessment criteria; relevance, coherence, effectiveness, efficiency, impact, and sustainability; set forth by the OECD DAC Network on Development Assessment are used to serve as the cornerstone for analytical judgments about the merit or worth of UNRWA anemia prevention and control program intervention.

2.2 Literature Reviews

This section reviews the literature to provide an overview of anemia definition, diagnosis, risk factors, prevalence, causes and effects in children below five years old. The chapter also reviews the strategies for preventing and management of IDA in children besides the critical role of iron supplementation, food fortification and nutrition education together with possible barriers to optimal iron utilization by children.

2.2.1 Anemia Definitions and Scope among Young Children

Anemia is a condition in which the number and size of red blood cells, or the Hb concentration, falls below an established cut-off value, consequently impairing the capacity of the blood to transport oxygen around the body (WHO, 2021[a]). In accordance to WHO, the cut-off level to diagnose anemia depend in Hb level in specific age group. Subsequently, anemia is considered when Hb levels fall below 11 g/dL in the aged 6 months to 5 years; 11.5 g/dL in children aged 5–12 years; and 12 g/dL in teenage girls aged 12 years and 13 g/dL in adolescent boys. Also, anemia is classified according to Hb level as mild anemia when the Hb level falls between 10.0-11.0g/dL, moderate anemia when Hb levels falls between 7.0-9.9g/dL and severe anemia once the Hb level decline below 7.0g/dL.

Anemia has multiple causes but the main three mechanisms through which anemia develops are: ineffective erythropoiesis which refers to insufficient, or abnormal red blood cell production; excessive red blood cell destruction which sometimes is termed hemolysis; and excessive red blood cell loss (Kumar and Clark, 2012). Other contributing causes may include poor nutrition related to dietary intake, dietary quality, sanitation, and health

behaviors; adverse environmental conditions; lack of access to health services; and poverty (WHO, 2021[a]).

Iron is an essential component of Hb, which is needed to make red blood cells (Chaparro and Suchdev, 2019). If there is not enough iron in the diet or if it is not well absorbed, the body cannot meet its requirement for iron resulting in IDA development. International Nutritional Anemia Consultative Group (INACG) and the WHO elucidate that nutritional iron deficiency is considered a major form of malnutrition throughout the world that causes about 50 percent of anemia worldwide making it the single largest cause of anemia (WHO, 2021[a]).

In addition, iron requirements increase at certain stages in the life cycle such as during childhood period, adolescence and pregnancy. Therefore, children are particularly vulnerable to IDA especially in the first two years of life because of their increased iron requirements in the periods of rapid growth (Powers et al., 2020). Therefore, feeding practices adopted during this period greatly influence children's iron status.

Among children, iron insufficiency and IDA can also be caused by reduced iron supply due to celiac disease, symptomatic giardiasis and insufficient oral iron intake for cultural or religious reasons (Sandnes et al., 2021). Chronic and recurrent infections such as diarrhea, malaria, sickle cell anemia and human immunodeficiency virus are other causes of IDA in underdeveloped nations (Akin et al., 2016). Moreover, poor sanitation may result in parasite infection such as hookworm; which is one of the most prevalent tropical infections worldwide and despite its close relationship with IDA in impoverished countries is frequently neglected and left untreated (Loukas et al., 2016). In sporadic cases, iron refractory IDA is a rare autosomal recessive iron metabolism condition result from mutations in the TPMRSS6 gene and characterized by IDA that is resistant to oral iron but responds to parenteral iron treatment (Akin et al., 2016).

In addition, it appears that maternal anemia during pregnancy, insufficient nutrition and a combination of unfavorable socioeconomic determinants have the greatest impact on childhood anemia. Between November 2000 and February 2001 in a small Jewish town in southern Israel, a study was done using a structured questionnaire on 101 infants and mothers of these infants. A multivariate logistic regression analysis revealed a significant and inverse relationship between the presence of anemia and the level of maternal knowledge (odds ratio

= 5.6, 95% Confidence Interval (CI) 1.6–9.7; P = 0.006) and reported adherence with iron supplementation (3.2, 1.1–9.7; P = 0.04). Therefore, the study concluded that the presence of anemia in infants and level of maternal knowledge were inversely related, with low knowledge of anemia leading to a 12-fold increase in prevalence of anemia in infants compared to women with higher levels of knowledge (Bilenko et al., 2007).

Similarly, recent a cross-sectional study of 100 anemic preschool children aged 36–59 months was conducted in Jordan to assess maternal level of education and nutritional practices. The result showed a significant statistical relationship between maternal educational level and Hb level ($\chi^2 = 8.820$, $p = 0.012$) (Al-Suhiemat, Shudifat and Obeidat, 2020). Similarly, qualitative research was conducted in Peru, to understand mother's perspective of pediatric anemia and on how to prevent and treat anemia. The study revealed that mothers expressed concerns about utilizing ferrous sulfate and many women did not understand the reason for supplementation provided through child health care (Louzado-Feliciano et al., 2020). Even when the benefits of iron supplementation are known, mother showed negative attitudes towards iron supplementation, derived from side effects, concerns with the medication bad taste, or fears of adverse outcomes which lead to non-compliance with health advices provided by health practitioners (Louzado-Feliciano et al., 2020). Accordingly, as suggested by Wang, understanding and then addressing the determinants of these behaviors is essential to enhancing anemia services (Wang, 2016).

2.2.2 Diagnosis of IDA

Mild and moderate anemia are usually asymptomatic. Therefore, clinical assessment alone will not detect all people with anemia. Consequently, clinical assessment should be complemented by laboratory confirmation (Kumar and Clark, 2012).

IDA is a microcytic and hypochromic anemia in which, Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC) are all low in the Complete Blood Cell Count (CBC) (Kumar and Clark, 2012). Other laboratory features include low red cell count, high Red Cell Distribution Width (RDW) and, anisocytosis (variation measure of red blood cell size), low reticulocyte counts or reticulocyte production index, low hemoglobin A2, with frequent thrombocytosis. Additionally, there are many biochemical markers of IDA including low serum iron, low serum ferritin, decreased transferrin saturation, increased total iron-binding capacity,

elevated soluble serum transferrin receptors (sTfR), elevated serum zinc protoporphyrin (ZnPP), and low serum hepcidin-25 which is the active form of hepcidin. However, as ferritin is an acute-phase protein, it can be deceptive in children with IDA and other illnesses. At the same time sTfR and ZnPP measurements are not generally available and costly. Likewise, hepcidin is almost only utilized for research due to the lack of a gold standard test assay and the ongoing worldwide harmonization efforts (Lasocki et al., 2018).

In the recent two decades, the proportion of hypochromic erythrocytes, particularly CHr (hemoglobin content of reticulocytes or RET-He) has emerged as a credible indication of IDA and response to iron treatment. CHr is an early predictor of iron-restricted erythropoiesis, or the second stage of iron shortage preceding the onset of overt anemia, since it quantifies the functional iron available for erythropoiesis over the previous three days. In addition, unlike ferritin, CHr is unaffected by inflammation. In a juvenile Italian trial, CHr combined with absolute reticulocyte count was able to identify early responders to oral iron treatment among IDA patients, allowing unresponsive children to be offered alternate regimens (Mantadakis, Chatzimichael and Zikidou, 2020).

2.2.3 Burden of Anemia

Anemia is an indicator of both poor nutrition and poor health. The WHO classifies anemia as a mild, moderate, or severe public health hazard if the prevalence of anemia in a population is 5-20 percent, 20–40 percent, or >40 percent respectively (WHO, 2021[a]). Therefore, countries with more than 10 percent anemia prevalence in one or more of the vulnerable groups should consider anemia as a significant public health problem requiring priority attention. In the majority of the WHO nations, anemia is a moderate-to-severe public health concern affecting over 20% of women and young children (WHO, 2021[a]). In addition, iron deficiency is the 9th most common modifiable risk factor for mortality, according to the Global Burden of Disease research (Vos and et al., 2016). Untreated iron deficiency leads to the development of IDA. In African and Southeast Asian nations, anemia contributes to child mortality by causing malnutrition and increasing susceptibility to infection (Bundy et al., 2018).

Normal myelin production requires iron as iron is required for both maturation and function in myelin-producing oligodendrocytes (Volpe, 2019). Furthermore, iron is important for learning and memory, as well as the speed with which the brain processes information. Early

iron insufficiency is extremely harmful to the developing hippocampus (Armitage and Moretti, 2019). As a result of early iron shortage, a negative impact on the developing brain can arise due to disturbance in myelination and important dopamine pathways (Volpe, 2019). Evidence based studies proved that IDA at a young age may be linked to long-term cognitive damage, impaired learning capacity, and alterations in motor function which may be irreversible even when iron reserves are replenished. So, children with iron deficiency should be treated without delay as soon as feasible (McCann, Perapoch Amadó and Moore, 2020).

2.2.4 Epidemiology of IDA

Every infant and child have the right to good nutrition according to the "Convention on the Rights of the Child" (Taghizade et al., 2015). WHO/UNICEF have emphasized that the first 1000 days of life is a critical window period for nutritional interventions (WHO, 2003). Despite this, malnutrition remains a serious burden of a public health concern among children. The WHO define malnutrition as deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients (WHO,2021[b]). Undernutrition contributes to about 45% of deaths among under-five children with the burden being high in low- and middle-income countries (WHO, 2022). Moreover, the burden of micronutrient malnutrition; in particular deficiencies in key micronutrients such as iron, vitamin A, iodine, and zinc; is estimated to affect 2 billion people worldwide (WHO, 2021[a]). The term hidden hunger is synonymous with micronutrient deficiencies as it refers to the invisible nature of the problem and the lack of overt and evident symptoms (Muthayya et al., 2013). Therefore, adequate nutrition is recognized as one of the main pillars of public health interventions worldwide. In 2013, the first global Hidden Hunger Index (HHI) was developed to provide an advocacy tool for stimulation a greater investments and attention from policy and decision-makers to eliminate hidden hunger in the high-burden countries (Muthayya et al., 2013).

Recognizing the importance of nutrition for development, in 2015, United Nation (UN) member states adopted an ambitious target: to end malnutrition in all its forms by 2030 as part of the Sustainable Development Goals (SDGs) (target 2.2). This was taken onward by the UN Decade of Action on Nutrition 2016–2025 and adopted in 2015 by the UN with an emphasis to end malnutrition in all its forms at all parts of the lifecycle (Amoroso, 2018). Moreover, the WHO and UNICEF jointly developed the Global Strategy for Infant and Young Child Feeding (IYCF) to improve the nutritional status and the general health of

young children. Accordingly, the WHO developed indicators to assess children's dietary adequacy according to eight key components of feeding practices and dietary provision which includes the following: early initiation of breastfeeding; exclusive breastfeeding to 6 months of age; continued breastfeeding at 1 year of age; timely introduction of complementary foods; MMF; MDD; consumption of iron-rich or iron-fortified foods; and feeding a minimally acceptable diet (WHO, 2021[b]). Despite this the Global Nutrition Report showed that there is inadequate implementation of policies, programs and interventions vital to ending malnutrition, even for those with proven efficacy or effectiveness (Fanzo et al., 2019).

In 2022, The Lancet Glob Health published a study that reanalyzed individual-level biomarker data for micronutrient status globally in seven regions using 24 nationally representative surveys done between 2003 and 2019. The study concluded that the estimated global prevalence of deficiency in at least one of three micronutrients including iron to be 56% among preschool-aged children equivalent to 372 million (95% UI 319–425). Regionally, three-quarters of preschool-aged children with micronutrient deficiencies live in south Asia (99 million, 95% UI 80–118), sub-Saharan Africa (98 million, 83–113), or East Asia and the Pacific (85 million, 61–110) (Stevens et al., 2022).

The WHO and World Bank categorized countries based on the prevalence of anemia into four groups. Normal prevalence countries with <5% prevalence that include Canada, Italy, Germany and France; low prevalence countries with 5-19.9% prevalence that include England, the United States, New Zealand, Japan and Australia; medium prevalence countries 20-39.5% prevalence that include Iran, Pakistan and countries in North Africa and parts of central America, while high prevalence countries with more than 40% IDA prevalence that include India, central and southern Africa (WHO, 2023).

The relative importance of factors related to anemia varies by region. In low-resource settings, pediatric anemia has a variety of causes but the inadequate iron intake is the most common cause of IDA development, which is characterized by low dietary iron content and a lack of dietary animal protein (Mantadakis, Chatzimichael, and Zikidou, 2020). Powers et al., found that the major cause of IDA in underdeveloped nations is not the lack of iron in the diet, but rather a lack of bioavailability, because it originates from plant sources high in inhibitors of iron absorption (Powers et al., 2020). Maintaining an appropriate iron balance in resource-limited environments is difficult because their diet primarily consists of cereal-

or legume-based flours, which are high in phytates, and many common foods or beverages containing iron-binding phenols. Additionally, animal-derived foods with high iron bioavailability are either expensive or in short supply. In addition to inadequate vitamin C intake and frequent tea consumption, both of which are risk factors for IDA, rural diets in most low-income countries also lack adequate iron supplies for economic, cultural, and/or religious reasons (Mantadakis, Chatzimichael, and Zikidou, 2020).

On the other side, in industrialized countries IDA is linked to improper dietary habits. According to reports from the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition Committee, the prevalence of IDA in children aged 1-3 years was 3-9% and the main risk factors for IDA in European infants and toddlers include low birth weight, early cord clamping, male sex, low socio-economic status, low meat intake, low intake of iron-fortified products and high intake of cow's milk (Mantadakis, Chatzimichael, and Zikidou, 2020). Similar values for prevalence and risk factors of iron deficiency have been identified in United States. According to data from the National Health and Nutrition Examination Survey in the United States the reported prevalence of iron deficiency in toddlers 1 to 2 years of age was 9% (Gupta et al., 2016).

In 2018, Iglesias Vázquez et al. conducted a systematic review and meta-analysis study on 128,311 preschoolers and 38,028 school-age children from 21 Latin American and Caribbean (LAC) countries in order to estimate the overall prevalence of anemia in preschool and school-age children in LAC and the effectiveness of nutritional interventions. According to this study anemia was mild or moderate public health problem in most LAC countries with the overall prevalence of 28.56%. Pre-school children from the Caribbean, the Andean subregion and Brazil were the population with the highest risk. The study found a significant difference in the prevalence of anemia according to children's age with the percentage of anemia being higher in preschool children than in school-age ones (Iglesias et al., 2019).

Following the nutritional intervention programs, some countries continued to have high rates of anemia while others reduced its prevalence significantly. Due to the implementation and effective monitoring of dietary intervention programs, anemia was a mild public health issue for children in Chile and Argentina. While Argentina introduced fortification of wheat flour in addition to iron supplementation for children under the age of two, Chile's national complementary feeding program was centered on iron fortification of powdered milk (Brito et al., 2013). Along with food fortification, Cuba's national programs included food delivery

to increase the accessibility and variety of food for the general population. As a result, the prevalence of anemia dropped from 32 to 26% (Pita et al., 2014). Additionally, successful outcomes were recorded in Mexico and Peru following the implementation of larger scale comprehensive plans that included health services, nutritional and health education, and cash transfers. The prevalence of anemia was consequently decreased from 26% to 17% in Mexico and by more than 40% in Peru (Rivera et al., 2004)

However, in some nations, the prevalence of anemia for young infants exceeded 40% because some governments lacked a well-established national anemia reduction plan. For example, Panama's national plan for the prevention and control of micronutrient deficiencies was in place from 2008 to 2015, however there is no data available to date on how it affected the prevalence of anemia (Iglesias et al., 2019). In the case of Brazil, some reports highlight the low coverage and inadequate compliance with the national iron supplement program approved by the government in 2005 (Cembranel, Corso and González-Chica, 2017).

In 2021, a multilevel ordinal logistic regression analysis based on the most recent Demographic and Health Survey (DHS) data of 32 sub-Saharan African countries was conducted by Tesema et al., with 135,619 children aged 6–59 months was included in the study. This study found that 64.1% of children in sub-Saharan Africa aged 6-59 months had anemia on average [95% CI: 63.9%, 64.4%] with poor maternal education, lower household wealth status, large families, higher order births, maternal anemia, underweight, wasted, and stunted, being a boy child, multiple births, having had a fever in the previous two weeks, and having had diarrhea in the previous two weeks were all significantly linked to increased odds of having higher levels of anemia. However, having a mother who is over 20 years old, having children between the ages of 24-59 months, and taking medication for an intestinal parasite were all substantially linked to lower odds of having greater levels of anemia (Tesema et al., 2021).

Furthermore, in 2021 a review based on a comprehensive search of national and regional articles published between 1995 and September 2020 was conducted by Al-Jawaldeh et al., aimed to assess the burden of IDA among women of reproductive age and children under five years old in the Eastern Mediterranean Region (EMR) and to evaluate whether countries are on track towards meeting the World Health Assembly target for 2025 (Al-Jawaldeh et al., 2021). Anemia prevalence in children under the age of five ranged from 23.8% to 83.5%, with Yemen having the highest reported incidence (83.5%), followed by Somalia (55.8%),

Pakistan (53.7%), Sudan (48.1%), Morocco (47.5%), Afghanistan (46.4%), and Djibouti (42%) (WHO, 2021[a]). In most of the countries in EMR area, the prevalence of anemia in children under five had remained stable over time, with only Egypt, Iran, Iraq, Oman, and Sudan showing signs of progress. Above and beyond, according to the review of the evidence conducted for this paper, none of the EMR countries have a comprehensive anemia reduction strategy. Instead, fragmented anemia reduction initiatives and activities are carried out without a strategic outlook, frequently focusing on one determinant at a time rather than holistically addressing the multifactorial etiology of anemia (Al-Jawaldeh et al., 2021).

According to Jordan's most recent national Jordan Population and Family Health Survey (JPFHS), which was conducted in 2017–2018, 32% of children aged 6–59 months were anemic (Department of Statistics-DOS, 2019).

2.2.5 The Status of Anemia among Palestinian Children

The deterioration in nutritional status of Palestinian children has become well recognized at both national and international levels. In the GS like other regional countries, substantial changes in the demographic, economic, political, and social environment impact nutrition, and health. A nutrition transition, characterized by substitution of healthy Mediterranean diet, rich in pulses, grains vegetables and olive oil, to salty processed foods, higher in fats, sweeten drinks and added sugars, result in increased rate of nutritional disease (Golzarand et al., 2012). Adding to this is the chronic unstable internal and external political situation that leads to food insecurity and malnutrition (El Kishawi et al., 2015). Moreover, Poverty and unemployment affect more than half of all people living in the GS, pushing food insecurity to a record high of 68.5% (Asi, 2020).

In 2002, a household survey to evaluate the nutritional status of Palestinian children ages 6-59 months an d women ages 15-49 years was conducted. The result showed that the overall anemia levels were high, with 43.8% of WB and 44.0% of the GS children ages 6-59 months are considered anemic. Anemia was strongly related to the child’s age, with children ages 6-23 months had greater prevalence of moderate and severe anemia than the older children in the sample. Children living in refugee camps were much more anemic than children in rural or urban areas, with a 40.1% anemia levels in camp children, compared to 34% for rural and 34.2% for urban dwellers (PCBS, 2003).

In 2003, a national anthropometric assessment of children ages 6-59 months was undertaken by academic partners in Al Quds University and Johns Hopkins Bloomberg School of Public Health under a United State Agency for International Development (USAID). The nutritional assessment showed that the incidence of anemia among Palestinian children was 44%, and that 81.3% of children aged 1-3 years old in the WB and 88.7% in the GS had a deficiency in daily iron intake (intake less than 8.0 mg of iron) (Abdeen et al., 2003).

A cross-sectional, community-based home survey of 770 people was conducted in Gaza City in 2009 to examine the nutritional condition of Palestinian preschool children aged 2–5 years under the blockade. The study finding showed that 50% of the preschool children were anemic and 26.8% of those had a stool test positive for parasitic infections mostly with Entamoeba histolytica (15.7%) and Giardia lamblia (11.1%). Also, finding disclosed that the majority of households faced difficulties accessing food due to the siege and the shortage of food products. Besides, rural area was the worst locality in the nutritional status as they were more food insecure households with a higher prevalence of anemia than other localities (Radi et al., 2013).

In 2012, a study conducted in the GS attempted to estimate the prevalence of anemia and investigate nutritional status among 150 children between the ages of 24 - 62 months in three rural communities located in north Gaza Government area. The study showed that the prevalence of anemia was 65.3 % with the male children were more susceptible to anemia; the percentage of anemia among male and female children was 35 and 30 respectively; and anemia was significantly higher in Jabalia camp. In addition, the study explored the dietary habits and revealed that most of the children included in the study were having low quantity of iron rich food as great proportion of the children were taking meat occasionally and green leafy vegetables on alternate days. Half of the children were eating poultry but this consumption was not regular and the quantity was low when compared to the recommended daily intake (Alzain, 2012).

Similarly, in 2012 a cross-sectional study was conducted in the GS on 357 preschool children to determine the prevalence and associated factors of anemia among this age group. Result showed that the prevalence of anemia among preschool children in the GS was higher than those reported in previous local studies, indicating that anemia is a major public health problem as the overall prevalence of anemia was 59.7%. The study also revealed that the sociodemographic characteristics (such as geographic location, sex, age, and monthly

income) and nutritional status of children were significantly associated with the prevalence of anemia as children living in Jabalia refugee camp have a high risk of anemia [adjusted b= −0.55; 95% confidence interval (CI; -0.72, -0.39); $p < 0.001$]. Boys were more susceptible to this deficiency than girls [adjusted b = 0.17; 95% CI (0.0.01, 0.33); p = 0.031]. Hb level increased with age [adjusted b = 0.02; 95% CI (0.01, 0.03); $p < 0.001$]. Hb level decreased in children living in poor households [adjusted b = −0.24; 95%CI (−0.41, -0.06); p = 0.006]. Underweight children were more susceptible to anemia than normal weight children [adjusted b = − 0.22; 95% CI (−0.41, −0.03); p = 0.025] (El Kishawi et al., 2015).

In 2014, a quasi-experimental study was done at the GS on 735 kindergarten children in which children with IDA were treated using an oral iron formula (50 mg ferrous carbonate + 100 mg vitamin C /5 mL) and the CBC was reassessed after three months. The study revealed that the overall prevalence of IDA was 33.5% with no significant differences between boys and girls while significant differences were reported between different governorates of the GS in which the governorate with a low education level of the parents and higher rate of parental smoking were considered a significant risk factor for developing anemia among children. Finding showed that oral iron treatment improved Hb concentrations, and normalized the iron deficiency marker in the studied group significantly. To that end, the study concluded that IDA is a serious health problem among children living in the marginalized areas of the GS, which justifies the necessity for national intervention programs to improve the health status for the less fortunate development areas (Sirdah, Yaghi and Yaghi, 2014).

In 2013, data from Palestinian Micronutrient Survey that included 587 pregnant women and 582 children aged 6 to 59 months revealed a widespread burden of multiple micronutrient deficiencies (MNDs) in the GS. According to the survey findings, more than one-third of preschool-aged children were anemic with the prevalence of iron deficiency among preschool children in 2013 was 19% and more than 70% of them presented with zinc deficiency (Elmadfa, Abu Rub and Ben-Abdullah, 2014).

Furthermore, several surveys were conducted among the Palestine refugee population served by UNRWA from 1961 until 2006, in order to evaluate the prevalence of anemia. A decrease was observed in the anemia prevalence in children since 1999 due to the introduction of prophylactic iron supplementation to all pregnant women on registration. But the latest survey revealed that anemia is still highly prevalent in preschool children and women of

reproductive age. UNRWA annual health report 2020, reported that the prevalence of anemia among pregnant women at 24th week of gestation in the GS was 73.8%, while prevalence of anemia among children 12 months of age was 77.2% (UNRWA, 2021). In four of UNRWA's operating countries, including the GS, WB, Syria, and Lebanon, a cross-sectional study conducted in 2017 on first-graders at UNRWA schools found that anemia prevalence among the surveyed children increased to 25% from the previous UNRWA study, which was conducted in 2005 (AbuKishk et al., 2020).

A randomized controlled trial was carried out at two UNRWA health clinics in the middle area governorate of the GS from October 2015 to January 2017 to ascertain the impact of Micronutrient Powder Supplementation (MNP) on infants' growth and Hb levels in the GS. The study result revealed that the experimental group had a higher concentration of Hb at 12 and 15 months than did the control group, and a significant difference ($p < 0.05$) was observed at 15 months only. Accordingly, the study found that included MNP in the current National Micronutrient Supplement program enhanced young children's nutritional status (Albelbeisi, et al., 2020).

A commentary to raise awareness of the burden of MNDs among the Palestinian refugee particularly among pregnant women and preschool-aged children in the GS was published in 2020. By reviewing the literature, the authors came to the conclusion that toddlers might get MNP as part of UNRWA's primary care services in the GS, where food insecurity, poverty, and MNDs coexist and are common. As well as to the close monitoring of dietary quality, food security, extent of deficiencies, the adequacy of coverage and adherence to existing supplementation and fortification programs (Horino et al., 2020)

In 2021, a cross-sectional, community-based, household survey was carried out in Gaza using 24-hour dietary recall to assess nutrient intake and adequacy among 176 children aged 2–5 years. The result of this study demonstrated that nutrient intake among preschoolers in the GS displayed a dramatic deterioration in macro- and micronutrient deficiency, especially in rural areas and bout 47.2% of the children studied consumed less than the recommended dietary allowance for iron (Radi, 2021).

2.2.6 Prevention and Control of IDA

Iron deficiency can be managed through primary prevention efforts or through secondary prevention efforts which include screening, early detection and subsequent therapy. The American Academy of Pediatrics recommends that children at one year of age should

undergo comprehensive screening for anemia. This includes determining Hb concentration and assessing IDA risk factors (Wood and Sperling, 2019). The WHO supported national guidelines in various countries to prevent and treat iron deficiency through stablishing a cost-effective, readily accessible, easily affordable, and sustainable interventions. According to the WHO, inadequate consumption of absorbable iron and folate are the major causes of anemia worldwide (WHO, 2016). Therefore, integrated, multifactorial and multisectoral approach is required for effective control and management of IDA among young children which include iron supplements, food fortification, biofortification, dietary diversification, nutrition education and training to increase awareness about the importance of iron supplements (WHO, 2016). Other strategies include improving water, sanitation and hygiene services and influencing positive beliefs, practices besides behavior modifications through providing a propriate dietary advices and therapy (WHO, 2017). Moreover, public health initiatives have emphasized raising dietary iron consumption through population-based iron supplementation and diet diversity, as well as fortifying foods to improve their iron content. As a result of these actions, anemia prevalence has decreased in several Asian nations (Pasricha et al., 2011). According to Chaparro and Suchdev, anemia is estimated to have decreased roughly seven percentage points between 1990 and 2016, from 40% to 33% (Chaparro and Suchdev, 2019).

Despite this, obstacles to regulate pediatric anemia still exist over the world for several reasons include inadequate supply, delivery, and distribution systems of iron supplementation, limited access to health care providers and child health care, ineffective social education and communication programs, and overall poor monitoring and evaluation of supplementation process (Zimmermann and Hurrell, 2007). Therefore, understanding anemia's varied and complex etiology is essential for creating interventions that effectively address the context-specific causes of anemia and for keeping track of anemia control initiatives.

2.2.6.1 Supplementation with Iron and Folate

There is no doubt that iron supplementation to vulnerable groups is frequently a recommended intervention for both prevention and treatment of IDA. Thus, to address IDA most policies describe iron supplementation as an integral component of maternal and child health care services (WHO, 2017). In countries where the feasibility of general dietary improvement is limited, iron supplementation for vulnerable groups and food fortification are the most cost-effective means of addressing IDA. In most developing countries, food industries are not well developed, and, where they are developed, most people cannot afford

fortified foods. Thus, supplementation with dietary iron can meet the iron needs for the vulnerable groups who do not consume fortified foods (PCBS, 2015).

For prevention of anemia and iron deficiency among young children in settings where the prevalence of anemia is 40% or higher, the WHO recommended the provision of 10 mg to 12.5 mg of elemental iron daily for three months in children age 6 to 23 months who were born at term and to increase the dose to 30 mg of elemental iron daily for children age 24 to 59 months. In the case of established iron deficiency in children < 2 years, the WHO recommended treatment with 25mg of elemental iron for 3 months. The most common form of iron that children are supplemented with is ferrous sulfate; however, fumarate and gluconate are also used as these compounds have low cost and have high bioavailability (WHO, 2016). In settings where anemia prevalence is higher than 20%, intermittent use of iron supplements is also recommended as a public health strategy. Both supplementation regimens have proven to be effective in reducing the risk of having anemia and iron deficiency (De-Regil, Jefferds and Peña-Rosas, 2017). Nevertheless, the overall progress on decreasing anemia is slow and uneven for the reason that in many developing countries there are eighter no adequate access to the services to reduce anemia prevalence or there is limited adherence and compliance with iron supplements. Therefore, improving the effectiveness of supplementation programs and strategies remains a challenge.

Similarly, Palestine is implementing a supplementation program with iron and vitamin A for infants and young children through child health care services. In the GS, most of child health care services is provided via extensive network of PHC facilities through the MoH which accounts for approximately one third of the PHC clinics (51 health center). In addition, a larger role is played by UNRWA and NGOs as UNRWA delivers PHC through a network of 22 PHC centers while NGOs provided the care through 80 health centers (MoH, 2020). UNRWA has recognized child health services as one of the vital investments in health, therefore UNRWA provide a range of community health and support services for children and their parents to give every child the best possible start in life. In 2010, UNRWA raised the age of children covered with child health services from 3 to 5 years old to fill the gap in child health services until the child reaches school age in order to improve child health outcomes (UNRWA, 2021). Within these PHC centers, different health services are offered including prophylactic iron supplement to high risky groups besides delivering screening and therapeutic services for young children.

2.2.6.2 Food Fortification

The addition of iron-containing substances to the product formula is known as fortification (Makkar et al., 2022). In 2008, some of the world's top economists analyzed the costs and benefits of various public health interventions. They concluded that fortification is one of the most cost-effective interventions that exist to address micronutrient malnutrition, as results revealed that every dollar spent on salt iodization and flour fortification would result in benefits of more than US$ 10 (OCHA, 2009). Therefore, iron fortification of foods is regarded as a cost-effective method of lowering the prevalence of iron deficiency and its associated anemia. The decision of ways and type of iron-containing substances to be added usually influenced by the intended product qualities, such as flavor and color, as well as cost and availability. However, iron in the food matrix can produce chemical instability due to its oxidation-reduction characteristics. In addition, the process of fortification has to rely on insoluble, weakly soluble, or heavily chelated iron compounds with low chemical reactivity while nonheme iron requires both solubility and chemical availability for successful absorption (Makkar et al., 2022). Nevertheless, consumption of fortified milk has already proven to be an effective strategy to reduce anemia in children and has been the basis for mandatory fortification of powdered milk with iron, vitamins, and other minerals in many countries around the world (Tulchinsky, Kaluski and Berry, 2004).

The WHO recommends fortification of complementary foods with iron-containing MNPs in infants and toddlers aged 6–23 months, which should contain 12.5 mg of elemental iron per sachet, preferably as coated ferrous fumarate, corresponding to 37.5 mg of ferrous fumarate or 62.5 mg of ferrous sulfate heptahydrate or other equivalent amounts in the various iron compounds (Zlotkin and Dewey, 2021). In children aged 2–12 years, the same guidelines recommended fortification of supplementary meals with iron-containing MNPs, with 12.5 mg of elemental iron for children aged 2–4 years and 12.5 to 30 mg elemental iron for children aged 5–12 years (WHO, 2016). Because Sodium iron EDTA (NaFeEDTA) has a better bioavailability than elemental iron, the dose of elemental iron should be lowered by 3–6 mg while NaFeEDTA is not advised for children aged 6–12 months. The MNP product from UNICEF and UNRWA has 10 mg of iron per sachet in the form of coated ferrous fumarate, NaFeEDTA, or ferrous bis-glycinate (Mantadakis, Chatzimichael and Zikidou, 2020).

Like other countries, Palestine began salt iodization and multiple micronutrient fortification of wheat flour in 1996 and 2006, respectively, as a tactic to combat nutritional deficits (Hasumi and Mahmassani, 2021). In 2006, the wheat flour fortification program was mandated by law by the Palestinian authorities. The fortification program was designed to provide 80 percent of the estimated average requirement for 10 micronutrients including iron (Hasumi and Mahmassani, 2021). For some but not all micronutrients, wheat flour and salt fortification has had a significant impact on increasing the micronutrient status of Palestinian children but unfortunately the policy has remained in place. In 2013, The Palestinian Micronutrient Survey collected 555 wheat flour samples (375 from the WB and 180 from the GS) and, using 'added' iron as a marker of fortification with using the potassium ferricyanide variant of the red spot test, concluded that 89% of the samples from the GS and 38.3% of the samples from the WB were not fortified (Hasumi and Mahmassani, 2021). Some of the main obstacles to Palestine's fortification program were the restrictions on imported supplies at the border, ineffective monitoring and tracking of operational processes, and a lack of subsidies for premix purchases which forced mills to either absorb the cost or raising the price of flour, neither of which are economically feasible, especially for the highly vulnerable population (PCBS, 2015).

Similarly, a recent WHO study found only 11% of flour consumed by the population in the GS was meeting the prescribed iron fortification level (Al Jawaldeh et al., 2019). According to a 2020 study conducted by Massad et al., Low serum levels of iron, zinc, and vitamin B-12 continue to remain the main micronutrient concerns for school children in the WB. According to the study, iron, zinc, and vitamin B12 fortification levels should be increased in order to treat anemia (Massad et al., 2020). Along with improving agricultural practices to ensure food availability and accessibility, the study recommended that laws for flour fortification be enforced to better control the import of unfortified flour from Israel and donated flour based on Palestinian specifications (Massad et al., 2020).

Finally, it worth to say that despite the fact that iron fortification with MNPs has been proven to successfully reduce the risk of iron insufficiency in children under the age of two without requiring them to change their normal diet in many low-income countries (Suchdev et al., 2020). Nonetheless, some studies showed that MNPs have been linked to changes in gut flora and the development of intestinal inflammation, which can result in diarrhea and an increased risk of hospitalization (Weiss, 2015; Paganini and Zimmermann, 2017).

Furthermore, the advantages of this intervention on baby and toddler survival and developmental outcomes remain unknown (Samuel et al., 2018). MNPs cannot therefore be called as a perfect meat substitute. Another significant problem with food iron fortification is the potential for iron excess in people with hereditary hemochromatosis and hemoglobinopathies hereditary hemochromatosis is the most prevalent autosomal recessive condition among Caucasians with an incidence of 1 in 300 to 500 people (Li et al., 2014). The illness is six times more likely to affect Caucasians than Blacks. Therefore, whereas universal iron fortification of foods may be healthy in Africa, it may be harmful in countries with a predominately Caucasian population. (Sandnes et al., 2021).

2.2.6.3 Advocacy and Behavior Change Communications (BCC)

An integrated strategy for anemia control initiatives should always include advocacy and behavior change communications activities (Chandarana et al., 2021). This strategy works well to increase population members' desire for and adherence to iron supplements by raising knowledge of the devastating effects of anemia on both the individual and the nation's social and economic growth. Effective BCC promotes specific changes in dietary practices that result in reduction in the intake of inhibitors of iron absorption or eliminating them totally from the diet such as tea consumption, at the same time encourage the increase of consumption of enhancers of iron absorption such as fruit, juices and other sources of vitamin C beside promoting the increased obtaining of food sources of bioavailable iron, including fortified foods. Additionally, Ganjoo and et al. proposed that this approach improved health care workers' motivation and ability to be actively involved in iron supplementation programs. Enhanced their knowledge of the program's importance and the appropriate dosages, and upgraded their skills in counseling and follow-up (Ganjoo et al., 2022).

2.2.7 Treatment of Iron Deficiency Anemia

Treatment of anemia follows the assessment of anemia severity but in all cases identification of etiology of anemia and treatment of the underlying cause (nutritional deficiency, infectious disease, and infestation) are warranted. The scope of treatment is to replenish micronutrient stores to normal levels and prevent future recurrence of micronutrient loss or deficiency through targeted interventions delivered to affected individuals throughout the life cycle (Taylor and Rampton, 2015).

IDA in children is typically treated with oral iron. For infants and young children, the recommended dose for treating iron deficiency anemia is 3-6 mg/kg elemental iron per day in three daily doses, although some studies have found that once-daily dose results in similar improvement as two to three doses daily and does not significantly increase adverse effects (Stoffel et al., 2017). Recent studies of single dose and alternate day dosed iron show improved iron incorporation into erythrocytes and fewer associated adverse effects that could improve adherence. Treatment for 4 weeks generally results in an increase in Hb of at least 1 g/dL and generally lasts for several months; the duration of treatment depends on the severity of anemia. Treatment includes an additional 3 months of oral iron after normalization of Hb to adequately replenish body iron stores (Taylor and Rampton, 2015). In rare cases of intolerance or clinical unresponsiveness to oral iron (iron refractory iron deficiency anemia), intravenous iron may provide optimal therapeutic responses.

Adverse events are typically limited to gastrointestinal tract symptoms, such as constipation, which appear to be directly related to the dose of elemental iron. Reducing the amount of elemental iron taken daily, or taking the iron with food may improve these symptoms (Taylor and Rampton, 2015). Urine and stool may be darker in color when taking iron (usually black), and liquid formulations can cause temporary gray staining of teeth and gums. Iron can cause important interactions with several drugs and can be fatal in overdose in children warranting the use of child proof dispensation containers (Palleria et al., 2013).

2.2.8 UNRWA's Strategy for Management of IDA among Refugee Children

UNRWA child health services regularly monitor the growth and nutritional status of children under five years of age to promote a healthy lifestyle and prevent malnutrition. UNRWA's strategy for the prevention and treatment of IDA is based on the WHO guidelines (UNRWA, 2020). Accordingly, UNRWA advocates four basic complementary approaches for IDA management among refugee children including; supplementation with iron preparations; dietary adjustments and diversification to increase iron intake; fortification of food with iron; and promotion of public health measures (UNRWA, 2020).

All children registered in UNRWA health centers should be provided with iron and vitamin A supplementation starting from 6 months of age, and this supplementation continues until they turn five years old. Once a child reaches 12 months of age, they are screened for anemia. According to the UNRWA guidelines, the threshold for diagnosing childhood anemia is Hb

level <11 g/L. Then the severity of childhood anemia is classified according to child Hb status as mild (10.0 g/L–10.9 g/L), moderate (7.0 g/L–9.9 g/L) or severe (<7.0 g/L) anemia (UNRWA, 2020). If the child is diagnosed as moderate to severely anemic, defined as a Hb level <10 g/L, they receive iron treatment at a dose of 25 mg elemental iron every day for 3 months. During the 3 months of treatment, children need to have repeated Hb tests after 1 month at the age of 13 months old. If the Hb concentration improves compared with the Hb level at the screening visit, each child continues the iron supplementation for two more months until the age of 15 months, along with dietary counselling by trained nursing staff (UNRWA, 2020). Six months after completing the treatment, at the age of 21 months old, a reassessment of Hb level is recommended. Anemic children who are unresponsive to the supplementation are screened for hereditary anemias, mainly thalassemia and sickle cell anemia. Thus, if the Hb concentration does not improve despite patient and doctor adherence with the iron treatment and the absence of any acute illness, further laboratory tests including CBC, MCV, MCH and RDW beside referral to a specialist is recommended (UNRWA, 2020).

Additionally, UNRWA health policy to combat IDA doesn't layover on iron supplementation alone. Other strategies are implemented on ground includes recommendations for increasing dietary diversification and enhancing the bioavailability of iron through increase the production and consumption of iron-rich foods. Furthermore, UNRWA advocates public health measures as an essential component for the prevention and treatment of iron-deficiency control program which compromise the promotion of breastfeeding, reducing the burden of intestinal infestations by the single dose of 500 mg mebendazole and fostering measures that decrease the frequency of infection such as improving sanitation, sustaining high immunization coverage and ensuring home management of diarrheal diseases (UNRWA, 2020).

Conferring to available data, a double burden of malnutrition among monitored children is observed (UNRWA, 2021). Therefore, in 2021 the health department respond via updating and distributing a new guideline for health staff on proper nutrition that aimed to provide technical and nutritional guiding principle to the UNRWA's health personnel on the basic principles of preventive and curative dietary practices (UNRWA, 2021). Through implementation of this new technical nutritional guidelines, UNRWA health care providers were equipped by evidence-informed recommendations and unified healthy lifestyle

messages to encourage mothers to properly practice breastfeeding and provide them with proper counselling and education on infant and child nutrition. The health education includes information about the appropriate use of complementary feeding and micronutrient supplements and the importance of avoiding fast food and sweetened drinks (UNRWA, 2021).

Chapter Three

Methodology

This chapter provides a thorough description of the methodology used to conduct this study. It elucidates the design of the study, study setting, study period, study population and sampling technique. Additionally, it covers the eligibility criteria, data collection tools, data collection procedure, data entry and analysis, techniques to guarantee the validity and reliability of the study instruments, as well as the pilot study, ethical considerations, and study limitations.

3.1 Study Design

The design of this study is triangulated using a mixed method involving both quantitative and qualitative parts. The quantitative part is a descriptive, analytic and cross-sectional study design by using a structur interviewed questionnaire with mothers of under-five anemic children attending UNRWA healthcare centers in the GS at the period of the data collection. The cross-sectional study design is relatively quick, cheap and captures information based on data gathered for a specific point in time (Asenahabi, 2019). Also, a medical records review checklist was conducted to enhance the understanding of the quality of documentation and degree of compliance of health care providers to the existing UNRWA policy for the management of childhood IDA including the implementation of screening and treatment technical guidelines.

To provide us with an in-depth understanding of the facts on the ground and to complement and validate the findings from the quantitative method, the qualitative component was carried out after the quantitative component. The qualitative part was conducted by using semi-structured Focus Group Discussions (FGDs) with mothers of under-five anemic children as well as mothers of under-five children who recovered from anemia. Also, FGDs were done with several health care providers who provide IDA prevention and control services to the young children attending UNRWA health centers to assess the extent of knowledge and perceptions regarding IDA management. Additionally, Key Informative Interviews (KIIs) were conducted with four health managers working in different senior positions in UNRWA Gaza field health department to appraise the degree of success in

policy implementation programs to manage and control IDA among preschool children attending UNRWA health centers in the GS.

The triangulated mixed method approach was used to provide better understanding of the research problem than either method alone as this would permit for the limitations of each approach to be balanced out while building on the strengths, leading to stronger and more reliable inferences (Bryman, 2006).

3.2 Study Setting

One center from each of the five governorates of the GS was chosen for the study's quantitative component, which was conducted in five conveniently located UNRWA medical facilities; Jabalia health center from North governorate, Rimal health center from Gaza City governorate, Nuseirat health center from Mid-Zone governorate, Khan Younis health center from Khan Younis governorate and Rafah health center from Rafah governorate. These facilities were chosen because they serve as the main UNRWA medical facilities for the aforementioned regions.

The qualitative part was conducted in three randomly selected health centers distributed in accordance to the three geographic zones in the GS operated by UNRWA health program; Beach health center in North Gaza zone, Nuseirat health center in Middle Gaza zone and Rafah health center in South Gaza zone. It is worth mentioning that at each center three FGDs were conducted; the first was with mothers of under-five anemic children, the second was with mothers of under-five recovered children, and the third was with healthcare providers. While the KIIs were conducted at the office of each healthcare manager working in UNRWA Gaza field health department.

3.3 Study Period

The study began in February 2022, and it was completed in March 2023. In February 2022, the research proposal was presented to the School of Public Health Committee and was successfully defended. At that point the researcher began creating the research tools after receiving a letter of approval from Al-Quds University and ethical approval from the Helsinki committee to perform the study. In July 2022, instruments for collecting quantitative and qualitative data were developed, validated, revised and finalized. After the UNRWA special research committee and the head of the health department approved the

study, a pilot study was conducted in August 2022. After that, quantitative data collection started in the mid of September 2022, followed by qualitative data collection which was started in November 2022. On the Statistical Package of Social Science (SPSS) application, a data entry model was created. In December 2022, data entry and cleaning were completed. Coding and analysis of both quantitative and qualitative data were conducted in January 2023. In February 2023, the researcher began to conclude the findings and discussion by linking the results with the literature. The supervisor received the final draft in March 2023 after it had been modified in response to his suggestions and criticisms.

The activities of the research and their durations are described in Annex (1).

3.4 Study Population

Regarding quantitative data, study population included under-five refugee anemic children and their mothers visiting UNRWA PHC facilities within the study period. According to data from UNRWA health annual report 2021, the total number of children below five registered at UNRWA Gaza field health department in 2021 was estimated to be 195,685 (UNRWA, 2021). All registered children are provided with iron and vitamin A supplementation starting from 6 months of age, and this supplementation continues until they turn five years old. Once a child reaches 12 months of age, they are screened for anemia (UNRWA, 2021). The total number of Hb lab tests at age one year conducted at UNRWA health centers in the GS during 2021 was 46,597. About 31,173 of the lab results showed abnormal Hb level of less than 11g/dl (estimated to be 67%).

In terms of the qualitative data, information was collected by conducting nine FGDs; three FGDs were conducted with mothers of under-five anemic children who recovered from IDA, three FGDs were conducted with mothers of under-five anemic children who are still suffering from IDA and three FGDs were conducted with several health care providers who were directly responsible for providing IDA prevention and control services to under- five refugee children inside the health center. FGDs were conducted in three randomly selected health care centers located within refugee camps that were distributed along the three main zone in the GS (Beach health center, Nuseirat health center and Rafah health center from north, middle and south area respectively). Furthermore, four KIIs were conducted with healthcare managers working in different senior positions in UNRWA Gaza field health department. Participants of KIIs were: Field Family Health Officer (FFHO), Field Nurse Officer (FNO), North Area health officer (AHO) and Rimal UNRWA Health Center's Senior Medical officer (SMO).

3.5 Sampling

3.5.1 Quantitative Study

According to data from UNRWA health annual report 2021, the total number of under- five children registered at UNRWA Gaza Field was 195,685 (UNRWA, 2021). The total number of Hb lab tests at age one year conducted at UNRWA health centers in the GS during 2021 was 46,597 with about 31,173 of the lab results showing abnormal Hb level of less than 11g/dl which is estimated to be 67%. Thus, the estimated population size was 131,108 of under- five registered refugee children. Epi-Info sample size statistical calculator version 7.2.1.0 was used to calculate the correct sample size and took into account the following parameter; a confidence interval 5%, an expected frequency 50% and a confidence level 95%. The researcher expanded the sample size from the recommended 384 to 400 in order to account for any possible non-respondents, get a representative sample, and increase the power of the study. Annex (2) shows the sample calculation using Epi info statistical sample calculator.

The sample was taken from one of the five main UNRWA health care facilities that are dispersed throughout the five governorates in the GS. The health care centers selected on the study are Jabalia UNRWA health care center in North Gaza Governorate, Rimal UNRWA health care center in Gaza Governorate, Nuseirat UNRWA health care center in the middle Governorate, Khan-Younis UNRWA health care center in Khan-Younis Governorate and Rafah UNRWA health care center in Rafah Governorate. According to Table (3.1), the proportional representation of the clients of each health center was as follows; 22% for the Jabalia health center, 20% for the Rimal health center, 16% for the Nuseirat health center, 21% for the Khan-Younis health center, and 21% for the Rafah health center.

Table (3.1): Proportional representation of anemic children below five registered at UNRWA health centers

Healthcare center	No. of clients	Percentage	Proportionate
Jabalia	15,928	22%	88
Rimal	14,571	20%	80
Nuseirat	12,072	16%	64
Khan Younis	14,904	21%	84
Rafah	15,063	21%	84
Total	**72,538**	**100%**	**400**

For the medical records review-check list, the researcher checked 100 files; twenty files from each central UNRWA health center were selected randomly through systematic sampling technique. By using the e-health electronic system after permission of the head health center, a list frame of under-five children registered with IDA in the assigned clinic was prepared. After that, the researcher selected the first file from the frame list randomly by using simple sample technique then every K^{th} file was selected to be checked from the list-frame. The K^{th} number varied according to a number of under-five children registered with IDA in the assigned clinic.

3.5.2 Qualitative Study

For the qualitative part, a non-probability purposive sample was used to select participant in FGDs which included an average number of eight members for each group. The sample was collected from three randomly selected health centers distributed in the three geographic zones in the GS operated by UNRWA health program. The health care centers selected on the study were Beach UNRWA health center in north Gaza zone, Nuseirat UNRWA health center in middle Gaza zone and Rafah UNRWA health center in south Gaza zone. Participants were purposefully selected at each center to be engaged on FGDs. At each selected health center, three FGDs were conducted; the first was with mothers of under-five anemic children, the second was with mothers of under- five children who were recovered from anemia, and the third was with healthcare providers.

In regards to the KIIs, a non-probability purposive sample was used to select four healthcare managers working in different managerial positions in UNRWA Gaza field health department to dig deeply and understand in-depth the perspectives of policymaker about

anemia policy implementation and prevalence. Participants of KIIs were: FFHO, FNO, AHO and Rimal health center's SMO.

To investigate the issues raised by the quantitative study, the qualitative component was conducted following the quantitative one.

3.6 Eligibility Criteria

3.6.1 Inclusion Criteria: Quantitative Data

- Being a refugee child between 6-59 month who met the operational definition of IDA (a child with Hb level lower than 11g/dl due to nutritional iron deficiency)

- Registered in the selected health center.
- The child's mother had the ability and accepted to respond to study questionnaire.

3.6.2 Inclusion Criteria: Qualitative Data

- Inclusion criteria for mothers of anemic children and recovered children who participated in FGDs were being a mother of a refugee child who was diagnosed with IDA in the selected health center, being co-operative and being accepted to participate in the group discussion session.
- The inclusion criteria for health care providers who participated in FGDs were being a fixed term health care provider, with more than one-year experience, working at the selected UNRWA health care center and being directly responsible in provision of anemia prevention and control program.
- Inclusion criteria for health managers who were selected for KIIs were being a decision-maker health manager who has influences in policy implementation regarding IDA, with at least two years' work experience in UNRWA senior position, who agreed on the study objectives and consented to record the interview.

3.6.3 Exclusion Criteria: Quantitative Data

- Children below five years suffer from other types of anemia including hereditary anemia like thalassemia.
- Children below five years suffering from chronic medical illness.
- Children with IDA above five years old.

3.6.4 Exclusion Criteria: Qualitative Data

- Mother or caregiver of selected child with special situation that prevent them from giving relevant data as mental illness.
- Any health care provider who didn’t meet the above criteria.
- Any health manager who didn’t meet the above criteria.

3.7 Data Collection Tools

3.7.1 Quantitative Instruments

This study used a face-to-face interview questionnaire (Annex 5). After reviewing the literature, the researcher created the questionnaire on their own, tailoring it to the study objectives. To increase the content's validity, the questionnaire was then reviewed and approved by research experts, clinical nutritionists, pediatricians, and UNRWA health staff in managerial positions. Along with the pilot study, their feedback was taken into account while creating the final version of the questionnaire. The questionnaire consisted of two main parts:

Part (A): this part included items related to sample demographics and socioeconomic factors related to the mother and her anemic child.

Part (B): this part included items related to the HBM. The model defines the key factors that influence health behaviors under six main domains which describe, how an individual's perceived threat to sickness or disease (perceived susceptibility), belief of consequence (perceived severity), potential positive benefits of action (perceived benefits), perceived barriers to action (perceived barriers), exposure to factors that prompt action (cues to action), and confidence in ability to succeed (self-efficacy). Accordingly, the researcher adopted the HBM to explicate the mother’s perception of the risk for their children of having IDA and to evaluate their knowledge about this health condition and its overwhelming consequences. In addition, to assess how the mother reacts regarding the participation in IDA prevention and control health programs offered to them through UNRWA health institutions to prevent and detect this condition and to examine how they counteract to eliminate or minimize their children’s chances of getting this health condition or from suffering its appalling consequences.

Part (B) of the questionnaire used a Likert scale to capture the diversity and complexity of people's perspectives for a better understanding of how people think and feel and to assess the views of participant in easy and simple manner. All perceptions had scores ranging from 1 to 5 (1=strongly disagree, 2= disagree, 3-natural, 4=agree, 5=strongly agree). The overall domain score was calculated by summing all items in each domain then dividing by the number of items.

The researcher created a checklist for the evaluation and analysis of medical records (Annex 7). To guarantee the content validity, it was then evaluated and approved by the UNRWA specialized research committee team and UNRWA staff in managerial positions. The check list was designed to better explore the degree of compliance of health care providers to the existing UNRWA policy for the management of IDA among young children attending UNRWA healthcare centers, including the implementation of screening and treatment technical guidelines, by determining the following items in the file; proper documentation of the anemic child health condition include growth and developmental anthropometric measurements, past medical history, detailed and focused physical examination; prophylactic and therapeutic iron supplementation at timely manner and at a correct dose and duration according to UNRWA technical guidelines; appropriate screening, diagnosis, treatment, follow up and referral of cases according to UNRWA technical guidelines; proper documentation of appointment for the next session; instructions given to patients and families and whether notes were used effectively to communicate the assessment and plan of care with the health care team.

3.7.2 Qualitative Instruments

For the qualitative part an open-ended semi-structured questions were developed by the researcher based on the preliminary findings of the quantitative data and then it was revised by a panel of experts and applied by the researcher. The qualitative part instruments included FGDs with mother of under-five anemic children and mothers of under-five recovered children (Annex 8). The questions covered areas related to the knowledge and perceptions among mothers of anemic children regarding IDA, the degree of adherence of mothers of anemic children to health education and iron supplementation programs provided to them by health care providers in UNRWA health centers and their perspectives about barriers to IDA control among their young children.

In addition, FGDs were conducted with several health care providers who are directly responsible for providing IDA prevention and control service to under-five refugee children (Annex 9). The questions covered areas related to the extent of knowledge of the health care providers about IDA and the ways for appropriate management, degree of compliance to UNRWA guidelines and protocols and barriers to effective IDA control and management among young children.

Furthermore, KIIs were conducted with several healthcare managers working in different managerial positions in UNRWA Gaza field health department (Annex 10). The questions covered areas related to policymakers' perspective on IDA prevention and control programs they deliver to refugee children registered in UNRWA child health care services besides program processes and dynamics which includes availability of policies and guidelines, availability of protocols and the extent to utilize it, capacity building and training program, monitoring system, challenges as well as possible ways forward for improvement. In addition, OECD-DAC criteria was used to analyze the KIIs responses in regards to IDA prevention and control program relevance, coherence, efficiency, effectiveness, impact, and sustainability.

3.8 Ethical and Administrative Considerations

An academic approval was obtained from the School of Public Health at Al-Quds University and an ethical approval was obtained from Helsinki Committee (Annex 3). An approval from UNRWA research committee and UNRWA Head of Health Department in the GS was obtained via e-mail, as well. A consent form was created in accordance with the values of the Helsinki Ethical Declaration to ensure that participants' rights are safeguarded (Annex 4) explaining the aim of the research and indicating that the participant confidentiality was assured for all of them. In addition, all respondents were informed by the researcher that their participation was optional and that no personal information would be revealed as a result of data analyses. Before beginning the interview, all mothers who were chosen from the clinics for the questionnaire were asked to sign a consent form indicating their agreement to participate in the study. The head health officers who participated in the KIIs, as well as the women and healthcare professionals who took part in the FGDs, all provided verbal consent. Additionally, participants in the FGDs and KIIs formally consented to the taking of notes and tab recording. The data gathered was submitted anonymously without disclosing and publishing their details. The researcher elucidated to the interviewee that they had full independence to withdraw at any time without being forced to be a part of this research.

3.9 Pilot study

For the quantitative part, a pilot study was conducted at Rimal UNRWA health center with 20 participants to explore the appropriateness, validity and reliability of the study instrument, and to let the researcher train for data collection and check for the clarity of meaning, scales, time taken to fill the questionnaire, and for expecting response rate. The tool was further modified as a result of the piloting, including the rewording or addition of explanations to some questions. The final questionnaire form and template were then created and printed. The pilot study's completed questionnaires weren't included in the final data set.

For the qualitative part, two interviewees served as pilot study in order to test the instrument's suitability and instruct the researcher on data gathering techniques. As a result, questions were further enhanced, enriched, and rearranged while also changing how they were asked. This made it possible to significantly enhance the study's validity and reliability.

3.10 Method of Data Collection

3.10.1 Quantitative Part

The researcher began data collection in the field when the piloting was complete. After coordination with Head Health Center, the researcher conducted in-person interviews with participants at the chosen UNRWA medical facility to collect the quantitative data. All interviews were carried out with participants at the waiting area of the well-baby clinic while they were waiting their child Hb lab test result to ensure a proper atmosphere for study participants to respond to the questionnaire where disruption is minimal and to prevent disruption of the daily work. The researcher requested that the consent form be assigned after explaining to each participant the study's ethical and administrative considerations in conducting the study. Then the researcher read the questionnaire questions to each participant one by one in the same phrasing in Arabic language and provided clarification of questions when needed. It is worth mentioning that the questionnaire was translated into Arabic from the original English version (forward and backward translations were performed by English and Arabic, mother tongue speakers). Each questionnaire took about 30 minutes on average to be filled. The researcher then skimmed through the questionnaires to make sure all of the questions had been addressed before reviewing the child electronic medical record to ascertain the diagnosis and the selected child demographic and anthropometric measurements.

After coordination with Head Health Center, 20 medical records from each center were selected randomly to fill the records-review check list. 100 medical records were randomly selected from each of the five health centers for the record review, and they were then revised in accordance with the check list's contents. Records were reviewed at the Head Health Center office by the researcher. Throughout the records review process, the researcher guaranteed confidentiality and client privacy.

3.10.2 Qualitative Part

After collecting and analyzing the quantitative data, the qualitative data collection process was launched in November 2022. The researcher conducted nine FGDs in three randomly selected health care centers located within refugee camps (Beach health center, Nuseirat health center and Rafah health center). At each health center three FGDs were conducted, a FGD session was conducted with mothers of under- five anemic children, then a FGD session was conducted with mothers of under- five children who were recovered from IDA and the last FGD session was conducted with several health care providers who are directly responsible for providing IDA prevention and control service to refugee children below five years inside the health center.

The FGDs interviews took place in the meeting room of the UNRWA medical facilities. An average of eight purposefully selected individuals participated in each FGD session, which lasted 60 minutes. The researcher introduced the study objectives in short to the participants during the FGDs, explained the ethical and administrative considerations of conducting this study, and then asked for their consent to record and take minutes throughout the discussion in order to capture more information. The attendees were encouraged to speak up and express their opinions during interactive discussions. The researcher made every effort to allow each participant to express their thoughts and opinions. To ensure that all themes were covered and participant perspectives were fairly reflected, prolonged engagement and probing techniques were used.

After that, four KIIs were conducted with healthcare managers working in different senior positions in UNRWA Gaza field health department; FFHO, FNO, AHO and Rimal Health Center’s SMO. Each interview lasted between 30 and 45 minutes and took place at the officer's desk. After obtaining special authorization, interviews were recorded, and brief notes were prepared to ensure that all necessary material was captured.

3.11 Response Rate

Before using any tool, all participants gave their informed consent and participated voluntarily. None of the clients refused to take part in the study when asked to fill out an interviewed questionnaire. Additionally, every interviewee who was requested to take part in FGDs and KIIs did so with enthusiasm. Thus, the response rate was 100%.

3.12 Scientific Rigor

3.12.1 Quantitative Part (Questionnaire)

3.12.1.1 Validity

The questionnaire was constructed with the supervisor's guidance, and it was frequently amended and modified. Afterwards, to evaluate the applicability, relevance, components, context, and the content of the instruments, the researcher had consulted a panel of ten experts. They were three epidemiologists, three clinical nutritionists, two pediatricians and two UNRWA staff working in managerial position (annex 11). Eight of them had responded, and the tool was further improved with the help of their comments, suggestions, and feedback. In addition, a pilot study was carried out prior to the actual data collection to examine participant’s responses and their comprehension of the questionnaire.

In order to ensure face validity during the validation process, the questionnaire layout was reviewed and formatted numerous times before the final version was submitted. This included well-structured, appealing layout, logical sequence of questions, clarity of instructions to ensure its rationality and appropriateness, and to allow easy data collection and data entry. This enhanced the questionnaire's validity when it was modified to make it more understandable. Additionally, reviewing records aided in as much as possible validating the mothers' responses.

3.12.1.2 Reliability

Since Cronbach's alpha is the most used technique for determining the internal consistency reliability, the researcher employed SPSS to measure the reliability of the questionnaire items. The domains of the questionnaire were tested after collecting the pilot study, and the reliability score with Cronbach`s alpha coefficient for each section “perceived severity,”

“perceived susceptibility,” “perceived barriers,” “perceived benefits,” “cue to action” and “perceived self-efficacy” was 0.76, 0.73, 0.76, 0.77, 0.76, and 0.77 respectively. The internal consistency reliability was retested after collecting the study sample, Cronbach`s alpha for the whole scaled questions in the questionnaire was (0.78), reflecting a good reliability. Moreover, to ensure instruments reliability, the researcher interviewed a large sample as well as the researcher was the data collector to ensure the standardization and confidentiality of data collection. Also, error detection, correction, and prevention were made more possible by the researcher checking the questionnaires at the conclusion of every data collection day. Data entry was done the same day as data collection to ensure the accuracy of the data and to re-fill the questionnaire when required. Finally, in order to reduce potential entry errors and ensure proper entry technique, 10% of the data were re-entered after data entry was complete. In addition, for the records review-check list, the researcher collected data and conducted analysis on it on the same day.

3.12.2 Qualitative Part Trustworthiness

To ensure that the semi-structured schedule of the FGDs and KIIs covers all the necessary dimensions, it was peer reviewed by health experts. The credibility, relevance and convenience of the instruments were then confirmed during debriefing meetings between the researcher and the supervisor. The participant was made aware by the researcher that their participation in the interview was entirely optional and that they had the option of accepting or declining any question. The interviews were recorded and minutes were taken throughout the session, this enhanced tracking up facts and re-checking the accuracy of the transcripts. Then, to ensure the accuracy and transparency of the transcripts and reduce the impact of the researcher subjectivity, a member check was conducted. Prolonged engagement was done as the researcher tried to probe for answers and cover all the interview dimensions properly. Finally, every transcript and recording were archived so that others could access the data at any time (Audit trail).

3.13 Data Entry and Analysis

3.13.1 Quantitative Part

Data entry models were created and questions and variables were coded and entered into the created database during the data collection. The researcher double-checked the completed questionnaire during data collection and filled in any missing information by recalling the families. The researcher used SPSS program-version 25 for data entry and statistical analysis. The process of data entry was done during the final two weeks of field data collecting and continued for three weeks after it was completed. Also, about 10% of the data was re-entered. Data cleaning was then carried out to check for errors or nonsensical values. For each question, general frequency tables were created to identify any missing data. For continuous data, mean and standard deviation were used to present the descriptive results, and percentages were used for categorical variables. According to the requirements, some continuous data were changed into categorical variables, and negatively phrased questions were converted and recoded. Descriptive statistics were used to describe the basic characteristics of the study sample. Moreover, to determine whether a difference was statistically significant, the researcher employed inferential analysis. When the P value is equal to or less than 0.05, the statistical difference is considered significant. Independent sample T-test was used to compare two means of independent variables, the ANOVA test was used to compare the means of three or more independent categorical variables, and the correlation test was used to compare the means of categorical variables. In addition, findings of records review check-list were analyzed and the findings documented.

3.13.2 Qualitative Part

As soon as the interview was over, on the same day, a debriefing report was done for each interview. It is important to highlight that non-promoted intimations, group dynamics, and non-verbal cues were all carefully observed and taken into account. The transcripts from the KIIs and FGDs were analyzed using open coding theme analysis. The key findings from the written transcripts were decoded using the MAXQDA program, and categories were created based on selected themes. To enrich results and strengthen and validate discussion, triangulation between the quantitative and qualitative data was created. Along with the text, significant and noteworthy quotations were included.

3.14 Limitations of the Study

- This research used a cross-sectional design. As the time of snapshot is not guarantee to be representative, this type of study design cannot be used to examine behavior over a period of time.
- While the opinions of other beneficiaries who received IDA prevention and control services from UNRWA health center but did not exist at the time of the study or who receive IDA prevention and control services from other health care providers could be important or reflect a better picture of reality, the study only included children visiting UNRWA health centers during the study period.
- Since the anemia screening program in the UNRWA health center is linked to the vaccination program and most beneficiaries don't return after completing their child's vaccine schedule, there is a dearth of data on IDA control in children older than two years old. Additionally, UNRWA guidelines state that a child's first birthday is the starting point for anemia screening, so there was a lack of information regarding infants under one-year-old who might have IDA.
- Participants from the five healthcare facilities were difficult to recruit since completing a personal interview questionnaire was expensive and time-consuming. In addition, the researcher is forced to gather all the data during the constrained working hours at UNRWA health care facilities.
- Response bias since the sample was taking from health centers during working hours. The researcher overcame this by assuring the participants of the confidentiality of the data and that their own perceptions would not alter the care given to them.
- The study assessed health care providers and key health manager's perspectives by a purposive sample, which is not representative sample

Chapter Four

Results and Discussion

An overview of the main quantitative and qualitative findings of this study is provided in this chapter. The findings were reached after collecting data from the responses of mothers of under-five anemic children to the structured questionnaire which also have been triangulated by a qualitative method that included deep discussions with selected individuals who participated in nine different FGDs in the north, middle and south areas of the GS (3 FGDs conducted with mother of under- five anemic children who still suffering from IDA, 3 FGDs with mothers of under- five children who recovered from IDA and 3 FGDs with health care providers) and through four KIIs with key healthcare managers working in UNRWA Gaza field health department. Additionally, the key conclusions from the medical records review check-list are summarized in this chapter.

First, in this chapter, the study population is described in terms of the family-specific sociodemographic characteristics followed by a description of the child-specific demographic characteristics. The subsequent sections illustrate HBM main domains and difference of HBM scores according to selected demographic characteristics as well as correlation and regression analysis among the HBM constructs. Then IDA prevention and control program was assessed using OECD-DAC criteria using the following themes: relevance, coherence, efficiency, effectiveness, impact, and sustainability.

Descriptive and analytical findings were presented jointly where appropriate. Qualitative data in this chapter was represented according to the participants` opinions and perceptions with quotations from participants were shown throughout the Chapter.

4.1 Description of the Family-Specific Sociodemographic Characteristics

Quantitative data from the study participants was collected through well-structured questionnaire. As shown in Figure (4.1), the population surveyed consists of 400 under- five refugee children distributed across the GS five main governorates with 22.3% from UNRWA Jabalia health care center in the North Gaza governorate, 20% from UNRWA Rimal health care center in Gaza governorate, 16% from UNRWA Nuseirat health care center in the Middle governorate, 21% from UNRWA Khan-Younis health care center in Khan-Younis governorate and 20.7% from UNRWA Rafah health care center in Rafah governorate.

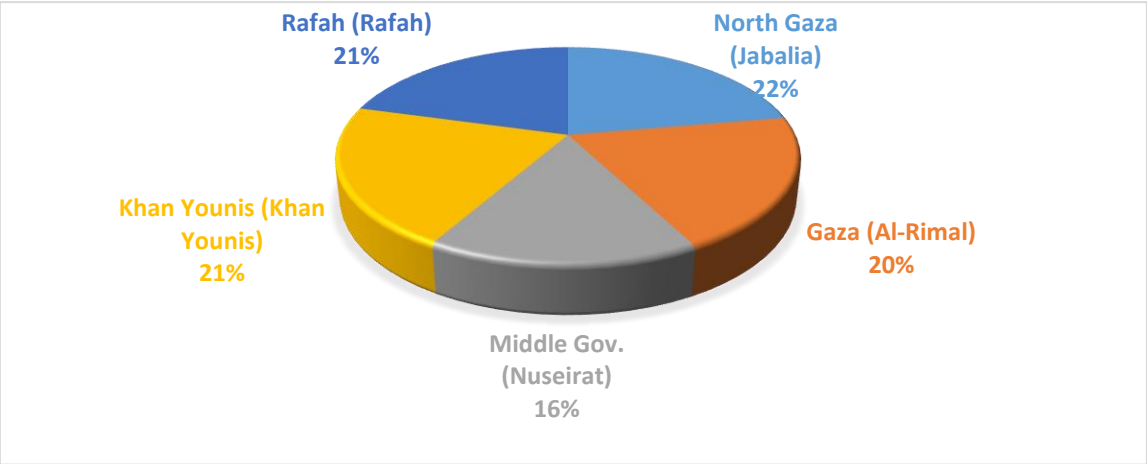

Figure (4.1): Distribution of study population by health care centers

Table (4.1) describes the sociodemographic and economic factors related to the families of the anemic children. More than half of the studied participant were living inside a camp (54.5%) and 55.2% of them were living in apartment. The percentages of participants living in nuclear and extended families were 48% and 52%, respectively. 47.3% of study participant stated that they have small family size consist of ≤ 4 persons. At the time of data collection, the current average of mothers' age in the study was 29.17±6.14 years whereas the average marital age was 20.97±3.66 years. The current fathers' age means was 33.07±6.99. Regarding the consanguinity of parents, the majority of the studied participants stated that there was no relation between both parents (61.8%). In terms of educational attainment, the study revealed that 51.4% of participants were highly educated and 36.8% had completed secondary school. With regard to the economic status of study population, the study results found that 88.8% of mothers were unemployed while 53.5% of participant's husbands were employed. The participants in the study had an average monthly income of 928.2 ILS with (Standard Deviation-SD= 843.8). Only 11% of the study's participants had monthly incomes above the deep poverty threshold (1,974 ILS), while 89% of participants had average monthly incomes that were below the deep poverty line. In addition, findings of this study showed that the percentage of monthly expenditure for food items was more than 30% per monthly income in 89.7% of participants.

Table (4.1): Description of family-specific sociodemographic characteristics (N=400)

		No. (%)	*Mean±SD*	*Min*	*Max*
Governorate (Health Center)					
	North Gaza (Jabalia)	89 (22.3%)			
	Gaza (Al-Rimal)	80 (20.0%)			
	Middle Gov. (Nuseirat)	64 (16.0%)			
	Khan Younis (Khan Younis)	84 (21.0%)			
	Rafah (Rafah)	83 (20.7%)			
Residency					
	Inside the camp	218 (54.5%)			
	Outside the camp	182 (45.5%)			
Dwelling unit					
	Villa	11 (2.8%)			
	House	155 (38.8%)			
	Apartment	221 (55.2%)			
	Marginal/Caravan/Barracks	13 (3.2%)			
Family type					
	Nuclear family	192 (48.0%)			
	Extended family	208 (52.0%)			
Mother's age (Year)			29.17±6.14	18.0	49.0
Mothers marital age (Years)			20.97±3.66	14.0	36.0
Marital age of less than 18 years age		116(29%)			
Father's age (Years)			33.07±6.99	20.0	65.0
Consanguinity of parents					
	First-degree (1st cousin)	80 (20.0%)			
	Second-degree (2 cousin)	73 (18.3%)			
	No relation	247 (61.8%)			
Mother's level of education					
	Low education	47 (11.8%)			
	Secondary school	147 (36.8%)			
	High education	206 (51.4%)			
Mother's occupation					
	Housewives	355 (88.8%)			
	Employed or self-employed	45 (11.2%)			
Father's occupation					
	Unemployed	186 (46.5%)			
	Employed in public sector	56 (14.0%)			
	Employed in private sector	34 (8.5%)			
	Employed in NGOs	40 (10.0%)			
	Self-employed	84 (21.0%)			
Monthly income Israeli New Shekel (ILS)					
	Average monthly income		928.2±843.8	0	6000
	≤1974 ILS (deep poverty)	356 (89.0%)			
	Between 1975 to 2470 ILS	26 (6.5%)			
	≥2471 ILS	18 (4.5%)			
Percentage of monthly expenditure for food items per monthly income					
	Average monthly expenditure for food		561.9±500.3	0	3000
	Less than 30%	41 (10.3%)			
	From 30% to less than 60%	141 (35.3%)			
	More than 60%	218 (54.5%)			
Family size					
	Average Family size		5.2±2.4		
	Small (≤4 persons)	189 (47.3%)			
	Medium (5–6 persons)	130 (32.5%)			
	Large (≥7 persons)	81 (20.3%)			

As illustrated in in table (4.1), the first section in this table shows the family-specific sociodemographic characteristics of the surveyed population including the geographic location of child's family in terms of locality, camps, dwelling unit besides age of both parent, marital age of women, family type along with household size. The distribution of participants in the study sample was selected according to the proportional representation of under-five refugee children registered at UNRWA health centers. Of the total surveyed population, 54.5% were living in camps while it was reported on UNRWA health annual report (2021) that only 37.1% of refuges settled inside a camp (UNRWA, 2021). These differences could be explained by the studied population attending UNRWA heath care centers that are located inside the refugee camps except for Rimal UNRWA health center which is located in the center of Gaza City.

The respondents were asked whether they would classify their families as nuclear or extended. In contrast to extended families, which include additional family members in addition to the nuclear family, nuclear families are made up of the parents and their children. According to PCBS (2017), nuclear families accounted for 85.7% of all GS residents, while extended families made up 14.3% of the population (PCBS, 2018[a]). The worsening socioeconomic conditions and difficulty of spouses to maintain separate residences, particularly in the wake of the COVID-19 epidemic, may explain the decreased percentage of nuclear families in this study in comparison to the overall population. This also explicates why only 38.8% of the participant stated that they were living in a house.

The mean family size of the entire study population is 5.2 which is virtually in line with what was stated by the PCBS (PCBS, 2018[a]). Mothers in the study were an average age of 29.17 years (SD=6.14) at the time of data collection. The lowest maternal age reported was 18, and the highest was 49 years. The average marital age is 20.97±3.66 years which is the same as what is reported by PCBS report (2018). While PCBS (2021) acknowledged on the eve of International Women's Day that there had been a decline in the percentage of early marriages (under the age of 18), stating that it had reached 19.9% in the GS of the females' registered marriages in 2019 (PCBS, 2021), 29% of all participants in this study reported a marital age of less than 18 years. This could be related to the bad financial situation among registered refugee inside camps where families use marriage to protect their girls from poverty, sexual harassment and assault and to family as a whole to have a way out of poverty.

Regarding the educational level of the study population, the study showed that more than half of respondents were highly educated (51.4%) which reflects a well-educated community and this is more or less similar to that reported by PCBS (2021) which declared that the percentage of female students enrolled in the Palestinian higher education institutions reached 61% (PCBS, 2021).

Table (4.1) also illustrates the economic status of the study population. Notwithstanding that a large proportion of mothers were found to be highly educated but only a small portion of women were employed (11.2%). The study's percentage of unemployed women was lower than that reported by PCBS (2018), which stated that the percentage of unemployed or economically inactive women in Gaza was 93.7% (PCBS, 2018[b]). The study's findings also revealed lower rates of female labor market engagement than those of males, and these results are comparable with those of the PCBS as well. 46.5% of the participants' husbands reported being unemployed, which is roughly comparable to PCBS's (2018) estimate that Palestine's unemployment rate was 52% in 2018 (PCBS, 2018[b]) as well as to what stated by OCHA (2022) that reported unemployment rate of 46.6% among the Gazans with a higher percentage of 48.1% for refugees in camps (OCHA, 2022). In addition, 89% of participants reported monthly incomes that were below the deep poverty line. This is consistent with PCBS's estimate that 81.5% of the population had been considered poor at the end of the third quarter of 2022 and OCHA's estimate that between 70 and 80 percent of Gazans were living below poverty line (OCHA, 2022). It is worth mentioning that the cut point of deep poverty according to PCBS Report 2017, was 1974 ILS (PCBS, 2018[b]). The high rate of unemployment and the blockade in the GS, which have a significant impact on the labor market and the availability of job opportunities, are cited as causes for the researcher's results. Furthermore, the average monthly expenditure for food items per monthly income was 561.9±500.3 and about 89.7% of participants stated that this represents more than one-third of their monthly income and 54.5% stated that this encompasses about two-thirds of their monthly income.

4.2 Description of the Child-Specific Demographic Characteristics

With regard to gender, as illustrated in table (4.2), 218 (54.5%) of the anemic children were males and 182 (45.5%) were females. The majority of surveyed population (46.5%) were between 13-24 months old, approximately one-quarter of the study participants (23.0%) were ≤ 12 months old, 15% of the study participants were between 25-36 months old, 8.8%

of the study participants were between 37- 48 months old, and 6.8% of the study participants were 49-60 months old. Regarding study participants' weight at birth, the majority of the children (83.3%) had normal weight at birth while mothers stated that about 14.2% of the surveyed children had underweight and 2.5% were macrocosmic.

The researcher used pediatric anthropometric measurements to assess the nutritional status of the studied children. As illustrated in table -4.2-, 53.7% of children were found to have normal weight for age's according to the standard z-score while 31.5% were suffering from different degree of underweight (20.3%, 7.7%, 3.5% had mild underweight (≤ –1.0 SD), moderate underweight (≤ –2.0 SD) and severe underweight (≤ –3.0 SD) respectively). In regards to height for age's z-score, 35% of the anemic children were having a normal height for age whereas 50.4% were suffering from different degrees of stunting (16.7%, 10.7%, 23.0% had mild stunting (≤ –1.0 SD), moderate stunting (≤ –2.0 SD) and severe stunting (≤ –3.0 SD) respectively). Moreover, the study described wasting among the studied anemic children using weight for height's z-score and found that 45.3% of children had normal weight for height while 20.5% of the children were found to be suffering from different degree of wasting (14.7%, 3.8%, 2.0% had mild s wasting (≤ –1.0 SD), moderate wasting (≤ –2.0 SD) and severe wasting (≤ –3.0 SD) respectively).

Table (4.2a): Description of child-specific characteristics (N=400)

		No.	***%***
Gender of the child			
	Male	218	54.5%
	Female	182	45.5%
Age of anemic child			
	≤ 12 months	92	23.0%
	13-24 months	186	46.5%
	25-36 months	60	15.0%
	37- 48 months	35	8.8%
	49-60 months	27	6.8%
child weight at birth			
	Underweight (<2,500 grams)	57	14.2%
	Normal weight (2,500-4,000 grams)	333	83.3%
	Macrosomia (> 4,000 grams)	10	2.5%
Description of malnutrition using weight for age's z-score (gender-dependent)			
	Moderate overweight (≥ +2 SD)	18	4.5%
	Mild overweight (≥ +1 SD)	41	10.3%

Table (4.2b): Description of child-specific characteristics (N=400)

	Normal nutritional status (SD: –0.99 to +0.99)	*215*	*53.7%*
	Mild underweight (≤ –1.0 SD)	81	20.3%
	Moderate underweight (≤ –2.0 SD)	31	7.7%
	Severe underweight (≤ –3.0 SD)	14	3.5%
Description of stunting using height for age's z-score (gender-dependent)			
	Extreme height (≥ +2 SD)	23	5.8%
	More than normal (≥ +1 SD)	35	8.8%
	Normal height (SD: –0.99 to +0.99)	140	35.0%
	Mild stunting (≤ –1.0 SD)	67	16.7%
	Moderate stunting (≤ –2.0 SD)	43	10.7%
	Severe stunting (≤ –3.0 SD)	92	23.0%
Description of wasting using weight for height's z-score (gender-dependent)			
	Extreme weight for height (≥ +2 SD)	76	19.0%
	More than normal (≥ +1 SD)	51	12.7%
	Normal weight for height (SD: –0.99 to +0.99)	181	45.3%
	Mild wasting (≤ –1.0 SD)	59	14.7%
	Moderate wasting (≤ –2.0 SD)	15	3.8%
	Severe wasting (≤ –3.0 SD)	8	2.0%
	Missing Data (not calculated by WHO Anthro)	10	2.5%

Table (4.2) demonstrates that about more than half of the anemic children included in this study were male (54.5%), while 45.5% of the study participants were female. This is congruent with the results of a cross-sectional study conducted by El Kishawi et al., in the GS which showed that boys were more susceptible to IDA than girls [adjusted b = 0.17; 95% CI (0.0.01, 0.33); p = 0.031] (El Kishawi et al., 2015).

In addition, as shown in table -4.2-, the percentage of anemic children decrease with age with the highest percentage being observed among children below two years old. This finding was further consolidated by qualitative part findings, as the FFHO in KII said:

> *"The percentage of children with anemia at one year is at least 70%, which is a high percentage. But when we examined the children in the first grade for a blood percentage in the new entrance exam, the percentage of the children whose blood were less than 11 was 14%. This means that the percentage that was 70% at the age of one year, is reduced to less than 20% at the age of six years".*

This also congruent with the results by El Kishawi et al., which demonstrated a significant linear positive relationship between the age of the child and the Hb level with those who

were older had a higher Hb level of 0.02 g/dl [adjusted b = 0.02; 95% CI (0.01, 0.03); p < 0.001] (El Kishawi et al., 2015). This also was similar to Khan, Awan, and Misu, study result which showed that, children below 24 months of age were at higher risk of anemia (OR 3.01; 95 % CI 2.38-3.81) (Khan, Awan, and Misu, 2016). A possible assumption may suggest that most mothers were committed with IDA prevention and control program inside UNRWA health center as long as this program is connected with their child vaccination appointment. But once the children complete their vaccination schedule, the commitment for anemia follows up decreases. This was further explained in qualitative component from several aspects wherein the SMO in KII said: "*We do not have a problem with detecting because it's spontaneously done at the age of one year, but the problem is with the follow up of cases*". In the same line of this, the FNO in KII elucidated that: *"In our clinics, vaccine coverage in Child Health Care is 99.5%, and then there is a noticeable delay after the last vaccination station, that is over 18 months. Which means that the child does not come unless he is on an outpatient clinic"*.

Table (4.2) also shows that 83.3% of anemic children had a normal birth weight and only 14.2% were underweight. On the contrary, literature had supported the relationship between low birth weight and childhood anemia. Prieto-Patron et al., did a global analysis using publicly available data from the Standard DHS from 2005 to 2016 in Asia, North-Africa, the Middle East, Sub-Saharan Africa and Latin America to study different factors associated with anemia in children 6–23 months old. The study result revealed that child anemia was strongly associated with low birth weight (OR 1.16, 95% CI: 1.12–1.19) (Prieto-Patron et al., 2018). Similarly, a community-based cross-sectional study was conducted on 436 children in Arusha Rural District in Tanzania to examine predictors of anemia among children under 5 years. It was concluded that low birth weight and dietary factors were predictors of anemia among under-five children living in this rural setting (Kejo et al., 2018).

Additionally, results in table (4.2) indicated that about half of the anemic children were suffering from different degree of stunting while less than one third of children suffered from different degree of underweight and about one fifth of them suffered from different degree of wasting. Stunting in children is a reflection of chronic undernutrition that occurs when a child does not grow to his/her potential because of the long-term cumulative effects of inadequate dietary intake and frequent illness or infection. This is consistent with the finding of the cross-sectional study carried out in 2014 in Ethiopia which disclosed that stunted children were 2.7 times more likely to be anemic than their counterpart (Woldie, Kebede and Tariku, 2015).

4.3 Description of HBM Domains

As shown in figure (4.2), the model describes six main domains which contain several factors that influence health behaviors as an individual's perceived threat to sickness or disease (perceived susceptibility), belief of consequence (perceived severity), potential positive benefits of action (perceived benefits), perceived barriers to action, (perceived barriers), exposure to factors that prompt action (cues to action) and confidence in ability to succeed (self-efficacy). The highest score was related to the perceived benefits domain with total average percentage of 78.4%, while the lowest total average percentage score was related to perceived barrier domain (45.8%). The average total percentage for perceived severity was 72.2% while the total average percentage for perceived susceptibility was 65.2%. More than three quarter (76.8%) agreed with cue to actions domain whereas 72.6% was the average total percentage for perceived self-efficacy domain.

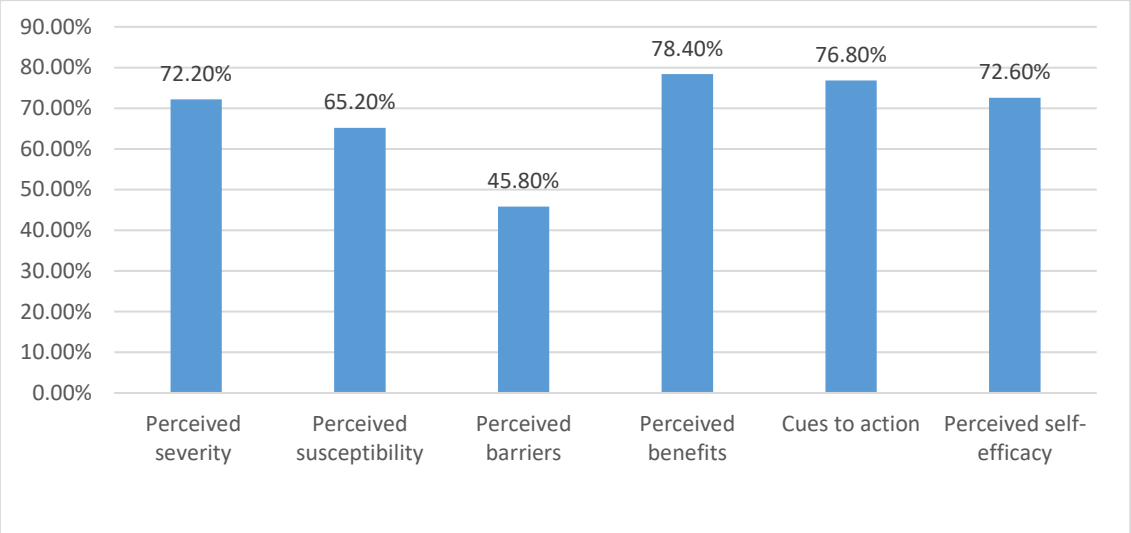

Figure (4.2): Description of HBM domains

As shown in table (4.3), the average total percentage of perceived severity domain was found to be 72.2% with 74.2% of the mothers of under- five anemic children reported a perceived severity of anemia among their children and 71.8% conveyed a perceived severity of not using anemia prevention and control program providing to them through UNRWA health care centers.

Also, table (4.3) demonstrates the average total percentage of perceived susceptibility of a child to have IDA which was found to be 65.2%. The majority of participants (71.6%) agreed that nutrition-related factors increase the susceptibility of a child to have IDA and more than one half (52.8%) supposed food insecurity-related factors would increase the susceptibility

for anemia. Moreover, about 62.8% of the participants agreed in mother-related factors and around two-third agreed in child-related factors (64.8%) as well as hygiene-related factors (63.8%) that could increase the susceptibility of a child to have IDA.

Additionally, the majority of mothers agreed that they fed their children iron rich food regularly with a mean score of 3.40 (SD = 0.71). Likewise, the mean score of mothers who agreed that they achieved MDD was 3.52 (SD = 0.70). While MMF had a mean score of 3.19 (SD = 1.06).

The third domain is the perceived barriers domain which describes perceptions in regard to the barriers of a medical intervention which had a mean score of 2.20 (SD = 0.67). As demonstrated in table (4.3), the average percentage of participant who stated that they face barriers regarding the availability and affordability of iron rich diet was 54.6% while the average percentage of participant who stated that the availability of iron prevention and control services could be considered as a perceived barrier for adopting the needed IDA preventive measures for their children was 41%. An average percentage of 43.8% was reported to a perceived barrier to accessibility of iron prevention and control services. In addition, 54.6% was the average percentage of reported acceptability barrier whereas 39.8% believe that unclear and limited health information received from health providers in the first contact was seeming as a barrier for integration in the service. Likewise, the average percentage of participant who perceive barriers of the effective coverage and in the effective integration in the IDA preventive and control program inside UNRWA health care centers was 41%.

Whereas, the average total percentage of perceive benefits domain of IDA interventions that aimed at reducing the health threat was 75.4% with more than three-quarters (77%) reported perceived benefits from prophylaxis iron supplementation and 80.4% conveyed perceived benefits to the adherence to iron drop treatment regimen.

Likewise, cues to action had an average total percentage of 76.8% with a reported average percentage of 74.8% and 77.8% to the internal cues and external cues respectively.

Concerning the perceived self-efficacy domain, it had an average total percentage of 72.6% with the highest average percentage (77%) for a perceived self-efficacy in iron supplement treatment followed by 72% average percentage of reported perceived self-efficacy in dieting while the average percentage of general self-efficacy scale was 70.8%.

Table (4.3): Description of HBM domains (N=400)

Code		*Mean±SD*	*Min–Max*	*Percentage*
Perceived severity				
A1	Perceived severity of anemia among children	3.71±0.90	1.0–5.0	74.2%
A2	Perceived severity of not using anemia prevention and control program	3.59±0.84	1.0–5.0	71.8%
A	Perceived severity (average of total)	3.61±0.81	1.0–5.0	72.2%
Perceived susceptibility: susceptibility of child to being anemic				
B1	Mother-related factors	3.14±0.95	1.0–5.0	62.8%
B2	Child-related factors	3.24±0.99	1.0–5.0	64.8%
B3	Hygiene-related factors	3.19±1.06	1.0–5.0	63.8%
B4	Nutrition-related factors	3.58±0.82	1.0–5.0	71.6%
B4-1	Regular and daily use of iron-rich food to feed children	3.40±0.71	1.0–5.0	
B4-2	Minimum dietary diversity (MDD)	3.52±0.70	1.0–5.0	
B4-3	Minimum meal frequency (MMF)	3.19±1.06	1.0–4.0	
B5	Food insecurity-related factors	2.64±1.08	1.0–5.0	52.8%
B	Perceived susceptibility (average of total)	3.13±4.80	1.03–4.08	65.2%
Perceived barriers				
C1	Availability and affordability of iron rich diet	2.73±0.91	1.0–5.0	54.6%
C2	Availability of iron prevention and control services	2.05±0.87	1.0–5.0	41.0%
C3	Accessibility of iron prevention and control services	2.19±0.83	1.0–5.0	43.8%
C4	Acceptability barriers	2.73±0.88	1.0–5.0	54.6%
C5	Contact barriers	1.99±0.85	1.0–5.0	39.8%
C6	Effective coverage barriers	2.05±0.81	1.0–5.0	41.0%
C	Perceived barriers (average of total)	2.20±0.67	1.0–4.92	45.8%
Perceived benefits				
D1	Perceived benefits from prophylaxis iron supplementation	3.85±0.75	1.0–5.0	77.0%
D2	Benefit to adherence to iron drop treatment regimen	4.02±0.73	1.0–5.0	80.4%
D	Perceived benefits (average of total)	3.92±0.69	1.0–5.0	78.4%
Cues to action				
E1	Internal cues	3.74±0.71	1.0–5.0	74.8%
E2	External cues	3.89±0.64	1.0–5.0	77.8%
E	Cue to action (average of total)	3.84±0.61	1.0–5.0	76.8%
Perceived self-efficacy				
F1	General self-efficacy scale	3.54±0.72	1.0–5.0	70.8%
F2	Perceived self-efficacy in dieting	3.60±0.75	1.17–5.0	72.0%
F3	Perceived self-efficacy in iron supplement treatment	3.85±0.72	1.4–5.0	77.0%
F	Perceived self-efficacy (average of total)	3.63±0.61	1.33–5.0	72.6%

Table (4.3) provides descriptive statistics of the study's HBM main domains and variables. As illustrated in the table, the majority of mothers perceive IDA (74.2%) as sever health condition among below five children that need medical intervention and has devastating consequences if lifted untreated and 71.8% agreed on perceiving a severity of not using anemia prevention and control program. This was in line with the qualitative study findings, as almost all participants in the FGDs agreed that IDA among their children is a sever health condition that need intervention. The study findings were also consistent with the results concluded by Aziz Ali et al., (2021) in their qualitative study which was conducted in Pakistan, as they found that all study participants perceived anemia as an important health problem tending to cause adverse outcomes among women and their children (Aziz Ali et al., 2021).

Regarding the perceived susceptibility of a child to get IDA, 65.2% of the mothers admitted the likelihood of their children to have IDA with the largest proportion of them (71.6%) agreed that nutrition-related factors were the commonest factor that could be attributed to susceptibility of their children to anemia. A similar result was noticed in Egypt, where a cross-sectional study enrolled 300 children found that infants with IDA were found to consume foods that were 50% below recommended daily allowance with iron content (Al Ghwass et al., 2o15). Similarly, this was consistent with findings of a cross sectional study conducted in children between the ages of 24 - 62 months in the GS to explore the dietary habits which revealed that most of the children included in the study were having low quantity of iron rich food compared to the recommended daily intake (Alzain, 2012).

Additionally, the researcher adopted IYCF practices recommended by the WHO to assess the extent of adequate nutritional practices provided to the under-five anemic children. As shown in the table (4.3), the mean score of mothers who agreed that they fed their children iron rich food regularly was 3.40 (SD = 0.71). In addition, the dietary diversity was measured when the diet contains four or more of the eight listed food groups recommended by the WHO while the MMF was defined as a twice for breastfed infants aged 6-8 months or three times for breastfed children aged 9-23 months or four times for non-breastfed children aged 6-23 months (WHO, 2021[b]). The mean score of MDD was 3.52 (SD = 0.70) and MMF had a mean score of 3.19 (SD = 1.06). Findings of this study were not consistent with results of mixed study reported by nutrition working group led by UNICEF with the support of the WFP and Save the Children to determine the nutrition status and the practices of pregnant

and lactating women and children 0-59 months in the most vulnerable communities of the GS. Study results revealed that a large proportion of the population were having a sub optimal food consumption score with 85% of the children aged 6 to 23 months were not able to meet this minimum standard and 61% of children 6 to 23 months are not fed as often as they should be (Nutrition Working Group, 2018).

Moreover, food insecurity was assessed among the surveyed population by using HFIES which is a reliable and valuable tool mandated by the UN General Assembly as indicator to monitor SDG target 2.1 which focuses on ensuring access to food for all (FAO,2017). Using the HFIES that relies on people's responses to eight brief questions regarding their access to adequate food, the mean score was 2.64±1.08. Finding of this study was consistent with results reported by Desogi et al., who conducted a cross-sectional survey on 445 households in north Kassala in Sudan to assess the effect of household food insecurity on the nutritional status of children under five which revealed that there is negative association between Hb level with households' food security ($P<0.05$) (Desogi et al., 2022). Similarly, this is in line with study findings conducted by Radi et al., (2013) which carried out in Gaza City to study the nutritional status of Palestinian preschool children aged 2–5 years under blockade which found that in rural area where more food insecure households existed, had a higher prevalence of anemia (Radi et al., 2013).

The third domain in HBM was related to perceived barriers by study participants regarding the affordability of iron rich diet and to the integration in IDA prevention and control services inside UNRWA health care centers. The mean scores for mothers who reported a perceived barriers related to the availability and affordability of iron rich diet was 2.73±0.91. This was consistent with Radi et al., study findings which disclosed that in Gaza City, the majority of households faced difficulties accessing food due to the siege and the shortage of food products (Radi et al., 2013).

Whereas, the perceived barriers associated to integration in health services were assessed using the Tanahashi model which evaluates health system coverage through five key measures that reflect different stages along the service provision continuum. The Tanahashi model highlights the need for availability of infrastructure, human resources, essential commodities, inputs and equipment (availability coverage) as the first step for effective coverage. The mean score for perceived barriers related to availability of iron prevention and control services reported by study participants were 2.05±0.87. After that, different kind of

access barriers were explored by the researcher including physical, geographical, financial, informational, and social barriers. The mean score for the existing access barriers reported by study participant was 2.19±0.83. After that, the researcher addressed several aspects of acceptability coverage including the extent of acceptance of iron supplementation provided by UNRWA health care centers to the children integrated in the service. The participant reported 2.73±0.88 as a mean average score for acceptability barriers. Next, barriers related to first contact between mothers of anemic children and health care providers were assessed to explore different aspects related to initial utilization in a way that would encourage mothers to integrate effectively in the service. The average mean score of mothers who faced barriers related to contact coverage was low with an average mean score of 1.99±0.85. Finally, the barriers associated to continuity of care nominated as effective coverage barriers were explored taking in consideration factors related to client satisfaction and meeting mothers' expectation regarding IDA management among their children. The average mean score for the participant perception about the effective coverage barriers was 2.05±0.81.

In contrary to the low average mean score reported to the perceived barrier domain in HBM (2.20±0.67), the study participants reported a high average mean score to the perceived benefit domain in the HBM (3.92±0.69). As illustrated in table (4.3), the majority of mothers reported a perceived benefit from prophylaxis iron supplementation (with mean average score of 3.85±0.75) as well as a perceived benefit to iron drop treatment regimen provided to their children through UNRWA IDA management programs (with mean average score of 4.02±0.73).

Interestingly, the study showed that the majority of mothers of anemic children agreed on adoption a healthier behavior toward their anemic children if they come upon a cue, or trigger for prompting engagement in health-promoting behaviors. The mean average score of cues to action was 3.84±0.61 with the percentage of study participants who stated that they would adopt healthy eating behaviors and would be more adherent to iron management programs if they persuaded by internal and external cues were 74.8% and 77.8% respectively.

The last domain in HBM describes perceived self-efficacy. Self-efficacy refers to an individual's perception on their competence to successfully perform a behavior. The researcher adopted the GSE scale which is a psychometric tool consist of a 10-item that is designed to assess optimistic self-beliefs to cope with a variety of difficult demands in life (Jerusalem and Schwarzer, 1992). The mean score for general self-efficacy scale among

study participants was 3.54±0.72 which reveals that the majority of mothers addressed levels of confidence in performing tasks that would contribute in IDA management among their children and they have the willingness to accomplish a given task in order to improve their children heath. Moreover, 72% of study participants reported perceived self-efficacy in dieting and belief in their capacity to prepare and feed their children a healthy and iron-rich foods. Similarly, 77% conveyed that they hold a perceived self-efficacy in following the health provider advices related to IDA management program.

4.3.1 Descriptive Statistics of "Perceived Severity Domain"

Perceived severity is an individual's belief that contracting a disease or carrying a trait would negatively impact their life. The severity perception in this model could be considered as an important step in recognizing the value in taking a suggested action to diminish the perceived threat.

Table (4.4): Description of Perceived Severity (N=400)

		Mean	***SD***	***Percentage***
Perceived severity of anemia among children				
1	I believe that anemia among children is a severe health problem in general that need intervention	3.88	1.02	77.6%
2	If my child anemia doesn't improve, he will get sick	3.94	0.99	78.8%
3	If my child anemia doesn't improve, he may die	3.32	1.19	66.4%
Perceived Severity of not using anemia prevention and control program (I feel that without this service my child)				
4	Won't be able to have normal growth pattern	3.50	1.13	70.0%
5	Won't be able to have normal physical development	3.48	1.15	69.6%
6	Won't be able to have normal mental development	3.40	1.10	68.0%
7	Will have a diminished cognitive ability	3.48	1.16	69.6%
8	Will have behavioral problems	3.47	1.17	69.4%
9	Will have a shorter attention span	3.73	1.07	74.6%
10	Will be irritable	3.46	1.13	69.2%
11	Will be more likely to become sick (less immunity to infections)	3.94	1.06	78.8%
12	Will be craving to eat non-food items like ice, dirt, paint or starch	3.12	1.23	62.4%
13	Will lack of energy and fatigue	3.89	1.02	77.8%
14	Nails will become brittle	3.81	1.10	76.2%
15	Will have a pale face and his tongue will look redder than normal with cracks on the side of the mouth	3.77	1.08	75.4%

Participants were asked to indicate the degree to which they agreed or disagreed with statements related to how they perceive seriousness of anemia among their children and its consequences if it is left unaddressed or untreated and how they perceive the severity of not using anemia prevention and control programs. As illustrated in table (4.4), the majority of participants believed that anemia among their children was a sever health problem in general that need intervention (77.6%). Similarly, 78.8% of participants agreed that if their children didn't improve from IDA, they will be sick while 66.4% agreed that this could result in children death. In 2014, Scott et al., did a meta-analysis of 12,000 children from six African countries to review the contribution of IDA to child mortality and to estimate the magnitude of that effect. Study results revealed a combined odds ratio of 0.76 (0.62–0.93), indicating that for each 1g/dL increase in Hb, the risk of death falls by 24%. In addition, due to the graded risk relation demonstrated on the study, even a modest improvement in Hb concentration could reduce mortality rates in infants and young children (Scott et al., 2014).

Regarding participants views about perceived severity of not using anemia prevention and control program, the majority agreed that this may result in negative health outcomes, including delay in child growth, physical and mental development, cognitive ability besides the increase tendency of suffering from behavioral problems and a shorter attention span. Also, the majority of participants agreed on the development of symptoms related to IDA including irritability, decrease immunity to infections, lack of energy, easy fatigability, brittle nails, pale face, red tongue with cracks on the side of the mouth and child craving to eat non-food items like ice, dirt, paint or starch. This reflects the importance of mother knowledge about IDA symptoms and consequences. Findings in this study were in line with a cross-sectional study finding done in a Jewish town in southern Israel which revealed an inverse relationship between the presence of anemia and the level of maternal knowledge as well as to the reported adherence with iron supplementation, with low knowledge of anemia leading to a 12-fold increase in prevalence of anemia in infants (Bilenko et al., 2007).

The above findings were further compared and matched to qualitative part findings, as mothers were asked to conceptualize their understanding of pediatric anemia and what came to their mind when they came upon IDA. Across all interviews mothers indicated that they perceived IDA as sever health condition that need intervention. A mother of anemic child in north area mentioned in the FGD that*: "It is not good for a child to have weak blood, because he may have symptoms that are not good, such as that he looks dizzier, had frequent falls*

and can't focus, so you must do things to strengthen his blood". In the same line another participant in south area described anemia in her child as: *"Blood affects everything. It is the thing that moves you. I was afraid when I saw my child's face color yellow like a lemon and he looked like a drugged person, so I went to ask the doctor about ways to correct it".*

From a very different prospective, health care providers elucidated that one of the main barriers they were facing during IDA management was the poor perception of anemia as important health condition that need intervention by children's caregivers. A medical officer from Nuseirat UNRWA Health care center said that:

> "*Honestly, what I noticed from my own experience in treating anemia is that the woman herself does not understand the extent of the problem. She does not perceive how much the problem may affect the growth of her child at present or the thinking and mental abilities when he grows up, and therefore she does not give importance to the subject".*

In addition, another medical officer from Rafah UNRWA health care center said:

> *"Through my own experience during my work in the agency, I can tell you that people care more about tangible things. I mean if the child is vomiting in front of his parents' eyes or has diarrhea or has an attack of fever, then parents would be convinced that he needs treatment. But for anemia, they do not perceive that their child is sick especially when he has no symptoms, so even if you tell them to take this treatment or do this, you feel that they are not very interested and not very oriented to the importance of the issue. And here is our role, the health provider should guide people and enlighten them with numbers and figures and explain to them more about the disease and its consequences if lifted untreated".*

In the same line, a mother of anemic child from north area said in FGD:

> *"When my child having a fever suddenly and looks tired, I go to treat it immediately. But in case of anemia, my child was looking very well and was playing and not complaining from anything. I was surprised when the nurse told me that he is anemic and give me a medication".*

The FFHO further clarified this point as she stated during KII:

> *"The largest portion of anemia diagnosed in UNRWA clinics is mild anemia. I mean, I am currently doing a study and found that about 50% of the children diagnosed with anemia had a Hb level between 10-11 and the remaining part had moderate anemia while it was very rare to find severe cases. So, because most of them are mild, they improve once the child starts to eat".*

She further explained:

> *"This affects caregiver perception. According to mothers she sees her son running and playing well, and she does not sense that large changes are happening, so maybe these things play a role. Also, sometimes you can find the mother talking about her other children who were suffering from low blood level and got better after two or three years, and they went to school without facing any problems".*

She also added with sorrow about this issue:

> "*You find that even the perception of the staff is that the issue is not very important. One time, during my visit to a health clinic, I asked a healthcare provider: why this case is not followed? The answer was because: this is mild anemia".*

4.3.2 Descriptive Statistics of "Perceived Susceptibility Domain"

Perceived susceptibility is the subjective awareness of the risk or the chance of being diagnosed with a medical condition. As illustrated in table (4.5), the researcher reviewed mothers' perceptions about the factors that could increase the tendency of their children to be diagnosed with IDA. These factors are grouped under five subdomains; mother-related factors, child-related factors, hygiene-related factors, nutritional-related factors and factors related to food insecurity. Respondents were asked to indicate the degree to which they agreed or disagreed with statements related to their perceptions regarding the susceptibility of a child to contract the diseases or the conditions.

Table (4.5): Description of Perceived Susceptibility (N=400)

		Mean	*SD*	*Percentage*
Mother-related factors				
16	I am suffering from chronic illness that affect my ability to take care of him/her	2.97	1.27	59.4%
17	If I had too many children, it may affect my ability to pay more attention and care to my child health and nutrition	2.92	1.24	58.4%
18	If there is short space between my pregnancies	3.16	1.12	63.2%
19	I was anemic (has low HB level) during my pregnancy with my anemic child	3.24	1.23	64.8%
20	There is a family history of hereditary blood disease	3.24	1.21	64.8%
21	I suffered from adverse events while I was pregnant with my child	3.29	1.17	65.8%
Child-related factors				
22	The child was born before 37-week gestation (premature)	3.07	1.15	61.4%
23	The child suffers from chronic disease	3.20	1.20	64.0%
24	The child suffers from more than three frequent loose stool in the day (diarrhea)	3.31	1.15	66.2%
25	The child suffers from parasitic infestation	3.32	1.18	66.4%
26	The child complains from chronic bowel inflammation and malabsorption disorders	3.28	1.19	65.6%
Hygiene-related factors				
27	Household don't have improved latrine (toilet)	3.14	1.22	62.8%
28	Household don't have improved handwashing facility with water and soap	3.17	1.22	63.4%
29	We don't utilize a good type of toilet facility	3.17	1.18	63.4%
30	We don't take the deworming medication in regular base	3.28	1.16	65.6%
Nutritional-related factors				
31	I feed my child an exclusive breastfeeding (only breast milk in the first 6 months of life)	3.31	1.22	66.2%
32	I didn't introduce to my child after age 6 months timely complementary feeding (Age-appropriate complementary feeding)	3.50	1.11	70.0%
33	The child diet contains an excess amount of milk, which is a poor source of iron	3.45	1.11	69.0%
34	My child didn't receive an iron-rich or iron-fortified food that is specially designed for infants and young children	3.63	1.12	72.6%
35	The child diet contains beverages that could decrease iron absorption when taken with meals such as tea and milk	3.72	1.13	74.4%
36	My child diet not containing foods that help the body absorb and use iron (such as vitamin C-rich foods and fresh citrus fruits like orange, lemons, etc.)	3.76	1.09	75.2%
37	The child diet is poor of iron	3.73	1.07	74.6%
38	Lack of iron-rich foods	3.40	0.71	68.0%
39	Minimum dietary diversity (MDD)	3.52	0.70	70.4%
40	Minimum meal frequency (MMF)	3.19	1.06	79.7%
Factors related to food insecurity				
41	Factors related to food insecurity: Household Food Insecurity Experience Scale (HFIES)	2.64	1.08	52.8%

Mother-Related Factors

As shown in table (4.5), 59.4% of participants assumed that when the mother is suffering from chronic illness, this would affect her children indirectly as it could affect taking care of their children health and diet. Likewise, 58.4% stated that having too many children could affect the mother ability to pay more attention to her children health and nutrition while 63.2% stated that the short space between pregnancies may result in IDA among their children. Furthermore, 64.8% connected anemic during pregnancy with increase susceptibility of their children to have IDA. This was further explicated in qualitative part of this study, when a 22 years old woman whose child was suffering from IDA in the middle area declared in FGD that: *"Basically, I got married at the age of 16 years and I had four children behind each other. I am now 22-year-old and I have anemia and my four children have anemia as well".* Similarly, another mother stated that: *"I got married at the age of 14 and gave birth to 7 children, all of them had low blood level, and I used to follow up with them in the clinic, and throughout the pregnancy my blood did not come out from 8 and 9".*

This is congruent with findings from a cross-sectional study conducted in Malawi, Mozambique, Namibia, and Zimbabwe using nationally representative samples of children aged 6–59 months to examine the association between maternal anemia and childhood anemia from selected Southern Africa countries. Generalized linear mixed models was used and revealed that anemic mothers had increased odds of having an anemic child in all four countries (Ntenda et al., 2018). A possible explanation may be that mothers with anemia could be residing in poor households thus facing problems in purchasing and providing good nutritious-iron rich food for themselves as well as for their children which might result in anemia in both the mother and her children. These findings were elucidated during KIIs, as FNO stated:

> *"Often, through my observations of clinics, if you did a matching between the child who has anemia and his mother, you will find that during the antenatal care his mother was suffering from anemia as well. For the reason that this diet trend is present at home and applies to the mother before the child".*

In addition, 65.8% of participant indicated that suffering from adverse events during pregnancy may increase their child risk. Similarly, 64.8% of participant stated that family history of hereditary blood disease could result in development of IDA among their children.

In the south area a 43-year-old mother of anemic child mentioned that: *"From my experience, I have 11 children, and the blood level for all of them was very low at the age of less than two years, and with the supplements their blood improved"*. Similarly, a mother of anemic child in FGD from the north area said*: "I have 4 children and all of them have anemia. Also, I'm suffering from anemia. My doctor thought that it may be inherited disease and examined us for thalassemia. But thanks God he was wrong*". This could be explained by what was mentioned by Miller when he stated that untreated IDA during pregnancy would be passed to infant, and unless the iron deficiency is treated at some stage of life, the cycle of iron deficiency from mother to child may remain unbroken for several generations much like genetic traits (Miller, 2013).

Child-Related Factors

Regarding child-related factors, 61.4% of study participants perceived that preterm delivery could increase the child risk for IDA. Additionally, about two-third of participant agree that when the child suffers from chronic disease (64.0%), diarrhea (66.2%), parasitic infestation (66.4%), chronic bowel inflammation and malabsorption disorders (65.6%) this would increase the chance to develop IDA. This is in line with Radi et al., cross sectional study which showed that 26.8% of anemic preschool children had a stool test positive for parasitic infections mostly with Entamoeba histolytica and Giardia lamblia (Radi et al., 2013). In addition to the study conducted by Tesema et al., which revealed that children aged 6–59 months who had fever in the last two weeks and those who had diarrhea in the last two weeks were significantly associated with increased odds of higher levels of anemia in sub-Saharan African countries (Tesema et al., 2021).

Hygiene-Related Factors

Furthermore, the researcher examined the participant degree of agreement with statements related to hygiene-related factors that could predispose to the development of IDA among their children. 62.8% agreed that they didn't have improved latrine, 63.4% agreed that they didn't have improved handwashing facility with water and soap and 63.4% agreed that they didn't utilize a good type of toilet facility. These findings were clarified during FGD, as one of the participants from the middle zone said: *"My house is located above the new valley, during the rain, the valley overflows over the bridge, and the whole area is full of sewage, and whoever passes there will spread it throughout the camp".* Another participant added:

"There is a smell of sewage in the street and around our house. Even about five days ago, before the rain, you feel the camp as a sewage pond". These findings are consistent with Khan, Awan, and Misu study conducted in Bangladesh which found that children from households without access to improved water sources and toilet facilities were 1.34 and 2.48 times more likely than others to be anemic (Khan, Awan, and Misu, 2016). These findings would provide an opportunity for further serious public health measures to be addressed by policy makers for sewage system quality assessment and control.

Moreover, 65.6% agreed that they didn't take the deworming medication in regular base. Over one-third of people on the planet are infected with worms, with children and the impoverished experiencing the most severe infestations (Montresor, Nesheim and Savioli, 2003). In light of the likelihood that children will contract the disease once they cease nursing and will continue to contract and re-infect themselves throughout their lifetimes, the WHO advises the widespread use of anti-helminthic medications to treat all children (Montresor, Nesheim and Savioli, 2003). This was consistent with a systematic evaluation on the impact of deworming on the prevalence of anemia worldwide, which was carried out by a systematic literature search of articles published between 1998 and 2015. Findings showed that the Hb level changed by 1.62 g/dl overall following deworming (95%CI=1.01-2.25) (Girum and Wasie, 2018). The above results were further discussed to figure out why almost two-third of participants were not using regular deworming medication. The FFHO explained that:

> *"The issue of deworming is present in our strategy to control IDA among children. But according to our technical instructions, it is only provided to children from the first to the sixth grade, it is not given to younger children. In addition, the deworming medication provided through this program is the mebendazole which is not given to children under two years".*

While the deputy head health center in Rafah UNRWA health center who is a pediatrician showed his dissatisfaction about the current strategy as he said:

> *"An important point in this aspect (I mean anemia management) is the issue of deworming. In the agency, deworming program targeting school age children for prophylaxis, although WHO recommends that children over the age of one, as well as older children and adults should receive regular deworming treatments"*.

When mothers were asked about their reflections about providing their children with deworming medication, most participants agreed with the idea. One participant from south area declared: *"I feel like all of my children have worms. I wish if I could give them a treatment".* Another mother added: *"Honestly, I want to give my child treatment for worms. I saw many of them in his diaper but I was shy to tell anyone about that"*.

Nutritional-Related Factors

It is well known that the first thousand days of life; ranging between conception and the second birthday; is a critical period for healthy growth and neurological development across the child lifespan (Thurow, 2016). Regarding nutritional-related factors, participants were asked to indicate the degree to which they agreed or disagreed with statements related to IYCF practices that could affect child health and contribute to IDA. Approximately two-third (66.2%) of mothers disclosed that they fed their child an exclusive breastfeeding which is a higher percentage than what was reported by The World Bank Exclusive Breastfeeding report which stated that the rate of exclusive breastfeeding in the State of Palestine was 39% in 2020 (World Bank, 2020). A possible assumption may suggest that high percentage of participant were educated and unemployed as well as due to the high poverty rate of participant. This is in line with a cross-sectional study conducted in Ethiopia to assess the extent of exclusive breastfeeding practice and associated factors among employed and unemployed mothers which found that mothers who were unemployed were 3.4 times more likely to practice exclusive breastfeeding than employed mothers (OR 3.43, 95% CI 2.38, 4.95) (Chekol et al., 2017).

This finding was further explored during FGDs. The majority of mothers acknowledged the important and value of exclusive breastfeeding, but some of them faced some difficulties due to traditional or financial constraints which forced them to provide infants with milk that is not suitable for the age of the child. This was further explained by health care providers during FGDs. A practical nurse in Nuseirat UNRWA health center mentioned:

> *"In my work I was encountered with a problem in that there were women started giving their child UNRWA artificial milk formula from the age of three or four months. I told them that the UNRWA artificial milk formula harms their child at this age but they told me that we were raised on UNRWA artificial milk formula! When they returned back in the next visit, the child blood level was still low and when I asked them about the reasons, I found the same belief still exists, despite all the advices I gave".*

A senior staff nurse added: *"I had a woman who gave her son UNRWA artificial milk formula at the age of 28 days, she told me that her mother-in-law told her that, as she raised all her children on this type of milk and it is good as it contains iron"*. This finding was explained further through discussions with mothers of anemic children through the FGD, one of the participants who is 26-year-old educated mother from the middle zone said:

> *"My sister-in-law once she born, she gave her daughter UNRWA artificial milk formula, her daughter creep from the age of 5 months and she had good teeth and she are going to walk soon. While my daughter is now one and half year, and she still has nothing, no teething nor walking despite I breastfed her and didn't give UNRWA artificial milk formula. Now my husband and his family are blaming me".*

This perception was appeared to be influenced by culture and relatives as one participant from south area with a sad tone said: *"I know that UNRWA artificial milk formula is harmful to my child when given below one year, the nurse told me that. But my husband forced me to give it as it cheap and available and all family member are using it".*

Concerning the introduction of age-appropriate complementary feeding, the majority of participants disclosed that they didn't introduce to their children timely complementary feeding after age 6 months (70%). 69% agreed that their child diet contains an excess amount of milk and 72.6% agreed that their children didn't receive an iron-rich or iron-fortified food that is specially designed for infants and young children. These findings were consolidated during KIIs. The FFHO explained:

> *"We may have a problem with wean practice, and this is what we are trying to work on. How do women feed their children? Do they use things that can cause intestinal injury, such as cow milk formula? We have a lot of wrong habbits that may play a role in IDA development"*.

In the same line, the deputy medical officer in Rafah UNRWA health center supports these findings, as he said: *"I did a research 5 years ago in the European Gaza Hospital on the effect of cow's milk and UNRWA artificial milk formula in children when given under the age of one year, it causes occult blood resulting in resistant anemia due to blood loss".*

Additionally, about three-quarters (74.4%) of participants agreed that their children diet contains beverages that could decrease iron absorption when taken with meals such as tea and milk and 75.2% agreed that their children diet not containing foods that help the body absorb and use iron such as vitamin-C-rich foods and fresh citrus fruits. The majority of participants (74.6%) admitted that their children diet was poor of iron and 68% declared that they fed their children meals that lack of iron-rich foods. The above findings were further compared and matched to qualitative part findings. A medical officer in Nuseirat UNRWA health center mentioned:

> *"Many children had poor blood. When I ask the mother why their blood is weak, she becomes surprised and tells me that she gave him beets, pomegranate juice and tomatoes. They depend on sources that are not rich in iron and rely on them completely without thinking of other proposed alternatives".*

Then he added:

> *"According to my information, and I think it is correct, the iron that absorbed quickly found in animal protein, especially red meat. People do not have this idea, and most children do not depend on this source either due to lack of capabilities or due to lack of knowledge, they eat it once a week or once a month".*

Another medical officer from the same health center commented:

> "*I presented this issue in a workshop that was about non communicable disease (NCD). Whether NCD or anemia, according to the established protocols, countries are divided into resource rich country and resource poor country, because it is not useful to treat both sides with the same scale. I can't tell those who live on agency flour and milk to eat like people who are able to get meat, liver, fish and nuts. The fact is people from month to month when they get meat, and it may be frozen, so we are a bit isolated from the reality of our society".*

This finding was in line with what was mentioned by mothers of anemic children. One participant from middle zone said: *"Every day in the morning, I give my children UNRWA milk mixed with bread, but I don't know why their blood is not improving with it"*. When she asked about other alternative options that she provided to her children. She replied with sorrow: *"I feed him vegetables and fruits, I mean, from month to month, because fruits and vegetables are according to their price"* then she added while crying: *"My son on the night dreams on meat and say let dad bring us meat. We can't do this as it is very expensive".*

Regarding bad dietary practices, a 24-year-old educated mother of anemic child in the north area said: *"Tea with breakfast is an essential thing for us. They do not accept to drink it after that, and when they see everyone drinking tea during the meal, how can I prevent it".* Another participant who is an unemployed and educated from the middle area said with a blaming tone:

> *"I feel remissness toward my children. I mean, I have too many burdens and duties as we are living with my husband family. I can barely find enough time to take care on my own children. For hours I am distracted by cooking and making food. When they start to cry from hunger, I gave them money (shekel) and let them buy chips, chocolate or biscuits from the shop, and when the food is ready, they get full and refuse eating with us".*

Similarly, another participant said: *"I live in the family's house. In the middle of the day when I finish all my work, I see my child and try to feed him".*

In regards to diet diversity, 70.4% agreed that they achieved the MDD while 79.7% agreed that they reached the MMF. This is contrary to cross-sectional study results conducted in Ethiopia which showed that among the IYCF practices, consumption of iron-rich foods, MDD, and minimum acceptable diet were significant predictors of stunting while breastfeeding and MMF had lower odds of childhood anemia (Hiruy et al., 2021).

Factors Related to Food Insecurity

Food insecurity occurs when people do not have suitable physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and preferences for an active and healthy life (Peng and Berry, 2019). As revealed in table (4.5), the researcher used the HFIES to assess the responder's food-related behaviors and experiences

associated with increasing difficulties in accessing food due to resource limitations. The average percentage of HFIES was 52.8% while WFP reported that the percentage of households experiencing severe or moderate food insecurity in Gaza reached 64.4% with the percentage of severely food insecure households 40.7% (WFP, 2022). The researcher attributed the relation between food insecurity and IDA among children due to the coping mechanism adopted by families during food shortage by consuming less preferred or inexpensive food.

This was further consolidated in qualitative part of this study. A 28-year-old mother of four anemic child in the middle area said: *"We are annoyed because we had many debts because we build a new house, and from month to month when we see apples or bananas. Do you think that we can purchase meat or fish?!"* Another participant in south area mentioned during the FGD:

> *"The deterioration of the economic situation in the country could be a reason for not be able to take care of our children nutrition. I mean, for example, today I am not able to get eggs for my son, because it is very expensive (a carton of eggs for 15 shekels). If I want to purchase some for him, I should buy eggs for the whole family as you will not make him eat alone without his brothers".*

4.3.3 Descriptive Statistics of "Perceived Barriers Domain"

Perceived barriers refer to the potential obstacle to taking a recommended health action. The researcher reviewed mothers' perceptions about potential barriers that could prevent them from proper integration in childhood IDA management programs. As illustrated in table (4.6), participants were asked to indicate the degree to which they agreed or disagreed with statements related to perceived difficulties that they may face, whether this may a raise from obstacles related to the availability and affordability of iron rich diet or/and barriers related to obtaining iron prevention and control services from UNRWA health care centers.

Table (4.6a): Description of Perceived Barriers (N=400)

		Mean	*SD*	*Percentage*
Availability and affordability of iron rich diet				
42	I don't buy beverages, foods, and snacks rich in iron because they are too expensive	3.14	1.22	62.8%
43	I don't prepare iron rich food because grocery shopping and preparing healthy foods would take up too much of my time	2.65	1.10	53.0%
44	I don't prepare iron rich food because I don't know where to find accurate information about achieving and maintaining a healthy diet rich in iron	2.65	1.13	53.0%
45	I don't prepare iron rich food because I don't know how to prepare healthy beverages, foods, or snacks.	2.48	1.09	49.6%
Availability of iron prevention and control services (I don't utilize iron prevention and control services from the clinic due to)				
46	Inappropriate designated health center building	2.48	1.09	49.6%
47	Lack of appropriate waiting area	2.03	1.05	40.6%
48	Inadequate seating space	1.97	1.01	39.4%
49	Inappropriate separate areas for consultation and examination with sufficient privacy	2.02	1.04	40.4%
50	Inappropriate health center facility for electricity	1.99	1.07	39.8%
51	Inadequate natural light and ventilation	1.99	1.07	39.8%
52	Inadequate toilets with water supply	2.10	1.12	42.0%
53	Shortage of appropriately-trained health personnel	2.01	1.03	40.2%
54	Health centers don't have nutritionists available to explain more	2.29	1.18	45.8%
55	Lack of health awareness material that provide me with information I need to take care of my child nutrition and diet	2.20	1.11	44.0%
56	Iron supplementation drops is not always present in the health center	1.95	1.05	39.0%
57	Lack of appropriate lab service that provide accurate HB blood test to diagnose and follow my child condition	1.99	1.07	39.8%
Accessibility of iron prevention and control services (I don't utilize iron prevention and control services from the clinic due to)				
58	It is not easy to reach the health center because the health center is far from my residence	2.35	1.22	47.0%
59	It cost me a lot (money, time and effort) to reach the health center	2.43	1.23	48.6%
60	I don't know that the health center provides iron prevention and control services	2.30	1.14	46.0%
61	I do not know where to go for questions	2.27	1.14	45.4%
62	Provider office is not welcoming	2.06	1.08	41.2%
63	Providers are not trustworthy	1.99	1.05	39.8%

Table (4.6b): Description of Perceived Barriers (N=400)

64	*Providers do not understand and respect my beliefs and culture*	*1.99*	*1.08*	*39.8%*
65	Unfair treatment due to gender/ educational level/ social class	1.89	0.99	37.8%
66	The working hours in the clinic is not appropriate for me due to my family/work responsibilities	2.13	1.09	42.6%
67	It takes me too much time to receive the service from the clinic	2.48	1.14	49.6%
Acceptability barriers				
68	I do not have any motivation to adopt healthy eating for my family	2.46	1.12	49.2%
69	We enjoy eating fried foods and snacks more than healthy and iron rich food	2.60	1.23	52.0%
70	From my perspective, Ferrous Sulfate is not very effective for treating anemia due to its side effects	2.44	1.18	48.8%
71	I don't use Ferrous Sulfate because it causes gastrointestinal upset	2.66	1.19	53.2%
72	I don't use Ferrous Sulfate because it causes staining of teeth	2.99	1.29	59.8%
73	I prefer not to give iron supplementation due to poor taste and resultant difficulty in administering it to my child	2.92	1.24	58.4%
74	I am not very adherent to iron supplement because I want to minimize my child's negative or traumatic experiences related to both therapy and ongoing follow-up care	2.59	1.24	51.8%
75	I prefer to prevent and treat my child with a well-balanced diet	3.20	1.26	64.0%
Contact barriers (Unclear and Limited Health Information Received from Health Providers)				
76	I was not given full explanation, in clear language about the benefits of iron supplement to prevent IDA when my child was 6 months old	2.02	1.05	40.4%
77	I was not provided with clear information on my child health condition and the aim of Hb screening during my child first birthday visit	2.06	1.03	41.2%
78	I was not provided with clear information on my child Hb result	1.96	1.00	39.2%
79	I was not provided with clear information on my child diagnosis?	1.98	0.98	39.6%
80	I was not provided with clear information about the rational of iron supplement use to treat my child condition when he was diagnosed to have anemia	1.94	0.97	38.8%
81	I was not involved in preparing the treatment plan of my anemic child	2.06	1.06	41.2%
82	I was not directed for the proper ways that enhance iron absorption	1.97	0.97	39.4%
83	I was not educated about food and beverage that prevent iron absorption such as tea and dairy products	1.93	0.94	38.6%

Table (4.6c): Description of Perceived Barriers (N=400)

84	*I was not given instruction on how to improve my child's diet*	*1.97*	*0.95*	*39.4%*
Effective coverage barriers				
85	The health care provider is not respectful	1.84	0.90	36.8%
86	From my perspective, the time I spent with the health provider is not enough.	2.07	1.02	41.4%
87	The health provider not always evaluate my child treatment plan and modify it when needed.	2.00	0.96	40.0%
88	The health provider doesn't do a monthly follow up HB test to follow the progress of my child health condition and doesn't explain the progress in my child HB level clearly	1.94	1.00	38.8%
89	The health provider doesn't make me feel comfortable asking questions about my child's health	1.91	0.91	38.2%
90	The health care provider doesn't use simple language and doesn't give simple information and advice that can be easily remembered	2.00	1.02	40.0%
91	The health care provider doesn't check what is practical and possible for me to do regarding my child's nutrition	2.04	1.03	40.8%
92	I was not informed about the adverse effects of the iron drops	2.05	1.07	41.0%
93	I was not informed about the duration of drug use	2.02	0.99	40.4%
94	I was not informed about the drug dose	2.00	1.00	40.0%
95	The health care provider doesn't set a date for the next appointment for follow-up	0.88	0.92	17.6%
96	I don't always attend to the health center in the agreed appointment	2.06	1.06	41.2%
97	I am not adherent to the prescribed iron drops as being told by the health care provider	2.51	1.22	50.2%
98	I don't apply the received instruction as being told	2.34	1.16	46.8%
99	The health services that I received from the clinic didn't meet my expectations	2.10	1.01	42.0%
100	The health services that I received from the clinic didn't meet my child's needs	2.16	1.07	43.2%
101	I am not satisfied with the care provided to my child from the health center	2.02	1.01	40.4%

Availability and affordability of Iron-Rich-Diet

About two third of the respondents (62.8%) agreed that they didn't purchase beverages, foods, and snacks rich in iron because they are too expensive. This was in line with what was disclosed by study participants in qualitative part. A mother of anemic child from south area said:

> *"The economic situation is affecting us, because we do not have everything for the child so that I can't support him with healthy food. Even fruits and*

vegetables we can't afford them all the time. Meat and fish are very expensive and not all of us can get them. Frozen ones are what we often rely on, and they don't have the same benefits as natural ones".

Another participant added:

"One kilo of meat equal forty shekels, a kilo of tomatoes is thirteen shekels. Those in charge should cheapen vegetables and meat so that we can buy them, and they should fight high prices or at least to find jobs for us so that we can buy them".

In the same line a practical nurse in Nuseirat UNRWA Health center commented in this issue:

"One day I told a woman to feed her son a frying pan of tomatoes in the morning. Her reply was: Based on the fact that we find tomatoes at home, tomatoes are not cheap! If people had no money for tomato! What should I say to her? Tell her to get liver, meat and chicken!!"

Furthermore, more than half (53 %) disclosed that grocery shopping and preparing healthy foods would take up too much of time. Similarly, 53% stated that they face difficulties in preparing iron rich food due to lack of accurate information about achieving and maintaining a healthy diet rich in iron and 49.6% agreed that preparing iron rich food could be an obstacle because they lack of knowledge about how to prepare healthy beverages, foods, or snacks.

This was further explained in qualitative part of this study. A practical nurse in Nuseirat UNRWA health center mentioned in the FGD: *"There is one thing that I notice while I was working on the issues related to anemia management among children, that the mother has a lack of knowledge about why diet is important in treating anemia in children".* This was further elucidated by FNO when she said: *"Dietary illiteracy is one of the main obstacles we face in managing IDA among children. Some mothers lack the knowledge about how to prepare healthy food for their children*". In addition, the SMO in Rimal UNRWA health center mentioned:

"Since the topic of anemia has become so common, we capitulate and attribute the causes of anemia to the fact that people are poor and they do

not have enough money to buy liver or multivitamin for their children. Although in reality it is not necessary to buy liver for their children. It is possible to eat traditional foods such as beans, falafel and hummus that we all buy every day and is a rich source of iron. But instead of the tea they drink with this kind of food, the mothers should replace it with lemon juice, which contain vitamin C which will increase the rate of iron absorption and will improve their children Hb level. But unfortunately, we have bad dietary habbits, and these habits are inherited".

Availability of iron prevention and control services

Regarding IDA preventive and control service delivery assessment, the researcher adopted the Tanahashi model and composed questions to review the degree of effective utilization of service by the target population, through analyzing the constraining components, to select measures for service improvement. Tanahashi described five coverage issues that encourage or hinder an individual to use a health care service named; availability, accessibility, acceptability, contact, and effectiveness coverage.

Availability coverage measures the service capacity to cover the health needs of the target group in terms of the infrastructure, manpower, drugs, and supplies. Participants were asked to indicate the degree to which they perceived the availability of IDA prevention and control services within UNRWA health care centers. About half of the participants (49.6%) perceived that the health center building was inappropriately designated and 40.6% acknowledged that the waiting area was inappropriate, 39.4% disclosed that there was inadequate seating space and 40.4% agreed that there were inappropriate areas for consultation and examination with sufficient privacy. In addition, 39.8% stated that the health center facility electricity was inappropriate, similarly 39.8% perceived that natural light and ventilation were inadequate as well as 42% declared that toilets with water supply within the health centers were inadequate.

In regard to the availability of adequate manpower, 40.2% of respondents agreed that they perceived a shortage of appropriately-trained health personnel and 45.8% declared that the UNRWA health centers were lacking of nutritionists to explain more. In addition, 44% of study participants agreed about lack of health awareness material to provide them with information they need to take care of their children nutrition and diet. Concerning the

availability of the iron supplement, 39% stated that iron supplementation drops are not always present in the health center. Furthermore, 39.8% agreed that the health center lack an appropriate lab service that provide accurate Hb blood test to diagnose and follow up the child condition.

There was a general agreement between the key informants that there is a shortage in the human resources as UNRWA is facing a financial crisis. This was further explained by FFHO when she was asked whether the available human resources are sufficient to provide all the required services with high quality, as she said:

> *"Of course, No. It's well known that the agency is facing a financial crisis and that the needed man powers to do the need task which is known as norms is suffering from severe shortage. We have a shortage of approximately 800 staff, including nurses and doctors. Therefore, when a practical nurse is absent there is no replacement and the work will be distributed to others. I mean, instead of a workload of 35 for a nurse, the workload will increase to 55. So, this would affect the counseling and follow-up of cases".*

Similarly, the AHO of the north Gaza area mentioned:

> *"We have something called health norms, and these norms were established according to our needs as human resource of staffing. The main problem in the health department in Gaza is that large segment and the main pool of employees are not permanent (Fixed). This seriously affects the entire health system, from the management of the clinic to the healthcare provider who provides care to the client. So far, we are promised to appoint more than one category, including nurses and doctors, in the year 2023".*

Accessibility of Iron Prevention and Control Services

Barriers to accessing health services can stem from geographical, financial, social or informational issues. Therefore, the researcher asked the participants questions to indicate the degree to which they agreed or disagreed with the presence of various kind of accessibility barriers. About 47% of respondents stated that they face difficulties to reach the health center because it was far from place of residence and 48.6% disclosed that reaching the health center costed them a lot (money, time and effort). It is worth mentioning

that UNRWA child health care services is free of charge. This finding is in line with Ntenda et al., study (2018) which revealed that the prevalence of IDA in Malawi and Mozambique was significantly higher in children whose mothers indicated a perceived distance to the health facility as a big problem which led to poor access to health services (Ntenda et al., 2018).

Through KII this point was further explored, the FFHO said:

> *"I imagine that the accessibility is very good. We have 22 clinics distributed along Gaza Strip from Beit Hanoun to Rafah. Maybe in some places like Al-Shouka and Al-Nasr, when I go to visit them, people come on foot because they live far away, but most of the other clinics are not".*

In addition, 46% of the participants stated that they didn't know that the health center provides iron prevention and control services and similarly 45.4% didn't know where to go for questions. Moreover, 41.2% perceived that the health care providers were not welcoming and 39.8% clarified that they perceived the health care providers not trustworthy. Likewise, 39.8% agreed that providers didn't understand and respect their beliefs and culture as well 37.8% perceived the unfair treatment due to gender, educational level or/and social class were a barrier to utilize the services.

These findings were further explored in FGDs. One of the participants, aged 36 years a mother of anemic child from the middle area mentioned: *"Most of the times, I was sitting in the waiting area and other clients do not respect the queue. When a woman comes and enters, the nurse says nothing to her. But when I enter, she tells me to wait for the queue"* she added with blaming voice: *"She applies the queue system according to her preference and doesn't strict to it most of the times"*. Another participant also added:

> *"There are times when you are not able to go to the appointment, so you have to wait until the queue turns over. In the clinic, the providers don't consider the circumstances that the one pass through. For example, there is sometimes we had no money at home so that I went to the clinic by walking which make me late for appointment. When I arrive, they refuse listening to me".*

Furthermore, the percentage of participants who agreed that the working hours in the clinic is not appropriate due to family or work responsibilities was 42.6% while about half (49.6%)

agreed that they took too much time to receive the service from the clinic. It is worth mentioning that UNRWA provides services only in morning shifts. Thus, it is not easy for all participants who have jobs or other responsibilities in the morning time to utilize UNRWA's services regularly.

A 24-year-old mother of two anemic children from the middle area mentioned in FGD: *"Examining my child blood takes a lot of time and the little child can't stand waiting in several stations, he gets bored, and cries, I don't know what to do"* then she added: *"Sometimes the providers become angry with me, and do not treat me with respect at all, especially when it is a man who you deal with and during collecting the blood in the lab"*. Another participant in south area mentioned:

> *"It takes a long time to examine my child. You have to go to nurse then to lab and back to nurse then she refers you to the doctor who may send me back to the lab. I have other responsibility behind me, I have to take care of kindergartens, schools, cooking, husband, and mother in low, so I become worried to be blamed and I don't focus with them. Just I want everything to be finished soon".*

The FNO also mentioned during the KII:

> *"We do not have a corner in the clinic for children in which the mother can sit waiting and the child can play in it, or where the child feels safe guard. I mean our clinics are beautiful and have spaces and everything you need. But we need a sustainable program to make our clinics a child friendly health center".*

Acceptability Barriers

In addition, table (4.6) demonstrates the participants perceptions to barriers related to the acceptability of the service. About half of respondents (49.2%) declared that they didn't have any motivation to adopt healthy eating for their family and more than half (52%) stated that they enjoyed eating fried foods and snacks more than healthy and iron rich food and 48.8% disclosed that they perceived treating anemia with ferrous sulfate drops as not very effective option due to its side effects. 53.2% agreed that they didn't use ferrous sulfate drops because it causes gastrointestinal upset and 59.8% agreed that they didn't use the drops because it

causes staining of teeth. Similarly, 58.4% of participants preferred not to give iron supplementation to their child due to its poor taste and due to the difficulty in administering it. More than one half (51.8%) also disclosed that they were not very adherent to iron supplement because they want to minimize their child's negative or traumatic experiences related to both therapy and ongoing follow-up care. While about two third (64%) agreed that they prefer to prevent and treat their child anemia with a well-balanced diet.

This was further elucidated in qualitative component. A practical nurse from Nuseirat UNRWA health center mentioned: *"Sometimes the parents refuse to take the supplements. People have a preconceived concept that the supplement is not useful and that it damages the teeth of their children thus they do not want to use it"*.

Similarly, a medical officer from Rafah UNRWA health center said: *"One time I found that the child Hb level at one year assessment was eight so I ask the mother: did this child take iron drops? She told me that she didn't give him at all because she had an experience with her older son whose teeth were damaged by the supplement".*

Another medical officer mentioned: *"My brother's wife is a teacher living in our family house. She said that the common information among the teachers is that iron stain the teeth, therefore she didn't give drops to her children*".

A senior staff nurse in Rafah UNRWA health center also comment: *"Many women ask the street and ask their neighbors and listen to what their cousin or mother-in-law tell her, but they do not hear from us"* she added with angry voice: *"Mothers often complain that the taste is not very acceptable, and they don't want to be tired or try to exert more efforts. Even if you gave them an antibiotic for five days they would only stick if the issue was critical. The problem here is in the nature of the beneficiaries"*.

These findings were further explored in FGDs with mothers of anemic children. The majority of mothers expressed concerns about utilizing ferrous sulfate iron drops due to the side effects it could cause. A 21-year-old woman, mother of anemic child from middle area said: *"I tried for two consecutive months. I used to give the drops to my child directly in her mouth without juice or water. After two months, I noticed her teeth were stained and turned black. After that I stopped giving her"*. Another participant explained: *"I gave it to my child for five days, he suffered from constipation and vomiting, so I stopped giving him these*

supplements". Similarly, a 34-year-old woman from south area said: *"I tried to force my son to take the drops. When he refused, I left him for half an hour or an hour, drank him water, let him play for a while then I tried to give it again but unfortunately the taste is very bad and unacceptable by the child".* Moreover, some mothers expressed doubt and skepticism regarding the health benefits of the iron supplements. A 26-year-old mother of anemic child in the middle area mentioned:

> *"It is a very difficult experience, it annoys me when I put all my effort to give my child the drops, and in the end, you find the blood at the same level. It is useless. You give us iron, and he does not accept it. I put some of it in juice, but once he smells it, he refuses to drink the juice".*

Another participant from north area said:

> *"I used to give my daughter vitamins A and D from the pharmacy instead of iron from the clinic to improve her blood, because honestly, some people told me about these drops and how they destroy the child teeth, and her father refuse to give it to her. You know she is a girl".*

From a different perspective, mothers of anemic children whose blood level improved by iron supplement agreed that they faced by challenges due to side effects but they didn't give up, a 33-year-old mother of an improved child from middle area mentioned: *"The drops stained my child teeth, despite this I continue giving it to my child because when I asked the nurse, she told me that they will be replaced by stronger teeth when his blood improve".*

Similarly, another participant from the north area said: *"When I told the nurse that my son refused taking the drops, she advised me about it to help my son to have a better health. I faced a lot of difficulties, sometimes I gave it to him by a syringe or in a juice, as she told me and he got better".*

The FNO added another dimension for adherence to iron supplements used by UNRWA as she mentioned:

> *"Before five years in 2018, the health department conducted an operational study which aimed to change Ferrous sulfate drops (FSD) which has a metallic taste to another type of iron supplement containing Ferrous*

fumarate drops (FFD) which has a better taste as it was with chocolate flavor, based on beneficiaries complain that the old type of supplement is the main cause of poor adherence to medication due to its side effects. The result of this study showed no significant differences between the clinics which used the new FFD comparing to those which were in the old FSD. Thus, this study contradicted our constant thinking that if we change iron drops to more flavor type, that is tasted good, the improvement rate will be better. According to the study this was not the main reason".

This was further explained by north area AHO who mentioned: *"Studies have shown that when we changed the taste of iron, compliance did not increase much, meaning that the idea was not purely or solely dependent on the type of iron, but depended on us as health care providers".*

As it appeared by the obtained results that one of the main acceptability barriers of iron supplement drops derived from the reported side effect but it is not solely the main reason for not using this medication. Other factors such as effective counseling between providers and beneficiaries play a role. That was obvious from the response of mothers whose children were anemic and improved by taking the supplement due to support and encouragement provided by health care providers.

Contact Barriers

As shown in table (4.6), participants were asked to indicate the degree to which they agreed or disagreed with statements related to their perceived contact barriers which refers to the obstacles related to their first contact and use of UNRWA IDA preventive and control health services. 40.4% stated that they were not given full explanation, in clear language about the benefits of iron supplement to prevent IDA when their child was 6 months old. Similarly, 41.2% agreed that they were not provided with clear information on their child health condition and the aim of Hb screening during their child first birthday visit and 39.2% of participants stated that they were not provided with clear information on their child Hb result as well as 39.6% disclosed that they were not provided with clear information on their child diagnosis. Likewise, more than one third (38.8%) agreed that they were not provided with clear information about the rational of iron supplement used to treat their children condition when they were diagnosed to have anemia. Moreover, 41.2 % disclosed that they were not

involved in preparing the treatment plan of their anemic child and about 39.4% stated that they were not directed for the proper ways that enhance iron absorption as well as 38.6% declared that they were not educated about food and beverage that prevent iron absorption such as tea and dairy products. Besides, 39.4% agreed that they were not given instruction on how to improve their child's diet.

The above-mentioned findings showed that some participants expressed diverse kinds of contact barriers that contributed to their effective integration in anemia control programs inside UNRWA health centers. This was further explored in qualitative component to understand possible reason behind this perception. The north area AHO mentioned:

> *"Counseling for anemia is a very easy topic. If I teach my son or someone on the street, they can do it, but the question is whether we do it with Feeling or not. The goal of counseling is that the client or audient get the massage and do it. I want to learn caregivers how to use the drop correctly and understand what things help in the process of iron absorption and what things can delay the absorption. In order for them to hear my words, they must feel that my words are steaming from my heart".*

In addition, the FNO said: *"The relationship between the mother and the service provider must be good and based on trust. This is basic for effective health dialogue. This will boost mother understanding of what the health care provider tells her and adopt it".*

Similarly, a senior staff nurse from Nuseirat UNRWA health center stated:

> *"Counseling consists of two parts, sender and receiver. In between comes method and ways used in the discussion. When you are giving the information, you should look in the face of the person who is receiving this information. Once you feel that the person is starting to get bored or lost from you, stop at this point, don't give all the information at once. Every time give a piece of information, and it would be better if it is written to be recalled in easy way".*

Then she added:

> *"Honestly, the practical nurses we have in our centers are excellent. But what happens? The practical nurses are counseling the mother while they are vaccinated the child who began screaming. At this time, the mother is not concentrating or understanding what is happening or what the nurse is talking to her. This is what I noticed in most of the stations during my morning round".*

Effective Coverage Barriers

Table (4.6) demonstrates the participants perception about barriers related to repeated contact with the health system to receive necessary care to achieve the effective coverage. More than one third (36.8%) agreed that the health care providers were not respectful and 41.4% agreed that the contact time they spent with the health provider was not enough.

When mothers of anemic children in FGDs were asked whether the time spent during the session is enough for them to understand the instructions given and to be convinced of the importance of treatment, the majority agreed but some respondent disagreed. A 27-year-old woman, a mother of anemic child from south area said: *"It is true that the period is limited to the time spent while the child is vaccinated. She gives the vitamin and the instructions while she is working"*. In the other hand mothers of children who were improved had a different prospective. A 33-year-old woman from south area whose child was improved said: *"The nurse spent a lot of time with me. She told me to give my child the iron drops, how to take care of his food, and answers all my questions".* Similarly, a 36-year-old woman from north area mentioned: *"The nurse used to give every patient his right and she used to explain everything to me while she is working"*

In addition, 40% agreed that the health providers were not continuously evaluating their child treatment plan and modifying it when needed and 38.8% declared that the health provider didn't do a monthly follow up Hb test to follow the progress of their child health condition and explained the progress in their child Hb level clearly. Also, 38.2% stated that health providers didn't make them feel comfortable asking questions about their child's health and 40% agreed that health care providers didn't use simple language and didn't give simple information and advice that can be easily remembered.

A 35-year-old mother of anemic child from south area mentioned in the FGD: *"Not all nurses give you the opportunity to inquire and talk. Some of them answer as much as the question is, besides it does not make you feel that it is acceptable to keep talking and asking"*. Then she added with blaming tone*: "You feel like she only wants to finish her duty"*.

Moreover, 40.8% agreed that health care provider didn't check what was practical and possible for them to do regarding their child's nutrition. A mother of anemic child from the middle area said in the FGD: *"My son keeps breastfeeding all the time, so I can't stop feeding to give him the drops as the nurse said. So, I stopped giving him these drops"*. Another mother from north area mentioned: *"Most of the focus in the nurse's words is in how to give iron drops, not how to feed my children a healthy food".* Whereas a 22-year-old mother of improved child mentioned: *"The nurse didn't oblige me to do anything specific. She tells me that whatever healthy thing you have, give it to your child, even if you want to feed him a tomato".*

Regarding iron supplementations, 41% acknowledged that they were not informed about the adverse effects of the iron drops, 40.4% stated that they were not informed about the duration of drug use and 40% agreed that they were not informed about the drug dose. Regarding the application of the appointment system, 17.6% disclosed that health care provider didn't set a date for the next appointment for follow-up while 41.2% declared that they were not adherent to the attendance to the health center in the agreed appointment.

This was further explored in qualitative part. The FNO mentioned during KII:

> *"After the Covid period, we focused on the appointment system, we expect to have the highest implementation of the appointment system in the well baby clinic and child health care, because they only arrive on the appointment and they do not have a new drop in and therefore the child who has its growth problem or anemia supposed to be present at time and the nurses will have enough times to do counseling".*

In the same line the senior staff nurse in Nuseirat UNRWA health center said: *"I noticed that after commitment of the appointment system, it is now easier to do counseling with beneficiaries".*

Additionally, about half of participant (50.2%) agreed that they were not adherent to the prescribed iron drops as being told by the health care provider as well as 46.8% confessed that they didn't apply the received instruction as being told. This was further explained in qualitative component, the FNO mentioned in the KII that:

> *"According to our experience, anemia management depends on the compliance of the mother or the caregiver with the health care provider instructions. I mean if the story is primary IDA and not secondary, then it is often the delay from the caregiver in giving the drops".*

In the same line, the SMO in Rimal UNRWA health center mentioned: *"Part of the difficulties that we face in managing and treating anemia in the clinic is that some clients when they took the treatment, they do not intend to come to the clinic for follow up"*.

These findings reflected a communication gap between mothers and health care providers and how communication between the caregiver and provider is an essential component for adherence to preventive and treatment interventions for the anemic children. This was in line with what stated by senior staff nurse in Rimal UNRWA health center during FGD when she said: *"It may be that the health care provider did not deliver adequate counseling to the woman or was unable to provide her with correct information to understand what to do"* she added: *"I mean that may be health care provider didn't conduct counseling in a good way. Therefore, the information is not transferred correctly and he/she think the woman understands the massage while she does not".* This was further explained by SMO in Rimal UNRWA health center as she added: *"We do not apply the counseling rules correctly because communication is supposed to be two-way. Most providers do the counseling without doing a proper eye contact with the beneficiaries"*.

The overall mean percentage of clients' who disclosed that the health services that they received from UNRWA clinic didn't meet their expectations was 42% as well as 43.2% stated that health services didn't meet their child's needs. Similarly, 40.4% acknowledged their dissatisfaction with the care provided to their children from UNRWA health center. Satisfaction of the client is good indicator for the quality of services as it reflects their future tendency to utilize the service and to endorse others to have the service from the same facility. Through KIIs with health manager this point was further explored. The FFHO said:

> *"We judge our work by things called performance indicator, these indicators tell me how my work is. In addition, I conduct through the visits that I do to*

the clinics exist interview and file auditing to assess quality of services provided".

Then she added:

"*In general, when I conduct a satisfaction survey, the response of the people is good. I mean, the clients reported that the nurse respected them and explained to them. But if you come to me as a supervisor, I am not satisfied at all because I come back with low percentage of improvement rate of anemic cases".*

4.3.4 Descriptive Statistics of "Perceived Benefits Domain"

Participants were asked to indicate the degree to which they agreed or disagreed with statements related to their belief in the value of the recommended action to reduce health risk as well as to their perceived benefits of taking the health act.

Table (4.7): Description of Perceived Benefits (N=400)

		Mean	***SD***	***Percentage***
Perceived benefits from prophylaxis iron supplementation				
102	Prevent the development of iron deficiency anemia	3.89	0.93	77.8%
103	Prevent the development of long-lasting diminished mental functioning	3.81	0.87	76.2%
104	Prevent the development of long-lasting diminished psychomotor and cognitive developments	3.90	0.84	78.0%
105	Prevent the development of long-lasting diminished behavioral functioning	3.87	0.93	77.4%
106	Prevent the development of long-lasting diminished motor functioning	3.81	0.90	76.2%
107	Prevent the development of long-lasting diminished growth and developmental functioning	3.82	0.91	76.4%
108	Improve the long-term productivity of my children	3.89	0.84	77.8%
It would benefit my child to be more adherence to iron drop treatment regimen to				
109	Increase his/her chances of having good health now and in the future	3.98	0.86	79.6%
110	Improve skin color	4.04	0.84	80.8%
111	Feel more energetic	4.06	0.85	81.2%
112	Will be less likely to become sick (more immune to infections)	4.09	0.79	81.8%
113	Become less pica	3.92	0.96	78.4%

Table (4.7) demonstrates the descriptive statistics of the perceived benefits domain. Regarding the perceived benefits from using the prophylaxis iron supplementation, the majority of participants indicated that they agreed that this could prevent the development of iron deficiency anemia (77.8%), as well as prevent the development of long-lasting diminished mental functioning (76.2%), psychomotor and cognitive developments (78%), behavioral functioning (77.4%), motor functioning (76.2%), growth and developmental functioning (76.4%) and improve the long-term productivity of their children (77.8%). This is in line with the result of a review consisted of twenty-six studies to assess various effects associated with preventive iron supplementation in children aged 0 –59 months living in developing countries, which revealed an observed reduction in cognitive and motor development in children with IDA, particularly with longer-duration and lower-dose (Iannotti et al., 2006).

Regarding the perceived benefits of the adherence to iron drop treatment regimen, table (4.7) reveals that the majority of the study participants disclosed that they agreed that this could advantage their children to have good health (79.6%). Besides, the improvement in anemia symptoms such as the child skin color would improve (80.8%), be more energetic (81.2%), be less likely to become sick as well as to be more immune to infections (81.8%) and has less pica symptom (78.4%).

The above findings were further compared and matched to qualitative part findings. The majority of participants in the FGDs agreed about the benefits they perceived from using iron drops. A woman from the north area, a mother of a child improved from anemia mentioned: *"My child's blood level improved because I adhered to the iron drops every day besides improving my child diet and through adherence to the regular follow up in the clinic".* Similarly, a mother of improved child from the middle area said: *"The clinic is good as they regularly follow up my child's blood. Without this, you will not be able to know if he is getting better or not"*. Another participant mentioned: *"At first, I wasn't committed with the supplement they gave it to me in the clinic. But when I found my child's blood was falling down, I adhered to it until it got better and I am now committing to it*". In the same line another participant added*: "From my experience, I can tell you that iron drops are necessary to improve blood level if we stick to it. My daughter was pale and sick and didn't gain weight but after committed with the supplements she is now better and her health improved".*

4.3.5 Descriptive Statistics of "Cues to Actions Domain"

Cues to action are the strategies taken to stimulate one's willingness which is crucial for decision-making process toward taking health action. Cues to action can be either internal motivators or external incentives for mothers to perform the preventive measures against developing IDA among their children.

Table (4.8): Description of Cue to actions domain (N=400)

		Mean	*SD*	*Percentage*
Internal cues				
114	Health care providers acknowledging me that I have a choice in therapy decisions (autonomy)	3.75	0 .99	75.0%
115	Health care providers consider alternative treatment approaches for me based on my individual values and preferences	3.83	0. 88	76.6%
116	Health care providers highlighting my sense of parent-child connection (relatedness)	3.82	0 .84	76.4%
117	I feel that I have the ability to successfully give iron therapy (competence).	3.76	0 .87	75.2%
118	Received extra medical care and support	3.88	0 .87	77.6%
119	A child of a close friend developed a serious health problem due to anemia	3.41	1.14	68.2%
External cues				
120	A family member or close friend advised me to eat a well-balanced iron rich diet	3.79	0 .98	75.8%
121	The health care provider emphasis in the importance of implementation of his medical orders to benefit my child state of health	4.01	0 .79	80.2%
122	The health care provider emphasis in the importance of the regular follow up in the clinic to improve my child health.	4.01	0 .74	80.2%
123	The health care provider emphasis in the importance of iron supplement intake according to the prescribed dose and period	4.01	0 .76	80.2%
124	The health care provider emphasis in the importance of doing the recommended follow up HB exams.	4.04	0 .77	80.8%
125	Improving communication channels between caregiver and health care provider	3.96	0.85	79.2%
126	I was presented information in radio, television or social media website about the health risk of anemia among young children	3.90	0.86	78.0%
127	A family member or close friend informed me about the benefits of iron therapy	3.75	1.00	75.0%
128	Receive Medical Brochure especially designated to inform me about the best ways to enhance my child diet and health	3.81	0.91	76.2%
129	Provide me with health awareness session inside the clinic through a trained health staff to enhance my child diet and health	3.65	1.05	73.0%

As illustrated in table (4.8), participants were asked to indicate the degree to which they agreed or disagreed with statements related to cues to action for adoption healthier behavior to manage IDA among their young children. In regards to the internal cues, about three-quarter (75%) of participants indicated that the health care providers acknowledged them that they have a choice in therapy decisions which is known as autonomy. Expressing respect for clients' autonomy means acknowledging that beneficiaries have the right to make decisions regarding their care, which essential to build trust relationship between health provider and beneficiaries. It worth mentioning that UNRWA launched a health reform package based on the family health-team approach in 2011 as a response to the changes in the health needs of Palestine refugee population to provide comprehensive PHC package for the entire family with the emphasis in long-term provider-patient relationships and patient centered care approach which stress on respecting the beneficiaries' autonomy in the medical decision-making process (UNRWA, 2021). The results of our study were consistent with those of a cross-sectional study conducted by Gerritsma et al., which examined the impact of a family health-team approach on the standard of infant care in Jordan and included parents of 437 infants in the intervention group and parents of 552 infants in the control group. The study's findings showed that the intervention group had a higher likelihood of receiving iron to treat anemia than the control group (4.76, 1.28–17.7) (Gerritsma et al., 2018).

Similarly, more than three quarter (76.6%) of participants disclosed that health care providers consider alternative treatment approaches for them based on their individual values and preferences and 76.4% agreed that health care providers highlighted their sense of parent-child connection (relatedness).

These findings were consolidated during FGDs, the deputy head health center in Rafah UNRWA health center mentioned:

> *"The most important point in this aspect is counseling, which means that we must sit with the woman and acknowledged her what her child has and what would happen if she does not treat his condition. In addition, she should understand the benefits that the child can get from taking iron drops compared to the harms. Moreover, we should mention to her the side effects of drops and explain to her that they are simple symptoms compared to the benefit that the child can get. Then she should do an informed decision according to the information we provided to her".*

Similarly, the senior staff nurse from Nuseirat UNRWA health center mentioned:

> *"The problem is not in the bottle we give it to the children, but in the mind and thinking of the mothers. There must be a perceptive sense of the value of the things we offer to them. They shouldn't feel that they are enforced to giving the drops, but they should feel that they have to do this to benefit their children".*

Furthermore, about three-quarter (75.2%) of participants disclosed that they were competent and agreed that they had the ability to successfully give iron therapy to their children while 77.6% stated that they need to receive extra medical care and support. Additionally, 68.2% of mothers indicated that they would be more willingness to manage IDA in their children if a child of a close friend developed a serious health problem due to anemia. In the same line, a mother of improved child from the middle area mentioned: *"My sister-in-law, her son's blood was weak at one year and seven months old, he was always sick and was referred to hospital several times for blood transfusion. So, I advise that the one should adhere to the medication and keep following up".*

As demonstrated in table (4.8), the researcher also asked the study participants to indicate their degree of agreement with statements related to external signals that would promote healthier action toward managing IDA among their young children. About three-quarter of participants (75.8%) agreed that they would be encouraged more to manage their child condition if a family member or close friend advised them about consumption a well-balanced iron rich diet while 80.2% stated that they would be stimulated if health care provider emphasis in the importance of implementation of medical orders that benefit their child state of health. Similarly, the majority of participants agreed that when health care provider emphasis on the importance of the regular follow up in the clinic (80.2%) and on the importance of iron supplement intake according to the prescribed dose and period (80.2%), as well as on the importance of doing the recommended follow up HB exams (80.8%%), then they would be more adherent to the instruction given. These findings were consolidated during KII, the north area AHO mentioned: *"What is required is to do effective counseling. This touches the beneficiaries' heart and motivate them to adopt a health behavior"* then he added*:*

"Basically, the difference between education and counseling is that education is done without feelings, but counseling involves feeling. In order to have a feeling, it is assumed that healthcare providers should be motivated and satisfied so they work in the sense that they are not doing a routine work to get their salary at the end of the month but because they love their work".

Effective communication is a central component in the delivery of health care since it increases beneficiaries' involvement and adherence to recommended therapy, influence patient satisfaction, improve quality of care, health outcomes as well as encourage health care utilization. 79.2% of study participants agreed that improving communication channels between caregiver and health care provider would promote their adherence. This was further explained in FGDs. A mother of improved child from middle area mentioned:

"Honestly, the health care providers in the center helped me a lot in improving my child Hb level. The nurse was doing seminar sessions inside the clinic with a group of mothers whose children suffers from low Hb level like my son and tells us how to feed our children and how to give the drops. I benefited, and from the third session my son's blood improved".

The above results were further discussed through KIIs, the FFHO mentioned:

"During my supervisory visits to health centers, I check the anemia record. Honestly, you find that some nurses have 9 out of 10 registered cases were improved, but when you go to another nurse in the same clinic, you will find that the improvement rate in her cases is 4 out of 10. These differences arise from counseling because the iron on both sides is the same".

Furthermore, 78% of participants agreed that information presented in radio, television or social media website about the health risk of anemia among young children would encourage them to adopt healthier behavior toward their child nutrition and management. A medical officer from Nuseirat UNRWA health center further clarifies that as she said during FGD*:*

"Nowadays, we have social media which facilitate communication with people. In addition, we have a friendship committee which can spread health messages through communication with local community. Because honestly, people usually don't accept tough massages. But if we present the health issues in the form of a story, cartoon, animation, or video people can adopt it more".

In the same line, the SMO of Rimal UNRWA health center mentioned:

> *"This is the role of the government to enhance topics related to anemia through advertisements and posters which could be hung in the streets. Because while women are walking in the street, they will look at these posters, therefore the issue remains in their minds".*

In addition, three quarter of participants (75%) agreed that the external stimulus may arise from family member or close friend if informed them about the benefits of iron therapy. On the other hand, the majority of respondents agreed that external cues that would encourage them to be more adherent to child management include receiving medical brochure especially designated to inform them about the best ways to enhance their child diet and health (76.2%), besides providing them with health awareness session inside the clinic through a trained health staff to enhance their child diet and health (73%).

The above findings were further compared and matched to qualitative part findings. The FFHO mentioned in the KII:

> *"Some health centers are performing group counseling. They took the children who did not improve and do group counseling with their mothers because through our experiences after integration of mental health program, we found that a large part of the health problems may be caused by mental issues. I mean that the mothers may be psychologically tired, stressed, neglected and do not give the appropriate care for their children, therefore this will affect their children health status".*

Similarly, the FNO mentioned:

> *"The important thing is to change the women's concepts through raising their health awareness. The story is not about how many blood tests I did and how many children I discovered, but the basis is to educate the women and influence the extent of their commitment to giving iron drops. These concepts are the most important. They should be provided with sufficient information about how to enter solid food to their children's diet and how to do proper weaning. If the mother adheres to these tasks, there won't be anemia".*

4.3.6 Descriptive Statistics of "Perceived Self-Efficacy Domain"

Perceived self-efficacy domain discusses the degree of confidence of study participants to perform a health action that would result in improving their child health condition. As the HBM claims, behavior change can only be successful if the individual feels threatened by current behavioral patterns and believes that change would result in a valued outcome. In addition, individuals should be self-efficacious to overcome perceived barriers in taking action (Glanz, Rimer and Viswanath, 2008).

Table (4.9a): Description of Perceived self-efficacy domain (N=400)

		Mean	***SD***	***Percentage***
General self-efficacy scale				
130	I can always manage to solve the anemic status of my child if I try hard enough	3.54	0.98	70.8%
131	If something opposes me, I can find the means and ways to improve my child health	3.57	0.92	71.4%
132	It is easy for me to stick to my aims and enhance my child health	3.59	0 .92	71.8%
133	I am confident that I could deal efficiently with unexpected events	3.39	1.03	67.8%
134	Thanks to my resourcefulness, I know how to handle unforeseen situations to enhance my child health	3.55	0 .96	71.0%
135	I can solve most problems if I invest the necessary effort to improve my child health condition	3.50	0.96	70.0%
136	I can remain calm when facing difficulties to improve my child health condition because I can rely on my coping abilities	3.45	1.02	69.0%
137	When I am confronted with a problem related to my child health, I can usually find several solutions	3.60	0.88	72.0%
138	If I am in trouble regarding adherence to my child treatment, I can usually think of a solution	3.66	0.88	73.2%
139	I can usually handle whatever comes my way to improve my child health	3.60	0.95	72.0%
Perceived self-efficacy in dieting				
140	I can feed iron-rich foods and having a diet rich in iron	3.64	0 .98	72.8%
141	I can give Vitamin-C-rich foods during or right after meals	3.48	1.04	69.6%

Table (4.9b): Description of Perceived self-efficacy domain (N=400)

142	*I can halt the beverage that prevent iron absorption from my child diet such as tea during or right after the meal*	*3.75*	*0.92*	*75.0%*
143	I feel confident in preparing meals with iron-rich foods	3.70	0.96	74.0%
144	I like the taste of iron-rich food	3.35	1.08	67.0%
145	We can eat fresh food rather than processed one	3.71	0.98	74.2%
Perceived self-efficacy in iron supplement treatment				
146	I can give iron supplements when prescribed	3.60	1.06	72.0%
147	I feel confident that if I give supplement to my child, he will improve	3.87	0.92	77.4%
148	I can follow the health provider advices related to iron treatment	3.78	0.90	75.6%
149	I can be more adherent to Hb follow up test to improve my child health	4.00	0.85	80.0%
150	I can be more adherent to follow up visit appointment	4.02	0.90	80.4%

As demonstrated in table (4.9), participants were asked to indicate the degree to which they agreed or disagreed with statements related to perceived competency in doing a health behavior that could improve their child health condition. The overall average percentage of GSE scale score was 70.8% indicating that the majority of respondents believed that they can perform difficult tasks and cope with stressful life events to improve their child health. More than two-third (70.8%) of participants agreed that they can always manage to solve the anemic status of their child if they tried hard enough and 71.4% accepted that if something opposed them, they can find the means and ways to improve their child health. The above results were also matched with the results of FGDs, a mother of anemic child from north area mentioned: *"When I found that my child's blood level didn't improve, this was alarming and motivated me to pay more attention and care"*. Another participant added:

> *"I do as much as I can to give my children the supplement. I didn't give up, I keep trying to give it to my children, because many people whose financial condition is bad, cannot bring fruits, fish, and meat. Therefore, I stick to iron drop as a mean to improve my child's blood"*.

Similarly, 71.8% agreed that it is easy for them to stick to their aims and enhance their children health while about two-third (67.8%) were confident that they could deal efficiently with unexpected events. Also, 71% of participants stated that they knew how to handle

unforeseen situations to enhance their child health. Likewise, 70% indicated that they can solve most problems if they invested the necessary effort to improve their children health condition. These findings were also consolidated during interviews with mothers of anemic children during FGDs. A mother of improved child from north area mentioned:

> *"I started to give iron drops to my child at the age of six months, but when I found that it was difficult to give it to her as she vomited it and the vomitus has a metallic bad odor, I stopped till the age of one year. When I found that her blood was weak, I felt that it was my fault so I tried harder and gave it back again till her blood improved".*

Similarly, another participant commented:

> *"I overcome the problem of giving drops to my children by using a concept that if there is something the child does not eat or accept, you can add it to something else that they like to eat, then it will be much easier for you to give it to your child".*

Likewise, mother of anemic child from north area stated: *"Even if the financial situation is difficult. We can put in our budget part specified for feeding our children a healthy food. We may consider it like a medicine, that we should bring it".*

Furthermore, 69% agreed that they can rely on their coping abilities when facing difficulties to improve their child health condition while about 72% indicated that they can find several solutions when they confronted with a problem related to their child health. In addition, 73.2% stated that if they had trouble regarding adherence to their child treatment, they can think of a solution as well as 72% of participants agreed that they can handle whatever comes their way to improve their child health. A mother of anemic child from south area mentioned during FGD:

> *"I had a bad experience with iron, which caused tooth decay to my child and a change in color, and this made me to stop giving the drops, but I tried to look for an alternative and rely on nutrition. I found that her blood was improving but in a very slow way but at least it was getting better".*

Another participant declared: *"Honestly, when I found my son refusing iron, I brought to him a multivitamin supplement from the pharmacy"*. In the same line a mother of a child whose Hb level improved from the south area comment when she was asked about her experience:

> *"My daughter's blood was 7.2 at one year, and once the nurse gave me the supplements, I gave it to her. In addition, my aunt gave her a tomato and told me it was good for her blood. So that, every day I made her own tomato juice with 3 or 4 tomatoes and fed her till her blood raise to normal"*.

The findings were in line with a cross-sectional study conducted in India which revealed that there was a significant association between self-efficacy beliefs and intentions to take supplements among the studied population (Sedlander et al., 2021).

In the other hand some mothers of anemic children declared that they were facing difficulties in managing their children condition without being able to solve them. A mother of anemic child from north area said: *"The biggest obstacle in a mother's upbringing of her children is the people around her. I mean, since my daughter was born, I wanted to follow a certain healthy system, but I couldn't"* then she added with a sad voice: *"My mother-in-law or sister-in-low interfere with our life and destroying everything, making you feel that you are not able to raise your children"*. Another participant also stated: *"I used to live with my mother-in-law, she is an old woman with difficult mind. Every day she must feed my child tea with bread in the breakfast"*.

In addition, as elucidated in table (4.9), participants were asked to indicate the degree to which they agreed or disagreed with statements related to perceived self-efficacy in dieting. A three-quarter of participants (75%) indicated that they can halt the beverage that prevent iron absorption from their children diet such as tea during or right after the meal while 69.6% stated that they can give vitamin-C-rich foods during or right after meals. Majority of participant agreed that they can feed their children iron-rich foods and having a diet rich in iron (72.8%) and felt confident in preparing meals with iron-rich foods (74%). Likewise, two-third (67%) disclosed that they liked the taste of iron-rich food whereas about three-quarter (74.2%) felt competent that they can eat fresh food rather than processed one.

Regarding perceived self-efficacy in iron supplement treatment, table (4.9) illustrates that the majority of participants were confidence that they can give iron supplements when prescribed (72%), follow the health provider advices related to iron treatment (75.6%), can be more adherent to Hb follow up test (80%) and be more adherent to follow up visit appointment (80.4%). In addition, more than three-quarter (77.4%) acknowledged their confidence that their children will improve through giving iron supplement.

These findings were also consolidated during FGDs. A mother of improved child from north area mentioned*: "My daughter refused taking the supplement drops. I used to give it to her in lemon juice, but she drank only a very little amount. So, I began to give it to her at night, especially when she asked to drink water. I put it in the water"*.

When she asked about her advice to other mothers whose children have anemia she said:

> *"From the first blood test of the child, if they found it to be weak, they must continue to follow up with the doctor or nurse and don't interrupt the visit. They should adhere to health providers advices and to the clinic supplements they are giving to them".*

4.4 Difference on HBM Scores According to Sociodemographic Factors

This section examines the association between various sociodemographic characteristics and the HBM domains using various statistical analyses. Independent sample T-Test, One-way ANOVA, and correlation were the methods utilized to examine the data.

4.4.1 Difference of HBM Scores According to Governorates Distribution

Table (4.10) shows the differences of HBM scores according to governorate distribution. There is a significant difference between all HBM domain and governorate distribution with except for perceived self-efficacy domain that has no statistically significant relation with governorates distribution. Rafah governorate has significantly the highest mean±SD than the other governorates in the perceived severity domain score (4.27±0.53) with (F=4.985, P<0.001), perceived susceptibility domain score (3.25±0.50) with (F=6.458, P<0.001), perceived benefits domain score (4.22±0.52) with (F=5.532, P<0.001) and cues to action domain score (4.15±0.53) with (F=7.296, P<0.001), while it has the lowest mean±SD than the other governorates in the perceived barriers domain score (1.87±0.52) with (F=6.729,

P<0.001). Whereas North Gaza governorate has significantly the lowest mean±SD than the other governorates in the perceived severity domain score (3.24±0.9) with (F=24.985, P<0.001), perceived susceptibility domain score (2.84±0.79) with (F=6.458, P<0.001), perceived benefits domain score (3.76±0.78) with (F=5.532, P<0.001) and cues to action domain score (3.73±0.70) with (F=7.296, P<0.001).

Table (4.10): Difference of HBM scores according to governorates distribution

North Gaza (Jabalia)	*Gaza (Al-Rimal)*	*Middle Gov (Nuseirat)*	*Khan Younis*	*Rafah*	*Test value*	*P value*
n=89	**n=80**	**n=64**	**n=84**	**n=83**		
Perceived severity score						
3.24±0.9	3.63±0.62	3.59±0.74	3.36±0.77	4.27±0.53	**F=4.985**	**<0.001***
Perceived susceptibility score						
2.84±0.79	3.17±0.60	3.22±0.62	3.23±0.51	3.25±0.50	**F=6.458**	**<0.001***
Perceived barriers score						
2.29±0.73	2.24±0.54	2.28±0.66	2.34±0.78	1.87±0.52	**F=6.729**	**<0.001***
Perceived benefits score						
3.76±0.78	3.89±0.63	3.89±0.75	3.85±0.69	4.22±0.52	**F=5.532**	**<0.001***
Cues to action						
3.73±0.70	3.75±0.48	3.81±0.62	3.76±0.58	4.15±0.53	**F=7.296**	**<0.001***
Perceived self-efficacy score						
3.75±0.60	3.68±0.55	3.59±0.70	3.51±0.54	3.62±0.67	F=1.984	0.096
* Difference is significant at level $P \leq 0.05$ (Two-Tailed).						

4.4.2 Difference of HBM Scores According to Family Residency

Table (4.11) shows the differences of HBM scores according to family residency. As illustrated in the table, there is only a significant difference between perceived severity domain score and family residency with the mean±SD of perceived severity for mothers of anemic children who lives outside the camps is significantly higher (3.70±0.79) than the mean±SD score for mothers of anemic children who lives inside the camps (3.54±0.82) with t=2.009 and p=0.045.

Table (4.11): Difference of HBM scores according family residency

HBM	*Inside the Camp n=218*	*Outside the Camp n=182*	*Test value*	*P value*
Perceived severity score	**3.54±0.82**	**3.70±0.79**	**t=2.009**	**0.045***
Perceived susceptibility score	3.09±0.66	3.19±0.60	t=1.623	0.105
Perceived barriers score	2.26±0.70	2.13±0.63	t=1.838	0.064
Perceived benefits score	3.92±0.69	3.92±0.70	t=0.042	0.967
Cues to action	3.86±3.81	3.81±0.63	t=0.699	0.485
Perceived self-efficacy score	3.63±0.60	3.64±0.62	t=0.265	0.791

4.4.3 Difference of HBM Scores According to Type of Dwelling Units

Table (4.12) shows the difference of HBM scores according to the type of dwelling units. There is no significant difference in all domains of the HBM according to the difference of dwelling units.

Table (4.12): Difference of HBM scores according to type of dwelling units

Villa	*House*	*Apartment*	*Marginal/ Caravan/ Barracks*	*Test value*	*P value*
n=11	**n=155**	**n=221**	**n=13**		
Perceived severity score					
3.82±1.00	3.60±0.82	3.61±0.79	3.67±0.84	F=0.280	0.840
Perceived susceptibility score					
2.89±0.69	3.10±0.63	3.17±0.61	3.12±1.00	F=0.876	0.454
Perceived barriers score					
2.27±0.55	2.12±0.59	2.24±0.72	2.42±0.89	F=1.523	0.208
Perceived benefits score					
3.84±0.90	3.89±0.68	3.96±0.69	3.66±0.83	F=0.950	0.416
Cues to action					
3.83±0.69	3.87±0.60	3.82±0.60	3.69±0.76	F=0.498	0.684
Perceived self-efficacy score					
3.39±0.69	3.61±0.60	3.66±0.59	3.63±0.97	F=0.765	0.514

4.4.4 Difference of HBM Scores According to Family Type

Table (4.13) shows the difference of HBM scores according to the family type. There is no significant difference in all domains of the HBM in accordance to the difference of the family type.

Table (4.13): Difference of HBM scores according to family type

HBM	*Nuclear family n=192*	*Extended family n=208*	*Test value*	*P value*
Perceived severity score	3.62±0.74	3.19±0.87	t=0.172	0.864
Perceived susceptibility score	3.19±0.62	3.08±0.64	t=1.685	0.093
Perceived barriers score	2.22±0.67	2.18±0.68	t=0.562	0.574
Perceived benefits score	3.89±0.66	3.95±0.73	t=0.817	0.414
Cues to action	3.83±0.60	3.84±0.62	t=0.090	0.928
Perceived self-efficacy score	3.64±0.59	3.63±0.64	t=0.194	0.846

4.4.5 Correlations of Mother's and Father's Age with The Domains of HBM Scores

Table (4.14) shows the correlations of mother's and father's age with the domains of HBM scores. There are no significant correlations between the variables.

Table (4.14): Correlations of HBM scores with parents' age (N=400)

	Pearson's correlation factor	***P value***
Mothers' age		
Perceived severity score	0.054	0.284
Perceived susceptibility score	0.052	0.301
Perceived barriers score	-0.039	0.434
Perceived benefits score	0.030	0.554
Cues to action	-0.019	0.702
Perceived self-efficacy score	0.039	0.438
Fathers' age		
Perceived severity score	0.029	0.558
Perceived susceptibility score	0.035	0.482
Perceived barriers score	0.027	0.585
Perceived benefits score	-0.005	0.916
Cues to action	-0.032	0.519
Perceived self-efficacy score	0.084	0.093

4.4.6 Difference of HBM Scores According to Consanguinity of Parents

Table (4.15) shows the differences of HBM scores according to consanguinity of parents. There are two significant differences seen in this model. The first significant domain is perceived barriers score; the mean±SD of second cousin group (2.38±0.74) was significantly higher than no relation group (2.18±0.67) and first cousin (2.10±0.61), respectively (F=3.767, P=0.024). The second significant domain is perceived self-efficacy score; the mean±SD of no relation group (3.70±0.62) was significantly higher than second cousin group (3.56±0.57) and first cousin (3.50±0.62), respectively (F=3.642, P=0.027).

Table (4.15): Difference of HBM scores according to consanguinity of parents

	1st degree (1st cousin)	*2nd degree (2nd cousin)*	*No relation*	*Test value*	*P value*
	n=80	**n=73**	**n=247**		
Perceived severity score	3.57±0.91	3.69±0.68	3.60±0.81	F=0.520	0.595
Perceived susceptibility score	3.13±0.57	3.22±0.53	3.11±0.68	F=0.801	0.450
Perceived barriers score	2.10±0.61	2.38±0.74	2.18±0.67	**F=3.767**	**0.024***
Perceived benefits score	3.88±0.79	3.98±0.63	3.92±0.68	F=0.371	0.690
Cues to action	3.81±0.64	3.79±0.57	3.86±0.61	F=0.432	0.649
Perceived self-efficacy score	3.50±0.62	3.56±0.57	3.70±0.62	**F=3.642**	**0.027***
* Difference is significant at level $P \leq 0.05$ (Two-Tailed).					

4.4.7 Difference of HBM Scores According to Mother's Level of Education

Table (4.16) shows the differences of HBM scores according to mother's level of education. There is a significant difference between all HBM domain and mother's level of education except for perceived susceptibility and perceived barriers domain that has no statistically significant relation with mother's level of education. In terms of perceived severity domain, the mean ±SD for high education is 3.71±0.79, which is significantly higher than the respective values for secondary school and low education, 3.57±0.78 and 3.30±0.89 (F=5.207, P=0.006). Similarly, in the perceived benefits domain score, the mean ±SD for high education is 3.97±0.68, which is significantly higher than the respective values for secondary school and low education, 3.95±0.65and 3.95±0.65 (F=5.867, P=0.003). In regards to the cues to action domain, the mean ±SD for secondary school is 3.88±0.56, which is significantly higher than the respective values for high education and low education, 3.86±0.60 and 3.60±0.73 (F=4.127, P=0.017). Concerning perceived self-efficacy domain, the mean ±SD for high education is 33.71±0.56, which is significantly higher than the respective values for secondary school and low education, 3.62±0.63and 3.34±0.69 (F=7.084, P=0.001).

Table (4.16): Difference of HBM scores according to mother's level of education

	Low education	*Secondary school*	*High education*	*Test value*	*P value*
	n=47	**n=147**	**n=206**		
Perceived severity score	3.30±0.89	3.57±0.78	3.71±0.79	**F=5.207**	**0.006***
Perceived susceptibility score	3.04±0.66	3.11±0.60	3.17±0.65	F=0.994	0.371
Perceived barriers score	2.37±0.76	2.16±0.63	2.19±0.68	F=1.695	0.185
Perceived benefits score	3.60±0.81	3.95±0.65	3.97±0.68	**F=5.867**	**0.003***
Cues to action	3.60±0.73	3.88±0.56	3.86±0.60	**F=4.127**	**0.017***
Perceived self-efficacy score	3.34±0.69	3.62±0.63	3.71±0.56	**F=7.084**	**0.001***
* Difference is significant at level $P \leq 0.05$ (Two-Tailed).					

4.4.8 Difference of HBM Scores According to Mother's Occupation

Table (4.17) shows the differences of HBM scores according to mother's occupation. T-test revealed that there are two significant differences seen with this model's scores. In terms of perceived barriers scores, the mean±SD score for housewives is 2.23±0.67, which is higher than the mean±SD score for employed mothers (1.98±0.65) with t=2.369 and p=0.018. The contrary is seen regarding the perceived benefits domain, as t-test revealed that the mean±SD for employed mothers (4.08±0.52) is significantly higher than the mean±SD score of housewives' mothers (3.90±0.71) with t=2.095 and p=0.04. Regarding other domains of the HBM, there is no significant difference in accordance to the mother's occupation.

Table (4.17): Difference of HBM scores according to mother's occupation

	Housewives	*Employed*	*Test value*	*P value*
	n=355	**n=45**		
Perceived severity score	3.61±0.81	3.62±0.81	t=0.064	0.949
Perceived susceptibility score	3.14±0.63	3.09±0.63	t=0.435	0.664
Perceived barriers score	2.23±0.67	1.98±0.65	**t=2.369**	**0.018***
Perceived benefits score	3.90±0.71	4.08±0.52	**t=2.095**	**0.04***
Cues to action	3.83±0.61	3.85±0.59	t=0.181	0.857
Perceived self-efficacy score	3.64±0.62	3.57±0.55	t=0.759	0.449
* Difference is significant at level $P \leq 0.05$ (Two-Tailed).				

4.4.9 Difference of HBM Scores According to Father's Occupation

Table (4.18) shows the differences of HBM scores according to father's occupation. T-test revealed that there is a statistically significant differences between father's occupation in both the perceived barriers scores and the perceived benefits scores. In term of perceived barriers scores, the mean±SD for fathers who are working (2.31±0.70) is significantly higher than the mean±SD score for fathers who are not working (2.10±0.64) with t=3.064 and

p=0.002. While concerning perceived benefits scores, the mean±SD of fathers who are not working (3.99±0.63) is significantly higher than the mean±SD score for fathers who are working (3.84±0.76) with t=2.142 and p=0.033. Regarding other domains of the HBM, there is no significant difference in accordance to father's occupation.

Table (4.18): Difference of HBM scores according to father's occupation

	Working	***Not working***	***Test value***	***P value***
	n=186	**n=214**		
Perceived severity score	3.59±0.85	3.63±0.77	t=0.464	0.643
Perceived susceptibility score	3.08±0.69	3.18±0.58	t=1.486	0.138
Perceived barriers score	2.31±0.70	2.10±0.64	**t=3.064**	**0.002***
Perceived benefits score	3.84±0.76	3.99±0.63	**t=2.142**	**0.033***
Cues to action	3.82±0.61	3.85±0.61	t=0.532	0.595
Perceived self-efficacy score	3.58±0.64	3.68±0.58	t=1.566	0.121
* Difference is significant at level *P* ≤0.05 (Two-Tailed).				

4.4.10 Difference of HBM Scores According to Family's Monthly Income

Table (4.19) presents the differences of HBM scores according to family's monthly income. No statistically significant differences are found between the mean scores of HBM domains and mean family's monthly income.

Table (4.19): Difference of HBM scores according to family's monthly income

	≤1974 ILS	***1975–2470 ILS***	***≥2471 ILS***	***Test value***	***P value***
	n=356	**n=26**	**n=18**		
Perceived severity score	3.61±0.79	3.56±0.99	3.73±0.88	F=0.257	0.773
Perceived susceptibility score	3.12±0.63	3.29±0.59	3.08±0.70	F=0.933	0.394
Perceived barriers score	2.22±0.69	2.11±0.63	2.02±0.49	F=0.931	0.395
Perceived benefits score	3.91±0.69	3.93±0.85	4.06±0.44	F=0.377	0.686
Cues to action	3.84±0.60	3.77±0.75	3.89±0.62	F=0.219	0.803
Perceived self-efficacy score	3.63±0.62	3.63±0.59	3.63±0.61	F=0.002	0.998

4.4.11 Difference of HBM Scores According to The Percentage of Monthly Expenditure for Food Items Per Monthly Income

Table (4.20) describes the differences of HBM scores according to the percentage of monthly expenditure for food items per monthly income. There is only a significant difference with the perceived susceptibility domain, with the mean±SD for family who expended more than 60% for food items per monthly income is 3.19±0.64, which is significantly higher than the

respective values for families who expended 30%–60% and for families who expended less than 30% for food items per monthly income, 3.12±0.60and 2.88±0.67 (F=4.067, P=0.018).

Table (4.20): Difference of HBM scores according to the percentage of monthly expenditure for food items per monthly income

	<30%	***30%–60%***	***>60%***	***Test value***	***P value***
	n=41	**n=141**	**n=218**		
Perceived severity score	3.45±0.93	3.55±0.87	3.68±0.74	F=1.969	0.141
Perceived susceptibility score	2.88±0.67	3.12±0.60	3.19±0.64	**F=4.067**	**0.018***
Perceived barriers score	2.21±0.76	2.21±0.70	2.24±0.64	F=0.755	0.471
Perceived benefits score	3.72±0.87	3.96±0.73	3.93±0.63	F=1.909	0.150
Cues to action	3.84±0.63	3.85±0.65	3.83±0.57	F=0.026	0.974
Perceived self-efficacy score	3.66±0.80	3.60±0.64	3.65±0.55	F=0.308	0.735
* Difference is significant at level *P* ≤0.05 (Two-Tailed).					

4.4.12 Difference of HBM Scores According to The Family Size

Table (4.21) demonstrates the differences of HBM scores according to the family size which revealed that no statistically significant differences are found between the mean HBM scores and the mean family size.

Table (4.21): Difference of HBM scores according to the family size

	Small (≤4 persons)	***Medium (5–6 persons)***	***Large (≥7 persons)***	***Test value***	***P value***
	n=189	**n=130**	**n=81**		
Perceived severity score	3.53±0.83	3.62±0.82	3.79±0.73	F=2.802	0.062
Perceived susceptibility score	3.09±0.67	3.15±0.63	3.21±0.55	F=1.105	0.332
Perceived barriers score	2.17±0.68	2.26±0.70	2.18±0.62	F=0.692	0.501
Perceived benefits score	3.93±0.70	3.85±0.75	4.02±0.59	F=1.417	0.244
Cues to action	3.83±0.61	3.81±0.63	3.90±0.57	F=0.523	0.593
Perceived self-efficacy score	3.63±0.64	3.60±0.63	3.69±0.51	F=0.469	0.626

4.4.13 Relationship between HBM Domain and Sociodemographic Factors

Several statistical tests were used (including independent sample t-test, one way ANOVA and correlation) to examine whether there was a statistically significant association between HBM domains and different sociodemographic variables.

Table (4.10) showed a statistically significant relationship between HBM domains and geographic location with Rafah governorate has significantly the highest mean±SD in the perceived severity, perceived susceptibility, perceived benefits and cues to action domains scores while it has the lowest mean±SD in perceived barriers domain score. In addition, table (4.11) showed a significantly higher mean±SD of perceived severity score for mothers of anemic children who lives outside the camps.

These observations could be attributed to differences in living conditions, poverty, unemployment and imbalance between the needs and health care services provided to the refugee population in different GS governorates. These findings could be further explained by looking through health indicators reported by MoH annual PHC report in GS (2021) which indicated that the percentage of PHC centers distribution for all service providers by governorate for the year 2020 was the lowest in Rafah governorate as the percentage reached 12% with the number of health centers related to the UNRWA institutions represent 42% of all PHC services provided in Rafah governorate. In addition, the highest distribution of population by PHC centers was in Rafah governorate as it reached 16,492 people for each health center (MoH, 2020). Furthermore, according to PCBS the lowest percentage of unemployment was reported in North area governorate as it reached 38.1% compared to the percentage of 49.6% in Rafah governorate (PCBS, 2022). This may affect the perceived quality of care reported by people resident in different GS governorates which was reflected by the observed differences of HBM scores according to geographic location. This was in line with El Kishawi et al., study which showed that the sociodemographic characteristics such as geographic location were significantly associated with the prevalence of anemia in the GS (El Kishawi et al., 2015).

Furthermore, significant relationships were found between HBM domains and mother educational level. As illustrated in table (4.16), mothers who attended a higher educational level reported higher scores in perceived severity, perceived benefits, cues to action and perceived self-efficacy domains compared with mothers who attended lower educational level. In addition, table (4.17) demonstrated that employed mothers reported a higher score related to perceived benefit domain and lower scores in perceived barriers domain compared to unemployed women. These findings reflect that maternal education level and women empowerment enhance the ability of mothers to acquire knowledge on health issues and lead to optimal use of health services. Moreover, the educated mothers are more aware of the

impact of unhealthy diets so they are more knowledgeable about appropriate ways for preparing healthy and nutritious meals for their children. This is in line with cross sectional study conducted in Bangladesh, which showed that the prevalence of anemia was significantly higher for parents with no formal education compared to the higher educated parents (Khan, Awan, and Misu, 2016). Likewise, a cross-sectional study of 96,804 children age 6–59 months in the 27 sub–Saharan Africa countries participating in DHS that performed anemia testing showed that many individual and household factors were associated with a child's risk for anemia, especially maternal and socioeconomic factors and these variables were responsible for 67.8% of the burden of childhood anemia (Moschovis et al., 2018).

Also, table (4.20) showed a significantly higher perceived susceptibility among families who expended more than 60% for food items per monthly income in comparison to families who expended 30%–60% or less than 30% for food items per monthly income. This could be explained as families who has a higher expenditure in food items per monthly income may suffer from a higher level of food insecurity as the majority of participant had a high level of unemployment level and their monthly income below poverty line. Insufficient income among impoverished households might lead to the inability to provide appropriate meals for family members which could contribute to a higher perceived risk of children to suffer from anemia. This was congruent with a cross sectional study conducted on 432 preschool children in Ethiopia which revealed that food insecure household were 2.34 times at greater risk of developing anemia (OR: 2.12, 95% CI: 1.09, 4.12) (Engidaye et al., 2019).

4.5 Difference of HBM Scores According to Nutrition Indices

4.5.1 Difference of HBM Subdomains Scores According to Wasting Status

The difference in HBM subdomain scores according to wasting status using weight for height measurements is shown in table (4.22). Only two items showed the significant differences. In terms of perceived susceptibility of children to being anemic due to food insecurity-related factors, the mean ±SD for children with wasting (≤ –1.0 SD) is 2.86±1.08, which is significantly higher than the respective values for children with SD = (-0.99 to +0.99) and +1 SD, 2.44±1.02 and 2.74±1.09 (F=4.625, P=0.010). Also, a significant difference was found between the perceived self-efficacy in iron supplementation treatment and wasting; with the mean ±SD for children with SD = (-0.99 to +0.99) is 3.91±0.69, which

is significantly higher than the respective values for children with -1 SD and +1 SD, 3.90±0.64and 3.68±0.78 (F=4.192, P=0. 0.016).

Table (4.22): Difference of HBM Subdomains Scores According to Wasting status (weight for height)

	≥ +1 SD	***SD = –0.99 to +0.99***	***≤ –1.0 SD (wasting)***	***Test value***	***P value***
	N=127	**N=181**	**N=82**		
Susceptibility of child to being anemic – food insecurity-related factors	2.44±1.02	2.74±1.09	2.86±1.08	F=4.625	0.010*
Perceived self-efficacy in iron supplementation treatment	3.68±0.78	3.91±0.69	3.90±0.64	F=4.192	0.016*
* Distribution is significant at level *P* ≤0.05 (Two-Tailed).					

4.5.2 Difference of HBM Subdomains Scores According to Underweight Status

The difference in HBM subdomain scores according to underweight status using weight for age is shown in table (4.23). Only a significant difference is found with availability of iron prevention and control service in the perceived barriers domain in HBM, the mean ±SD for children with underweight (≤ –1.0 SD) is 1.88±0.80, which is significantly lower than the respective values for children with SD = (-0.99 to +0.99) and +1 SD, 2.10±0.88and 2.22±0.92 (F=3.994, P=0.019).

Table (4.23): Difference of HBM Subdomains Scores According to underweight status (weight for age)

	≥ +1 SD	***SD = –0.99 to +0.99***	***≤ –1.0 SD (underweight)***	***Test value***	***P value***
	N=59	**N=215**	**N=126**		
Perceived barrier-Availability of iron prevention and control service	2.22±0.92	2.10±0.88	1.88±0.80	F=3.994	0.019*
* Distribution is significant at level *P* ≤0.05 (Two-Tailed).					

4.5.3 Difference of HBM Subdomains Scores According to Stunting Status

The difference in HBM subdomain scores according to stunting status using height for age measurements is shown in table (4.24). Only a significant difference is found with the perceived barriers to the availability of iron prevention and control service, the mean ±SD for children with stunting (≤ –1.0 SD) is 1.93±0.87, which is significantly lower than the respective values for children with SD = (-0.99 to +0.99) and +1 SD, 2.15±0.85and 2.23±0.86 (F=4.255, P=0.015).

Table (4.24): Difference of HBM Subdomains Scores According to Stunting status (height for age)

	≥ +1 SD	***SD = –0.99 to +0.99***	***≤ –1.0 SD (stunting)***	***Test value***	***P value***
	N=58	**N=140**	**N=202**		
Perceived barrier-Availability of iron prevention and control service	2.23±0.86	2.15±0.85	1.93±0.87	F=4.255	0.015*
* Distribution is significant at level *P* ≤0.05 (Two-Tailed).					

4.5.4 Relationship between HBM Domain and Nutrition Indices

One way ANOVA test was used to examine whether there was a statistically significant association between HBM domains and different nutrition indices. In regard to wasting status using weight for height measurements, children with wasting (≤ –1.0 SD) had a significantly the highest scores in the perceived susceptibility of children to being anemic due to food insecurity-related factors. In addition, underweight status using weight for age measurement and stunting status using height for age measurements showed that children with stunting and children with underweight had a statistically the lowest score in the perceived barriers to the availability of iron prevention and control service.

This finding could be explained as mothers of children who suffers from malnutrition has a higher perception about the threat of the illness in their children, therefore they had a lower perception of barriers and a higher confidence of the benefits that would be obtained from integration in health intervention that could improve their children general health conditions.

This was in line with data from cross-sectional surveys obtained from Nepal DHS 2011 and Pakistan's National Nutritional Survey 2011 which were documenting the nutrition situation of women and children in Nepal and Pakistan. This study found that among the factors associated with anemia in children <5 years old was being a stunted child which was associated with a higher prevalence of anemia compared with not being stunted and a higher integration in health services (Harding et al., 2018).

4.6 Correlation among the HBM Constructs

Table (4.25): Pearson correlation among the HBM constructs

	perceived Severity	**Perceived Susceptibility**	**Perceived Barriers**	**Perceived Benefits**	**Cues to Action**	**Perceived Self-Efficacy**
Perceived Severity	1.000	0.503**	-.092	0.437**	0.476**	0.256**
Perceived Susceptibility		1.000	0.005	0.384**	0.335**	0.162**
Perceived Barriers			1.000	-0.346**	-0.217**	-0.102*
Perceived Benefits				1.000	0.608**	0.406**
Cues to Action					1.000	0.554**
Perceived Self-Efficacy						1.000
** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).						

The difference among the HBM constructs using Pearson correlation is shown in table (4.25). A significant positive correlation is observed between the perceived severity domain and perceived susceptibility (r=0.503, p=0.001), perceived benefits (r=0.437, p=0.001), cues to action (r=0.476, p=0.001) and perceived self-efficacy (r=0.256, p=0.001) domains. While no significant correlation was observed between perceived severity domain and perceived barriers domain (r=-0.092, p=0.066). This reflects that mother who perceive anemia among their children as a serious illness if lifted unaddressed, are more aware about the factors that make the children more susceptible to contract the disease and have a stronger believes that change would result in a valued outcome, making them more willingness in taking action to enhance their child health so that they perceived more benefits and low barriers to overcome anemia among their children. Similarly, significant positive correlation is observed between the perceived susceptibility domain and perceived benefits (r=0.384, p=0.001) and cues to

action (r=0.335, p=0.001) domains. While a significant very weak positive correlation is observed between perceived susceptibility domain and perceived self-efficacy domain (r=0.162, p=0.001) and no significant correlation was observed between perceived susceptibility domain and perceived barriers domain (r=0.005, p=0.920). This reflects that those mothers who have a higher perceived threat from anemia among their children, have a higher perceived benefit from IDA interventions provided to their child that aimed at reducing the health threat and are more willingness of adopting preventive measures when comes upon a trigger to seek the medical intervention.

Also as demonstrates in table (4.25), a significant weak negative correlation is observed between the perceived barriers domain and perceived benefits (r=-0.346, p=0.001), cues to action (r=-0.217, p=0.001) and perceived self-efficacy (r=-0.102, p=0.05) domains. This reflects that those mothers of anemic children who have a higher perceived barrier to a medical intervention are also perceiving lower benefits from IDA interventions provided to their child and are less willingness to overcome perceived barriers in taking action to enhance their child health when they come upon cues to integrate into a medical intervention.

Moreover, a significant strong positive correlation is observed between the perceived benefits domain and cues to action domain (r=0.608, p=0.001) and a significant moderate positive correlation with perceived self-efficacy domain (r=0.406, p=0.001). This reflects that those mothers who have a higher perceived benefit from IDA interventions provided to their child are more confidence of adopting preventive measures when comes upon a cue to improve their children anemic status. This was further demonstrated in table (4.25), which revealed a significant moderate positive correlation between cues to action domain and perceived self-efficacy domain (r=0.554, p=0.001). Thus, mothers of anemic children are more willingness and confidence in adopting healthier behavior when they are encountered by either internal or external cues to perform the preventive measures against developing IDA among their children.

4.7 Correlations and Regression Analyses

The researcher used correlations and logistic regression analysis to explain the impact of perceived severity domain, perceived susceptibility domain, perceived barriers domain and perceived benefits domain on both total cues to action domain and perceived self-efficacy domain.

4.7.1 Correlation and Regression of Perceived Severity with Total Cues to Action and Perceived Self-Efficacy Score

Table (4.26) presented the correlations and regression of perceived severity with total cues to action and perceived self-efficacy scores.

The first part showed that the total perceived severity domain is significantly and moderately correlated with total cues to action domain score (r=0.476), and is linearly related to total cues to action, B= 0.358 (95%CI: 0.293-0.423, P<0.001). A significant moderate correlation is present between cues to action domain with perceived severity of anemia among children subdomain (r= 0.388), and perceived severity of not using anemia prevention and control program subdomain (r= 0.469). As well as, cue to action domain is linearly related to perceived severity of anemia among children subdomain, B= 0.262 (95%CI: 0.200-0.323, P<0.001) and to perceived severity of not using anemia prevention and control program subdomain, B= 0.338 (95%CI: 0.267-0.401, P<0.001).

The second part showed that the total perceived severity domain is significantly and weakly correlated with total perceived self-efficacy domain score (r=0.255), and is linearly related to total perceived self-efficacy domain, B= 0.139 (95%CI: 0.121-0.266, P<0.001). A significant weak correlation is present between perceived self-efficacy domain with perceived severity of anemia among children subdomain (r=0.261), and perceived severity of not using anemia prevention and control program subdomain (r= 0.236). As well as, perceived self-efficacy domain is linearly related to perceived severity of anemia among children subdomain, B=0.178 (95%CI: 0.113-0.243, P<0.001) and to perceived severity of not using anemia prevention and control program subdomain, B= 0.172 (95%CI: 0.102-0.242, P<0.001).

Table (4.26): Correlations and regression of perceived severity with total cues to action and perceived self-efficacy scores

Part I: Correlations and regression of perceived severity with total cues to action score						
	Pearson's correlation	**B Coefficient**	**Test Value**	***P* Value**	**95% CI**	
					Lower	**Upper**
Perceived severity of anemia among children	0.388	0.262	8.388	<0.001*	0.200	0.323
Perceived severity of not using anemia prevention and control program	0.469	0.338	10.585	<0.001*	0.267	0.401
Perceived severity (average of total)	0.476	0.358	10.812	<0.001*	0.293	0.423
Part II: Correlations and regression of perceived severity with total perceived self-efficacy score						
Perceived severity of anemia among children	0.261	0.178	5.402	<0.001*	0.113	0.243
Perceived severity of not using anemia prevention and control program	0.236	0.172	4.850	<0.001*	0.102	0.242
Perceived severity (average of total)	0.255	0.139	5.258	<0.001*	0.121	0.266
* Regression is significant at level $P \leq 0.05$ (Two-Tailed).						

Figure (4.3) and figure (4.4) demonstrate the correlation between total perceived severity with total cues to actions and correlation between total perceived severity with total perceived self-efficacy respectively. As illustrated in figure (4.3) and figure (4.4), mothers of anemic children who have a higher perception of severity and seriousness of anemia in

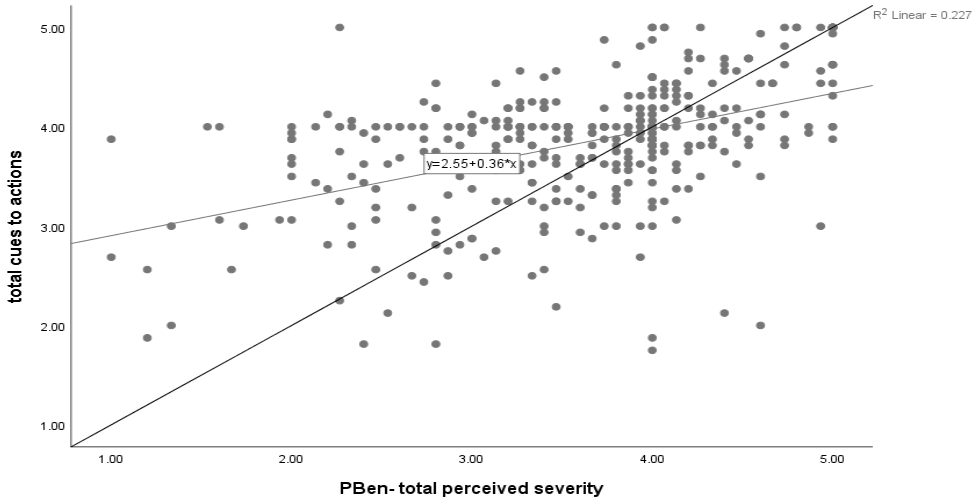

Figure (4.3): Correlation between total perceived severity with total cues to actions

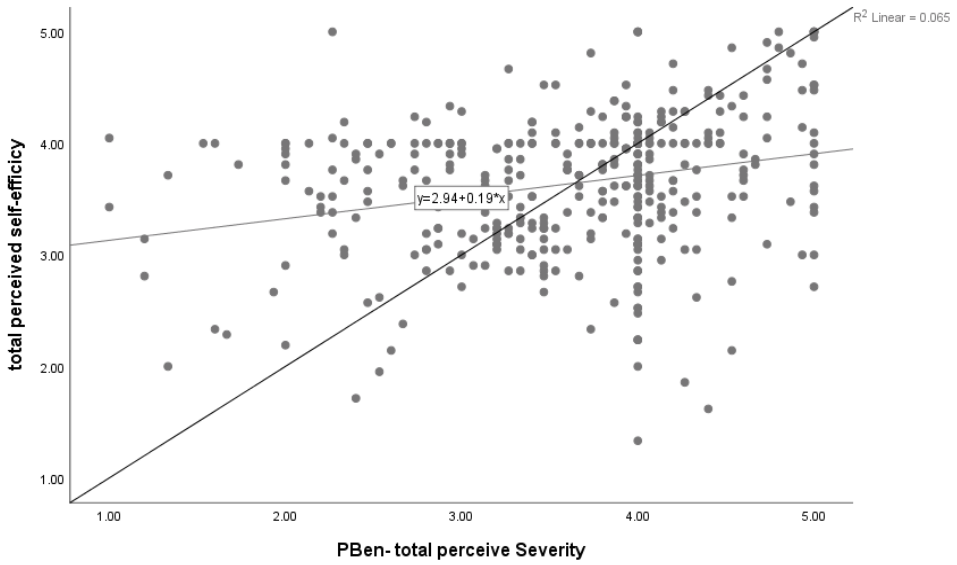

Figure (4.4): Correlation between total perceived severity with total perceived self-efficacy

their children are more willingness to adopt health behavior when they are come upon trigger or cues to enhance their children health condition.

4.7.2 Correlation and Regression of Perceived Susceptibility with Total Cues to Action and Perceived Self-Efficacy Score

Table (4.27) demonstrated the correlations and regression of perceived susceptibility with total cues to action and perceived self-efficacy scores.

The first part shows the degrees of correlation and regression between perceived susceptibility and total cues to action score. The results are all statistically significant with a positive weak correlation coefficient except for the MMF and the factors associated with food insecurity as their results are not statistically significant. The total perceived susceptibility domain is significantly and weakly correlated with total cues to action domain score (r=0.330), and is linearly related to total cues to action, B=0.316 (95%CI: 0.227-0.406, P<0.001).

The second part shows the degrees of correlation and regression between perceived susceptibility and perceived self-efficacy score. The results are all statistically significant with a positive correlation coefficient ranging from very weak to weak except for the MMF and the factors associated with food insecurity as their results are not statistically significant. The total perceived susceptibility domain is very weakly correlated with total perceived self-

efficacy domain score (r=0.162), and is linearly related to total perceived self-efficacy domain, B=0.157 (95%CI: 0.063-0.252, P=0.001).

Table (4.27): Correlations and regression of perceived Susceptibility with total cues to action and perceived self-efficacy scores

Part I: Correlations and regression of perceived Susceptibility with total cues to action score						
	Pearson's correlation	**B Coefficient**	**Test Value**	***P* Value**	**95% CI**	
					Lower	**Upper**
Mother-related factors	0.311	0.200	6.527	<0.001*	0.140	0.260
Child-related factors	0.292	0.179	6.089	<0.001*	0.121	0.237
Hygiene-related factors	0.226	0.130	4.637	<0.001*	0.075	0.185
Nutrition-related factors	0.393	0.291	8.520	<0.001*	0.224	0.358
Regular and daily use of iron-rich food to feed children	0.332	0.283	7.014	<0.001*	0.204	0.363
Minimum dietary diversity (MDD)	0.387	0.337	8.369	<0.001*	0.258	0.416
Minimum meal frequency (MMF)	-0.032	-0.019	-0.648	0.517	-0.075	0.038
Food insecurity-related factors	-0.020	-0.011	-0.398	0.691	-0.067	0.044
Perceived susceptibility (average of total)	0.330	0.316	6.964	<0.001*	0.227	0.406
Part II: Correlations and regression of perceived Susceptibility with total perceived self-efficacy score						
Mother-related factors	0.132	0.086	2.655	0.008*	0.022	0.149
Child-related factors	0.116	0.072	2.331	0.020*	0.011	0.133
Hygiene-related factors	0.156	0.090	3.144	0.002*	0.034	0.146
Nutrition-related factors	0.189	0.141	3.832	<0.001*	0.069	0.213
Regular and daily use of iron-rich food to feed children	0.260	0.225	5.378	<0.001*	0.142	0.307
Minimum dietary diversity (MDD)	0.329	0.290	6.954	<0.001*	0.208	0.372
Minimum meal frequency (MMF)	0.093	0.054	1.862	0.063	-0.003	0.110
Food insecurity-related factors	0.002	0.001	0.031	0.975	-0.055	0.057
Perceived susceptibility (average of total)	0.162	0.157	3.282	0.001*	0.063	0.252
* Regression is significant at level $P \leq 0.05$ (Two-Tailed).						

Figure (4.5) shows the correlation between total perceived susceptibility with total cues to actions scores. As illustrated in figure (4.5), mother's knowledge about predisposing factors of anemia among children, enhance their willingness to adopt a healthier behavior to improve their children health condition when triggered by stimulus. This is congruent with a study conducted by Souganidis et al., in Indonesia to examine the relationship between

maternal knowledge of anemia and anemia in the youngest child, aged 6–59 months. Results revealed that maternal knowledge of anemia is associated with lower odds of anemia in children and with some health behaviors related to reducing anemia (Souganidis et al., 2012). Also, this was in line with study done by Belachew and Tewabe which found that children who take <4 food groups daily were 1.71 times more likely to have anemia (Belachew and Tewabe, 2020). As well as to the findings of study conducted in Qatar to investigate the prevalence of IDA and the correlation between IDA and child feeding practices among mothers of all nationality's resident in Qatar. The study reported statistically significant relation between IDA in infants and their feeding practice and iron supplementation where infants diagnosed with IDA consumed less plant foods rich in iron (Zainel et al., 2018).

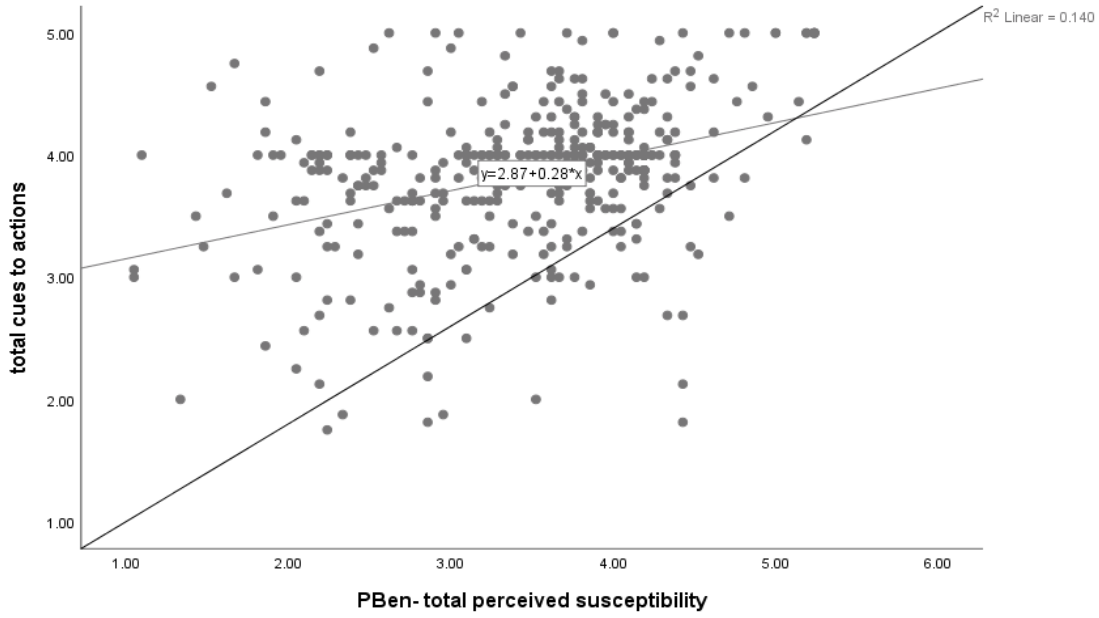

Figure (4.5): Correlation between total perceived susceptibility with total cues to actions

4.7.3 Correlation and Regression of Perceived Barriers with Total Cues to Action and Perceived Self-Efficacy Score

Table (4.28) shows the correlations and regression of perceived barriers with total cues to action and perceived self-efficacy scores.

The first part represented the correlations and regression of the perceived barriers with total cues to action score. The results are all statistically significant with a weak negative correlation coefficient except for the availability and affordability of iron rich diet and the factors related to aacceptability barriers as their results are not statistically significant. The

total perceived barriers domain is significantly weakly and negatively correlated with total cues to action domain score (r=-0.217), and is linearly related to total cues to action, B=-0.195 (95%CI: -0.282--0.109, P<0.001).

The second part represented the correlations and regression of perceived barriers with perceived self-efficacy scores. As shown in table (4.28), the total perceived barriers domain is significantly and very weakly negatively correlated with total perceived self-efficacy domain score (r=-0.102), and is linearly related to total perceived self-efficacy domain, B=-0.092 (95%CI: -0.181--0.003, P<0.042). A significant very weakly negative correlation is present between perceived self-efficacy domain with availability and affordability of iron rich diet subdomain (r=-0.161), and acceptability barriers subdomain (r= -0.243). As well as, perceived self-efficacy domain is linearly related with availability and affordability of iron rich diet subdomain, B=-0.109 (95%CI: -0.174--0.043, P=0.001) and to acceptability barriers subdomain, B= -0.170 (95%CI: -0.236--0.103, P<0.001).

Table (4.28a): Correlations and regression of perceived barriers with total cues to action and perceived self-efficacy scores

Part I: Correlations and regression of perceived barriers with total cues to action score						
	Pearson's correlation	**B Coefficient**	**Test Value**	***P* Value**	**95% CI**	
					Lower	**Upper**
Availability and affordability of iron rich diet	-0.013	-0.009	-0.266	0.791	-0.075	0.057
Availability of iron prevention and control services	-0.211	-0.147	-4.308	<0.001*	-0.215	-0.080
Accessibility of iron prevention and control services	-0.172	-0.126	-3.482	0.001*	-0.197	-0.055
Acceptability barriers	-0.097	-0.067	-1.945	0.053	-0.135	0.001
Contact barriers	-0.185	-0.133	-3.754	<0.001*	-0.202	-0.063
Effective coverage barriers	-0.219	-0.164	-4.469	<0.001*	-0.237	-0.092
Perceived barriers (average of total)	-0.217	-0.195	-4.430	<0.001*	-0.282	-0.109

Table (4.28b): Correlations and regression of perceived barriers with total cues to action and perceived self-efficacy scores

Part II: Correlations and regression of perceived barriers with total perceived self-efficacy score						
Availability and affordability of iron rich diet	-0.161	-0.109	-3.260	0.001*	-0.174	-0.043
Availability of iron prevention and control services	-0.011	-0.007	-0.210	0.833	-0.077	0.062
Accessibility of iron prevention and control services	-0.061	-0.045	-1.225	0.221	-0.118	0.027
Acceptability barriers	-0.243	-0.170	-5.006	<0.001*	-0.236	-0.103
Contact barriers	--	--	-0.009	0.993	-0.072	0.071
Effective coverage barriers	-0.087	-0.066	-0.735	0.083	-0.140	0.009
Perceived barriers (average of total)	-0.102	-0.092	-2.038	0.042*	-0.181	-0.003

* Regression is significant at level $P \leq 0.05$ (Two-Tailed).

Figure (4.6) reflects that those mothers who perceived more barrier in integration in health services, are less willingness and less confidence in adoption the needed health intervention to improve their children health. These findings were in line with results from qualitative research that was conducted in Peru which revealed that mothers expressed concerns about utilizing ferrous sulfate as well as mothers showed negative attitudes towards iron supplementation, derived from side effects, concerns with the medication bad taste, or fears of adverse outcomes which lead to non-compliance with health advices provided by health practitioners (Louzado-Feliciano et al., 2020).

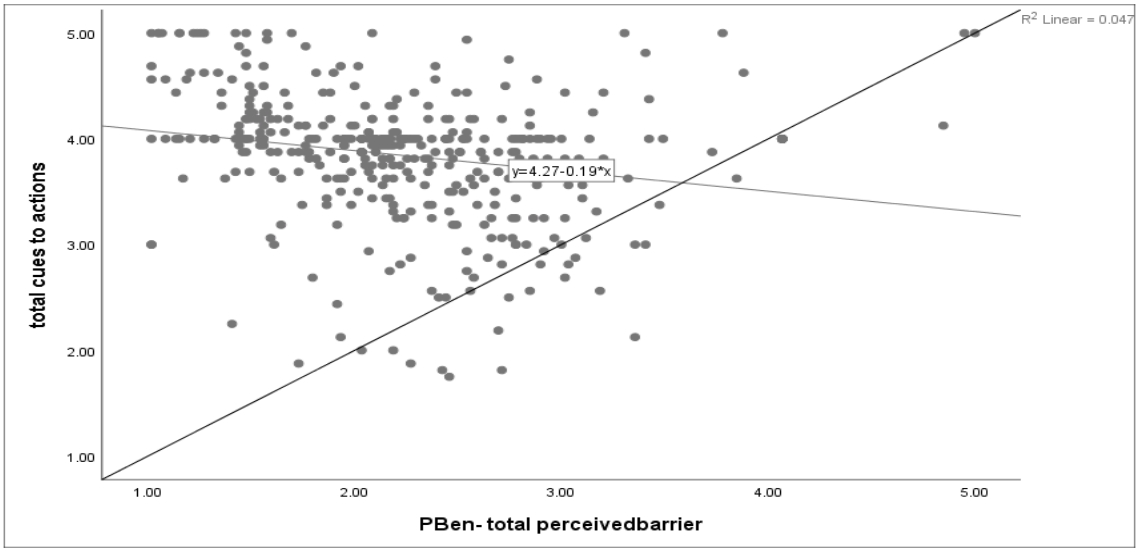

Figure (4.6): Correlation between total perceived barriers with total cues to actions

4.7.4 Correlation and Regression of Perceived Benefits with Total Cues to Action and Perceived Self-Efficacy Score

Table (4.29) displayed the correlations and regression of perceived benefits with total cues to action and perceived self-efficacy scores.

The first part showed that the total perceived benefits domain is significantly and strongly positive correlated with total cues to action domain score (r=0.608), and is linearly related to total cues to action, B=0.531 (95%CI: 0.463-0.600, P<0.001). A significant moderate correlation is present between cues to action domain with perceived benefits from prophylaxis iron supplementation subdomain (r= 0.576), and benefit to adherence to iron drop treatment regimen subdomain (r= 0.563). As well as, cue to action domain is linearly

related to perceived benefits from prophylaxis iron supplementation subdomain, B=0.465 (95%CI: 0.400-0.531, P<0.001) and to benefit to adherence to iron drop treatment regimen subdomain, B=0.472 (95%CI: 0.404-0.540, P<0.001).

The second part represented the correlations and regression of perceived benefits with perceived self-efficacy scores. As shown in table (4.29), the total perceived benefits domain is significantly and moderately positive correlated with total perceived self-efficacy domain score (r=0.406), and is linearly related to total perceived self-efficacy domain, B= 0.358 (95%CI: 0.279-0.438, P<0.001). A significant weakly positive correlation is present between perceived self-efficacy domain with perceived benefits from prophylaxis iron supplementation subdomain (r=0.390), and benefit to adherence to iron drop treatment regimen subdomain (r= 0.367). As well as, perceived self-efficacy domain is linearly related to perceived benefits from prophylaxis iron supplementation subdomain, B=0.319 (95%CI: 0.245-0.393, P<0.001) and to benefit to adherence to iron drop treatment regimen subdomain, B=0.311 (95%CI: 0.233-0.388, P<0.001).

Table (4.29): Correlations and regression of perceived benefits with total cues to action and perceived self-efficacy scores

Part I: Correlations and regression of perceived benefits with total cues to action score						
	Pearson's correlation	**B Coefficient**	**Test Value**	***P* Value**	**95% CI**	
					Lower	**Upper**
Perceived benefits from prophylaxis iron supplementation	0.576	0.465	14.043	<0.001*	0.400	0.531
Benefit to adherence to iron drop treatment regimen	0.563	0.472	13.603	<0.001*	0.404	0.540
Perceived benefits (average of total)	0.608	0.531	15.274	<0.001*	0.463	0.600
Part II: Correlations and regression of perceived benefits with total perceived self-efficacy score						
Perceived benefits from prophylaxis iron supplementation	0.390	0.319	8.462	<0.001*	0.245	0.393
Benefit to adherence to iron drop treatment regimen	0.367	0.311	7.882	<0.001*	0.233	0.388
Perceived benefits (average of total)	0.406	0.358	8.863	<0.001*	0.279	0.438
* Regression is significant at level $P \leq 0.05$ (Two-Tailed).						

Figure (4.7) and figure (4.8) demonstrate the correlation between total perceived benefits with total cues to actions and correlation between total perceived benefits with total

perceived self-efficacy respectively. As illustrated in figure (4.7) and figure (4.8), mothers of anemic children who perceived more benefits from anemia prevention and control program are more confidence and more willingness when they are stimulated by trigger that enhance their integration in the health services. This was consistent with study findings conducted by Powers et al., which showed that interventions should aim to increase parental motivation by emphasizing the health benefits of adherence to iron therapy through provision of specific instructions, support from healthcare providers, motivation to the therapy and follow-up as well as an appreciation of child's improvement with successful completion of therapy as these were expressed as a facilitators to effective management of IDA among children (Powers et al., 2020).

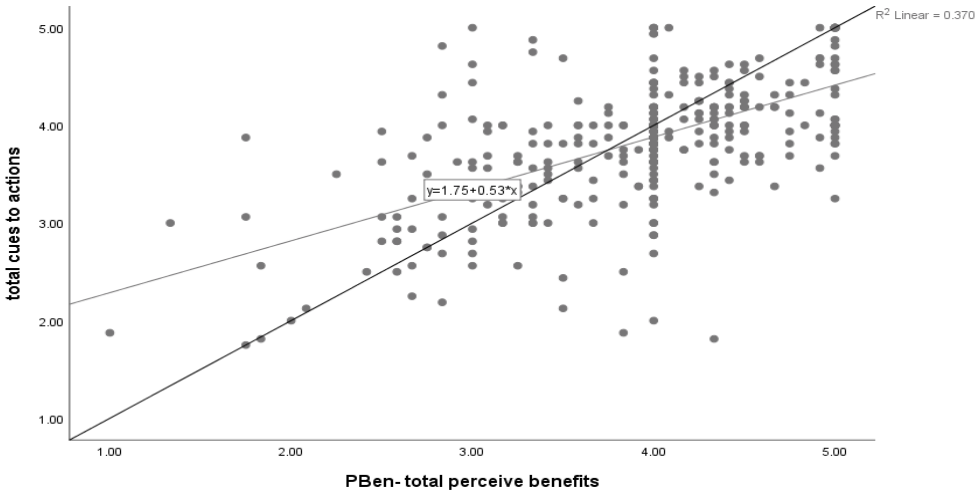

Figure (4.7): Correlation between total perceived benefits with total cues to actions

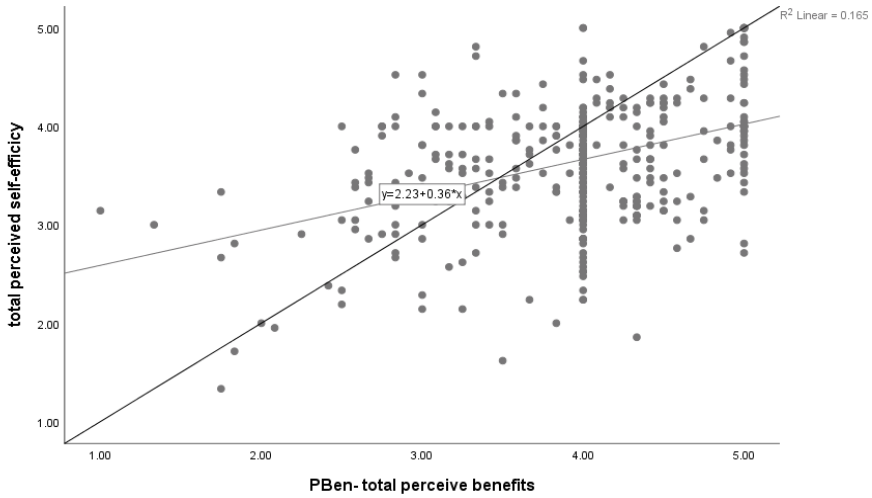

Figure (4.8): Correlation between total perceived benefits with total perceived self-efficacy

4.8 Results from Medical Records Review- Check List

Table (4.30): Checklist (N=100)

No.	*Item*	*Yes*	*No*	*N/A*
1	Document essential and accurate information about the child health condition include growth and developmental anthropometric measurements	96	4	--
2	Reviews past medical history that is relevant to the IDA problem	83	15	2
3	Documents an appropriately detailed and focused physical examination	83	15	2
4	Prophylactic Iron supplementation to infants and young children was provided in timely manner and at a correct dose and duration according to UNRWA technical guidelines	85	8	7
5	Infants and children registered in the child care program were screened for anemia using the hemoglobin concentration test according to UNRWA technical guidelines	98	2	--
6	When the child was diagnosed with anemia, he/she was treated with daily iron supplementation at a correct dose and duration according to UNRWA technical guidelines	90	9	1
7	Repeated hemoglobin test after one month of treatment was conducted for infants and children who are anemic.	98	--	2
8	Repeated hemoglobin tests after the second visit were done to the anemic child according to UNRWA technical guidelines	83	10	7
9	When anemia status did not respond to iron treatment, further investigation for other causes of anemia was considered and documented including CBC, MCV, MCH and RDW	70	25	5
10	When anemia status did not respond to iron treatment, referral to a specialist for further evaluation and treatment was considered	48	29	23
11	Documentation is carried out regularly and periodically manner for every provided session, and appointment for the next session is documented appropriately as well	73	27	--
12	The medical record is used effectively to communicate the assessment and plan of care to the health care team	76	24	--
13	Effectively documents instructions given to patients and families	79	21	--
14	Follow-up notes are written in a way that permits making comparisons and tracking the improvement or deterioration in the health status of the patient over time.	65	35	--
15	Documents a multi-disciplinary plan of care	57	41	2

As shown in Table (4.30), the majority of medical records (96%) had accurate and well documented essential information about the child health condition, growth, developmental and anthropometric measurements. Whereas 83% of the checked records included cues that health care providers reviewed the past medical history that is relevant to the IDA problem or had done an appropriately detailed and focused physical examination to the anemic children. This was in line with what mentioned by the deputy head health center in Rafah UNRWA health center when he declared:

> *"For doctors, their medical thinking should not be narrow, especially in cases where they are faced with resistant anemia. When a child reaches the age of one year and you have blood of 8 for example. You must do a comprehensive examination for the child, including the lymph node and all the organs of the body. You can request a CBC as it may give you an idea about diagnosing anemia and its causes whether it's primary or secondary anemia".*

In addition, 85% of the medical records documented that prophylactic iron supplementation to infants and young children was provided in timely manner and at a correct dose and duration according to UNRWA technical guidelines. When practical nurses in the health centers were asked about this point in the FGDs the majority of them mentioned that they gave the prophylactic iron supplementation according to the technical instructions in timely manner but some of them don't document this in the medical record. In the other hand, most mothers who participated in FGDs elucidated that they didn't adhere to iron supplements that were recommended by UNRWA health centers when their baby reaches 6 months. Some participants disclosed that they even didn't remember whether they were provided with these supplements at that time or not. A mother of anemic child from north area mentioned during FGD: *"I started giving the drops at age one year"*. When she was asked about the prophylaxis supplements, she said:

> *"The nurse didn't give it to me, she told me her blood was fine. But at the age of one year, the nurse did a blood test, and checked my child blood and it was weak. Then she told me to take iron, and wrote a new appointment after a month for follow up".*

While another participant from the same clinic replied: *"Honestly, the nurse gave it to me at six months, but I gave it to my child after one year, when I knew that his blood was weak"*. In the same line a mother of improved child stated:

> *"The nurse gave the drops to me at 6 months, but when my child blood test was done at one year her blood was weak, then the nurse told me to increase the dose and tell me to keep giving them regularly*".

Also, table (4.8) illustrates that in the majority of medical records (98%) infants registered in the child care program were screened for anemia using the Hb concentration test and in 90% of the checked cases, the anemic children were treated with daily iron supplementation at a correct dose and duration according to UNRWA technical guidelines. The above results were further discussed with KIIs. When the FFHO was asked about whether health providers are committed to the UNRWA technical instructions, she stated:

> *"It is more or less individualized. I mean not all of the health care providers are compliance with the guidelines. Until now, when I visit health centers, I found the doses and duration is not exact one hundred percent as it should be, and here comes the role of supervision, monitoring, and training".*

Then she further explained*:*

> *"For example, we noticed that the amount of iron disbursement is increasing in the past period, when we dig about the reason for that, we found that there was more scrutiny from the management on the accuracy of doses, so the provider became more committed to dispensing the treatment in the correct way"*.

Moreover, as shown in table (4.30), in 98% of medical records, Hb test for the anemic children was repeated after one month of treatment. As well as 83% of records revealed that repeated Hb tests after the second visit were done to the anemic child according to UNRWA technical guidelines. In more than two third of records (70%), further investigation for other causes of anemia was considered and documented including CBC, MCV, MCH and RDW. While in less than one half (48%) of medical record, a documented referral to a specialist for further evaluation and treatment was considered when anemia status did not respond to iron treatment.

These findings were in line with a retrospective observational study conducted in Jerash Camp UNRWA health center to investigate patient and doctor adherence to UNRWA guidelines by analyzing electronic health records which revealed that patient adherence was 89.6% at the screening visit and decreased to 34.4% at the third follow-up visit. While doctor's adherence to iron supplement was 81.3% at the screening visit and decreased to 63.9% at the first follow-up visit which means that the missed opportunities to be diagnosed and treated for anemias was 35% of children at the first follow-up visit and 65% of children at the third follow-up visit (Harada et al., 2022).

The results were further explored in the qualitative part wherein the FNO explained UNRWA IDA management guidelines. She said:

> *"During the first-year assessment, the child must be sent to the laboratory to be examined for Hb. If Hb is normal or above 10g/dl (mild anemia), then the child takes the prophylaxis iron supplement dose, which is 10 drops twice a week for 3 months. But if Hb result is below 10 g/dl, then the practical nurse should send the child to the health team medical officer to be examined and set the management plan which included iron treatment at a dose of 25 mg elemental iron every day for 3 months. Then the nurse gives the mother an appointment after a month to check the child's Hb and for assessment. If the child's Hb increased by more than 0.7g, the mother is encouraged to continue giving the drops according to the treatment dose until the age of one year and 3 months, and after that she will do the Hb test again. But if the child Hb does not improve or the increase is less than 0.7g, he must be referred to a medical officer for further instructions. If the doctor suspects a secondary cause of anemia or thalassemia then he requests electrophoresis or other lab test to exclude this or to refer the child for specialist consultation".*

Furthermore, FFHO indicated during the KII that:

> *"Honestly, I feel that the problem is in the appropriate implementation of the guideline. I mean we start iron supplements in a proper age. The examination is also supposed to be done on the age of one year which is also appropriate, and the follow up is done in a suitable way, but the implementation is the one that has a problem, whether at the point of iron supplementation or what accompanies it".*

According to the documentation, it was found that it was carried out in a regular manner for every provided session as well as the appropriate documentation of the next session appointment was done in about three-quarter of the checked medical records (73%). Also, in the majority of medical records (79%) the researcher found effective documentation of the given instructions to patients and families.

Furthermore, the medical record was used to communicate the assessment and plan of care to the health care team in more than three-quarter of the files (76%), while follow-up notes that permits making comparisons and tracking the improvement or deterioration in the health status of the patient over time were written in a less than two-thirds (65%) of the checked medical records. Improving the quality of patient record documentation is highly recommended.

In the workplace, there is an increase awareness that productivity and effectiveness are linked to team-based work. Multidisciplinary team working refers to a group of people with varied but complimentary experience, qualifications and skills that contribute to the achievement of an organization's goals or objectives (Salas et al., 2000). Through the implementation of UNRWA family health team approach, each family is assigned to a specific multidisciplinary family health team staffed by doctors, midwives and nurses and all health care team members have a clear understanding of each other's roles and responsibilities to provide a holistic care with high quality to the refugee population (UNRWA, 2021). As shown in table (4.30), more than one half of medical records (57%) contain a documented a multi-disciplinary plan of care.

4.9 Program Evaluation through OECD-DAC Criteria Lenses

To appraise the degree of success in policy implementation to manage and control IDA among preschool children attending UNRWA health centers in the GS, the researcher adopted OECD-DAC criteria to understand factors supporting or hindering the IDA prevention and control program intended results. To assess policymaker and health manager prospective the following themes were used to analyze the KIIs of the qualitative part: relevance, coherence, efficiency, effectiveness, impact, and sustainability.

4.9.1 Relevance and Coherence

Palestine refugees are a highly vulnerable population as there is a growing rate of unemployment, poverty and food insecurity evolved from poor socioeconomic conditions, political division, and exposure to injuries from ongoing and acute conflicts from Israeli occupation, closure and the difficult living conditions experienced within refugee camps which contributed in creating unique and continuously evolving contexts.

The evaluation found that IDA prevention and control program is deemed as a relevant and appropriate as it continuously revised to respond to the emerging needs of Palestine refugee. However, gaps remain between policy and proper implementation of the service on reality in practice. This finding was further consolidated during KII with FFHO when she mentioned: *"This topic was exhausted through research and investigation and we wish to find a solution for it"* she added:

> *"Even before I received this post, the level of anemia among children is very high in Gaza. Globally, if we are talking about prevalence of more than 20% in a community it is considered major public health problem. But we have a prevalence of children with anemia at one year at least 70% which is a high percentage".*

She further explained:

> *"The percentage is high despite the fact that we give iron according to the latest WHO national guideline. The response is still not satisfactory because the treatment of anemia doesn't include iron supplementation alone, there is other factors like diversification of diet, food fortification as well as public health strategies such as sanitation and deworming. These things are not implemented and are beyond our capacity although it's mentioned in our technical instructions and guidelines".*

Externally, IDA prevention and control program is coherent with relevant agency and UNRWA health partners as well as to MoH policies. This was further elucidated by FFHO who stated that:

"At a high-level there is coordination between UNRWA and nutrition group cluster which includes MoH, WHO and NGOs institution like Save the Children, UNICEF, Ard-El-Insan and ANERA institutions on matters relating to nutritional counseling and iron supplementation".

Then she added:

"However, advocacy from local authorities to adopt supportive services is less effective. For example, in developed countries, governments supported fortified milk, flour and biscuits provided to children while there is poor advocacy of these strategies by the local authorities. We only focus in iron supplementation and nutritional counseling alone".

Similarly, north area AHO mentioned in this regard:

"In the GS, anemia among children is classified as major public health problem. A huge effort should be exerted in this issue. Since the day I was appointed to the agency as a doctor, they worked on anemia management and how to improve IDA, but there was no real impact or real result of the work that was being done. This is because of lack of the systematic approach and the lack of proper coordination with the national policy maker".

Then he further explained:

"Honestly, in the past, the agency holds a concept of no sharing of health data information. The agency was very difficult in this regard. But now the situation is different, there is the possibility to share patient data, profile and medical record with another stakeholder, especially with MoH. The issue has become easier than the first. This was one of the most important reasons why there wasn't progress in anemia management in the past".

Then he added:

"In addition, one of the weak points in anemia management policy is the absent of a unified protocols for the treatment of anemia applied in the whole country, not just a protocol specific to the agency".

4.9.2 Efficiency

Since 2018, UNRWA has experienced a significant funding crisis which has its impact upon sufficient resources available for UNRWA health services, making it challenging to efficiently implement high-quality of services including IDA prevention and control program. Across all UNRWA health managers interviewed, there were agreement that they do not have enough health staff to meet the needs of the served refugee population. Since UNRWA's funding crisis, the health department was unable to replace staff who are turned over with a permanent staff, so they coped by hiring temporary staff to cover the gaps. Many medical officers and nurses have to bear the extra workload and burdens with a risk of burned-out. This was consolidated during KII with FFHO as she said:

> *"It's well known that UNRWA has a financial crisis. Since 2018, when the financial crisis appeared and there was no new hiring which affected the quality of service provided due to shortage in manpower. We (especially our chief Dr. Ghada) were in an ongoing war to recognize the norms till the higher management admitted that we really need to about 81 doctors and 120 nurses to fill the gap".*

She also added:

> *"This problem is not only affecting service delivery, but also resulted in training restrictions. You don't always have a fund to do training. Besides, even if I want to conduct training, I don't have a staff to replace those who work in the clinic".*

Moreover, the FFHO pointed to the lack of important lab investigation within UNRWA health centers that aid in anemia management among children including transferittin level. She stated in this regard:

> "*We only have in our clinics the CBC and electrophoresis device. We are faced several times in cases whose blood was in the border line and remained unclear whether it is thalassemia or not, even after conducting Hb A2, we keep doubting. We are supposed to have transferittin level, but this is also not available in our laboratory. If we want to go beyond thalassemia, you need to go to a gene study outside the clinic. This is only conducted in Gene laboratory and in the Islamic University, which cost 400 shekels. So, no one do it".*

Furthermore, FFHO mentioned that the financial problem also has its effect at the higher management level due to scarcity on management team who are responsible to response to the evolving needs and high expectations of the growing populations externally, and financial and staff resource constraints internally. She stated:

> *"I am responsible for pregnant women, children and school health. Sometimes I focus on one dimension, but you should pay attentions to all issues at the same time. But in fact, the size of work and the needs of people in Gaza is huge in the face of scarcity of resources available"*.

It worth mentioning that health department consist of three levels of management: field office, area office, and health centers senior staff. The chain of communication is directed from the field office onto the area office, and then to the head of centers in a top-down manner. Communication between different level of management appeared to be weak and lack of systemize approach. The north area AHO stated in this regard:

> "*Field health officer is responsible for technical supervision. Honestly, they are doing technical supervision, but from my point of view, it's not enough because their visits to clinics are not frequent".*

He then added:

> *"There is no clear, systemized, solid, and concrete link between the different supervisors. For example, there is no link between me as the AHO manager, and between FFHO and FNO. The three of us must jointly discuss how to tackle anemia management among children with the concerned staff"*.

He further explained:

> *"For example, if the FNO decided to visit any clinic to follow up anemia, she could coordinate with me before that to make pre-agreement points to what we need to focus on during the supervision visit. This approach is more fruitful than individualized approach".*

Moreover, he emphasis in the importance of regular monitoring and supervision as he declared:

> *"We must always monitor the issue related to end user. We should check and match between the information that the client should receive and the information that was given to them by the health providers. In my opinion, we do it from time to time, but not regularly".*

This was in line to what was mentioned by Rimal SMO when she was asked about ways to improve anemia management within UNRWA health center. She stated:

> *"We need to focus in effective supervision, reduce accountability, and improve the process to be more streamlining. There must be more regular supervision from the direct supervisor and at the higher-level management, with more frequent feedback to the frontline operational healthcare providers".*

4.9.3 Effectiveness and Impact

Effectiveness is a measure of the extent to which IDA prevention and control program achieve the program planned results and the desired outcome. While the impact measures changes whether positive or negative, directly or indirectly, intended or unintended, primary or secondary long-term effects brought about by applying IDA prevention and control program within UNRWA health centers.

In accordance to the perceptions of the interviewed refugee mothers of anemic children and UNRWA staff as to whether health outcomes have improved after using UNRWA IDA prevention and control program, the majority agreed about the effectiveness of the applied program in reducing the prevalence of anemia but the gaps a raised from the proper implementation of the program either from health providers side or from beneficiaries' aspects. However, it is important to recognize the impact of conditions in which people are born, grow, work, live and age on health outcomes. According to the WHO, these social determinants can be more important than health care programs in influencing people health (WHO, 2008). In this context, the high vulnerability of refugee population who are facing different kind of difficulties including poverty, conflict, food insecurity and poor housing conditions has impacted the degree of effectiveness of UNRWA IDA management program.

This was consolidated during KIIs with health managers when they were asked about the effectiveness of anemia control program. Across all interviews, there were agreement in the effectiveness of the program if there was proper compliance from health care providers to the health instructions along with the proper adherence of beneficiaries to the instructions given. In addition, there were agreement of lack of effective counseling conducted during the health session which contributes to the poor adherence of the given instructions by the beneficiaries. This was described by north area AHO as: *"I feel like the health care providers were vomiting out some information. There was no feeling or reflection on it. People were not convinced".* He also mentioned:

> *"On the technical level, anemia management wasn't conducted in a propriate way, because the most important thing in treating anemia is counseling. Honestly speaking, the health care providers at the clinic level don't do proper counseling".*

This was also in line with Rimal UNRWA health center SMO who stated:

> *"There is a big gap in the effective counsel. I mean, I keep talking to the employees, especially the nurses to do good counseling with the clients. I see this on my own eyes, the health care providers were talking to the woman with no eye contact".*

While FNO mentioned in this regard:

> *"Our anemia management program is definitely effective, because as long as the child is under focus from the service provider, he will notice the improvement. But we shouldn't neglect the impact of other factors, we can't deny that Gaza has very bad socioeconomic which affects IDA management. Another thing that plays a role is the extent of parents' knowledge of the proper nutrition of the child. I believe that continuous health awareness will have an impact, but it takes time".*

In addition, the integration of mental health psychosocial support services (MHPSS) was considered as an effective gain. After the success of mental health support groups conducted in NCD services, the higher manager transfers the experience to other realm including the child health care. In this regard, the FFHO stated:

"UNRWA is pioneer in integration mental health in PHC services. Among the people we focus on are the mothers of children who have IDA and didn't improve, because mental issues could play a key role in this issue, as the mother may be psychologically tired, stressed and does not give the appropriate care to her son. Therefore, we did group counseling, which includes 5 sessions that simulates those we conducted for NCD patient. Honestly, until now, we do not have any data because we newly start working on this subject, but it is promising as there are many children who entered group counseling who get better".

Concerning the monitoring system for anemia management, the majority of interviewed senior health staff stated the presence of a robust, effective and results-based monitoring system generated through the e-health. But the FFHO pointed to a weakness related to existence of performance indicators that assess progress in anemia management and affirmed that health program in Gaza field is working to ameliorate this point through developing a detailed excel sheet to assess different degree of anemia at specific age group to aid in following the affected cases and the progress of management per health center and for each health provider. In addition, an upgrading of the exist e-health system will be done in the future plans to give more accurate and segregated data regarding anemia management.

This was explained by FFHO as she stated:

"Currently there is a project to creating a new e-health because the existing version is old and there is no way to develop it more. The problem in the current e-health system is that it does not help me to follow up the child after the age of one year. So that I can't compare the blood percentage of the children at different ages".

Then she added:

"Currently, we are trying to develop an excel sheet to assess how many anemic children have improved and how many children were missed. Besides, a classification will be made to measure the percentage of mild, moderate, and severe cases for each age group separately".

Furthermore, to increase program effectiveness there are plans to enhance community awareness through investment in UNRWA electronic MCH application in smart phone through sending a reminder message through it. In addition, there was a suggestion from north area AHO to work more in effective community awareness through activation of outreach visits and the use of media to explain more about issues related to anemia. He mentioned in this regard:

> "*Not all people know about anemia, even most of those who know, they have many wrong information and false concepts related to anemia management. So, we should work on the community awareness in parallel with other health institution not just UNRWA*".

4.9.4 Sustainability

Since 1948, UNRWA has been responsible for the provision of a free of charge health services for Palestinian refugees including anemia prevention and control program. But in the recent years, a raised concerns about workforce and medicine supplies due to uncertainty around program budget following the financial crisis undermines the health program's sustainability.

Negative refugee perceptions about UNRWA health services may also affect its sustainability. Beneficiaries are aware of UNRWA's financial challenges and they had concerns regarding UNRWA's ability to meet their growing needs. For example, there is a negative perception that UNRWA provides free of charge medicines because they are of a poor quality. This was elucidated during FGDs with mother of anemic children as some of them mentioned that they bought specialized medication from the pharmacy because they are not sure about the effectiveness of UNRWA supplementations. Other participants stated that they use UNRWA services because they are the only option for those who cannot afford to access services elsewhere not because they are viewed as the best option available. This finding was further explained during KII with north area AHO who stated:

> *"There is a false perception from clients toward UNRWA health services. We found some clients, especially among those who are educated, who have misperception with regard to some health information, and this made them not very convinced about the health instructions they heard. This impedes the flow of information from healthcare providers and result in a conflict on information which avert proper implementation of health instructions"*.

UNRWA financial crisis that threatened the sustainability of health program has its effect on the health staff as well. The SMO of Rimal UNRWA health center mentioned in this regard:

> *"The general situation in the agency affects the staff morale. I mean, when they hear that the agency may not be able to pay their salaries at the end of the month, they feel job insecurity and become less motivated".*

Chapter Five

Conclusions and Recommendations

5.1 Conclusions

This study aimed to evaluate IDA management programs among preschool children attending UNRWA health centers in the GS by using a mixed method in order to enhance efficiency and effectiveness of these services and to provide policy makers and health care providers with recommendations that might help in reducing the prevalence of anemia among under-five refugee Palestinian children.

Perceptions about IDA among mothers of anemic children as well as how the mothers of anemic children react regarding the participation in IDA prevention and control health programs offered to them through UNRWA health centers in the GS were assessed using HBM. The study findings have shown that the majority of participants expressed a high perception level in the six domains of HBM except for perceived barrier domain which had the lowest reported score. This reflects that the majority of anemic mothers recognized the seriousness and severity of anemia among their children and its consequences if lifted unaddressed and believes that change would result in a valued outcome as they reported a higher perceived benefit score to overcome the perceived barriers and a high degree of confidence and willingness to perform a health action that would result in improving their child health condition when they come upon triggers or cues to adopt these health actions.

Additionally, the study findings revealed a statistically significant association between HBM domains and different sociodemographic variables including geographic location, mother education, mother and father occupation as well as to the percentage of monthly expenditure for food items per monthly income. Participants from Rafah governorate had significantly higher scores in perceived severity, perceived susceptibility, perceived benefits and cues to action domains while it had a lower score in perceived barriers domain. Besides a significantly higher perceived severity score was found among mothers of anemic children who lives outside the camps. In addition, participants with a higher educational level reported higher scores in perceived severity, perceived benefits, cues to action and perceived self-efficacy domains compared with mothers who attended lower educational level. Whereas employed mothers reported a higher score related to perceived benefit domain and lower scores in perceived barriers domain compared to unemployed women. Moreover, a

significantly higher perceived susceptibility score was obtained among family who expended more than 60% for food items per monthly income in comparison to families who expended 30%–60% or less than 30%.

Also, findings of the study revealed a statistically significant difference between HBM domains and different nutrition indices. Children with wasting had a significantly higher scores in the perceived susceptibility to anemia due to food insecurity-related factors whereas children with underweight and stunting status showed a statistically lower score in the perceived barriers to the availability of iron prevention and control service.

The findings also have revealed statistically significant correlations among the HBM constructs as well as correlations and logistic regression analysis was used and showed a significant association between perceived severity, perceived susceptibility, perceived barriers and perceived benefits domains with both cues to action domain and perceived self-efficacy domain.

With regard to the barriers to anemia management, the majority of the study participants indicated that they were facing problems in the affordability of iron rich diet because they are too expensive under the very difficult socioeconomic circumstances that they were living in. Besides many participants raised concerns related to acceptability of iron supplement drops derived from the reported side effect. Also, the majority of mothers acknowledged poor IYCF practices due to misconception derived from traditional and financial constraints which forced them to provide infants with complementary feeding and diets that is not suitable for the age of the child. Other factors such as the existence of communication gaps between health care providers and beneficiaries were considered as important factor that prevent effective utilization of UNRWA health services by many respondents.

Regarding the degree of compliance of health care providers to the existing UNRWA policy for management of childhood IDA including the implementation of screening and treatment technical guidelines, a medical review checklist was used. The study findings have revealed that the majority of medical records were accurate and had well documented essential information about the children health condition, growth, developmental, anthropometric measurements, follow up appointment, past medical history and appropriately detailed and focused physical examination relevant to the IDA problem. Moreover, the majority of medical records showed a documented prophylactic iron supplementation provided to

infants in timely manner and a documented screening for anemia using the Hb concentration test at the age of one year with the anemic children were treated with daily iron supplementation at a correct dose and duration according to UNRWA technical guidelines. Besides an appropriately conducted first follow up visit in accordance with technical guidelines were observed in the majority of medical records but a decrease in the degree of compliance in the subsequent visits was observed. On the other hand, referral to a specialist for further evaluation and treatment when anemia status did not respond to iron treatment was not documented in the majority of medical files as was the documentation of a multi-disciplinary plan of care. Whereas, follow up notes that permits making comparisons and tracking the improvement or deterioration in the health status of the patient over time were written in about two-third of the reviewed records.

Concerning policymaker and health manager prospective, OECD-DAC criteria themes were used to assess degree of success in implementation of health programs used to manage IDA among preschool children attending UNRWA health centers in the GS. The study findings revealed that IDA prevention and control program is deemed as a relevant and appropriate as it is continuously revised to respond to the emerging needs of Palestine refugee. However, gaps remain between policy and proper implementation of the service on reality as the prevalence and the improvement rate of IDA among refugee children are still high. Externally, IDA management program is coherent with relevant agency and UNRWA health partners but advocacy from local authorities to adopt supportive services is less effective, as the only focus in anemia management was on iron supplementation and nutritional counseling alone with less advocacy to the other strategies such as sanitation, deworming, community awareness, food fortification and diet diversification programs besides the absent of a unified protocols for the management of anemia that were applied in the whole country.

In addition, UNRWA funding crisis had its impact upon sufficient resources available for UNRWA health services, making it challenging to efficiently implement high-quality of services. Since UNRWA's funding crisis, the health department was suffering from shortage in permanent health staff and from training restrictions, so they coped by hiring temporary staff to cover the gaps as well as the current staff have to bear the extra workload and burdens which affected the quality of services provided to refugee population. Besides a reported

lack of important lab investigation such as transferittin level within UNRWA health centers had its effect on anemia management among refugee children.

Along with, the financial crisis undermines the health program's sustainability and had its effect on the higher management level due to scarcity on management team who are responsible to response to the evolving needs and high expectations of the growing populations externally, and financial and staff resource constraints internally. As well, beneficiaries are aware of UNRWA's financial challenges and they had concerns regarding UNRWA's ability to meet their growing needs.

Furthermore, despite the presence of a robust, effective and results-based monitoring system generated through the e-health, weakness related to lack of performance indicators that assess progress in anemia management was reported by health managers which was overcame through developing a detailed excel sheet to assess different degree of anemia at specific age group to follow the progress of anemia management per health center and per health provider.

Regarding the effectiveness of the applied program, finding of the study showed that the majority of health managers and beneficiaries considered it as appropriate but gaps exist in effective counseling between health care providers and caregivers which affect proper adherence to the instructions being given. Besides, it is well recognized that the social determinants of health had its impact in the effective implementation of health policies and programs to manage IDA among preschool children which includes the high vulnerability of refugee population who are facing different kind of difficulties including poverty, conflict, food insecurity, unemployment and poor housing conditions.

On the other hand, the integration of MHPSS program in PHC services provided by UNWA health centers was considered as an effective gain and promising as there are many children who entered group counseling get better.

But still, UNRWA financial crisis threatened the sustainability of health program and had its effect on the health staff morale as they hold a sense of job insecurity, making them less motivated with a risk of burned-out.

5.2 Recommendation

- In the light of our study, it's obvious that perceptions about IDA and measures for prevention and control it among young children were sufficient in the majority of respondents, but yet gaps still exist in achieving better progress in anemia management. Therefore, there is a need to establish educational sessions about the importance of good nutrition and proper implementation of IYCF practices to increase the community awareness about issues related to IDA prevention and management among young children.
- More efforts are needed by using innovative mechanisms to convince beneficiaries to demand the service by trying to integrate IDA prevention and control program into ongoing educational programs in kindergartens, schools and universities through cooperation with Ministry of Education.
- Endorse beneficiary's centeredness of service, by ensuring more participation in planning, implementation and evaluation of program as well as establishing a complaints system to guarantee community engagement in issues related to anemia management among their young children.
- Advocacy and behavior change communications interventions should be part in the integrated approach to anemia control programs. Thus, more efforts are needed through the usage of variety of channels and modern technology that have the best chances of uptake within and outside the health sector such as mass media, electronic and mobile technology, religious institutions and other community-based organizations to raise awareness of anemia's magnitude and its serious consequences which could enhance demand and compliance with iron supplements among population members.
- Urgent measures to mitigate barriers to the service integration includes enhancing effective counseling principles and creating a rapport trust-base relationship between healthcare providers and beneficiaries through bridging the reported communication gaps for better utilization of health services and encourage beneficiaries to be more adherence to the provided health instruction being given.
- It is important to ensure the existence of well established, continuous training programs for health staff especially those with temporary contract to be familiar with UNRWA protocols and technical instructions.

- UNRWA needs to develop more sustainable tools for regular monitoring to enhance and promote good practices, including provision of quality of services.
- To maximize the positive impact of health services, it is important to ensure continuous in-service training and capacity-building of health staff on IDA policy and programs and to keep them posted of latest updates to enhance their knowledge and skills about IDA prevention and control guidelines especially that related to follow up of cases and the use of appropriate referral channels to resistant cases when needed.
- There is a need to include clinic-level activities to enhance people perception that it really worth to wait to receive IDA preventive and control services through providing health messages and interventions especially in waiting areas such as in front of the lab services while the beneficiaries are waiting to obtain their lab results.
- There is a need to increase the awareness of healthcare professionals about the importance of multidisciplinary team and to have clear understanding of each other's roles and responsibilities to provide a holistic care with high quality.
- Improving communication between different level of management and between managers and frontline staff. As well as endorse effective supervision strategies with providing regular feedback about progress in management and ways for further improvement.
- Establishing networking between UNRWA, MoH, and local Community-based organization to raise the alarm of childhood anemia and to promote healthy eating habits and food diversification to prevent the development of anemia.
- Draw the attention of policy makers in the MoH about the need for adoption a unified protocol in anemia management with all relevant stakeholders and the importance of local authority's advocacy to implement supportive services such as food fortification, sanitation and deworming programs to combat anemia among young children.

5.3 Suggestions for Further Research

- A national survey should be conducted to estimate the prevalence of IDA among specific age categories that includes all community members. Data should be more segregated according to several sociodemographic variables.

- More and larger research is needed to evaluate anemia prevention and control programs provided by different stakeholders to identify bottlenecks that affect proper management of childhood anemia.
- A large scale in-depth qualitative study to evaluate other strategies adopted by UNRWA such as food fortification, sanitation and deworming programs.
- Conducting studies on specific areas on IDA management such as effective counselling, client satisfaction, and centeredness of care.

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Annexes

Annex (1): Study activities time table

Activity 2022	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March
Preparation of proposal	■	■													
Review literature		■	■												
Tool development			■	■											
Tool validation					■	■									
Tool revision and finalization						■	■								
Pilot study								■							
Quantitative data collection									■	■	■				
Qualitative data collection											■	■			
Data entry											■	■	■		
Data analysis												■	■	■	
Evaluation of results													■	■	
Writing & correction the thesis														■	■

Annex (2): Sample size calculation

Population survey or descriptive study
For simple random sampling, leave design effect and clusters equal to 1.

Population size:	131,108
Expected frequency:	50 %
Acceptable Margin of Error:	5 %
Design effect:	1.0
Clusters:	1

Confidence Level	Cluster Size	Total Sample
80%	**164**	**164**
90%	**270**	**270**
95%	**384**	**384**
97%	**471**	**471**
99%	**663**	**663**
99.9%	**1082**	**1082**
99.99%	**1512**	**1512**

Annex (3): Official letter of approval for the Helsinki committee in the Gaza Strip

المجلس الفلسطيني للبحث الصحي
Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار
Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee
For Ethical Approval

Date: 07/02/2022 **Number:** PHRC/HC/1148/22

Name: Walaa Sabri Salama الاسم:

We would like to inform you that the committee had discussed the proposal of your study about: نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:

Assessment of Iron Deficiency Anemia Management Among Preschool Children Attending UNRWA Health Centers in the Gaza Strip: A Mixed-Study Approach

The committee has decided to approve the above mentioned research. Approval number PHRC/HC/1148/22 in its meeting on 07/02/2022 و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member **Member**

Chairman

Genral Conditions:-
1. Valid for 2 years from the date of approval.
2. It is necessary to notify the committee of any change in the approved study protocol.
3. The committee appreciates receiving a copy of your final research when completed.

Specific Conditions:-

E-Mail:pal.phrc@gmail.com
Gaza - Palestine

Annex (4): Consent form for this study

Consent for Participation in Interview Research

I volunteer to participate in a research study conducted by Walaa Salama from Al-Quds University. I understand that the study is designed to gather information for evaluation of interventional programs to improve childhood anemia in Gaza Strip. I will be one of approximately 400 mothers of child age 6-59 month who have anemia interviewed for this research.

My participation in this research is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time without penalty.

I understand that most interviewees in will find the discussion interesting and thought-provoking. If, however, I feel uncomfortable in any way during the interview session, I have the right to decline to answer any question or to end the interview.

The interview will last approximately 15-30 minutes. Notes will be written during the interview. An audio tape of the interview and subsequent dialogue will be made.

I understand that the researcher will not identify me by name in any reports using information obtained from this interview, and that my confidentiality as a participant in this study will remain secure. Subsequent uses of records and data will be subject to standard data use policies which protect the anonymity of individuals and institutions.

I confirm that I have read and understood the information about the study as provided above and that I have been given a copy of this consent form.

My Signature _____ Date _____

My Printed Name _____

Signature of the Investigator _____

For further information, please contact:

Dr. Walaa S. Salama;

Al-Quds University;

School of Public Health;

Policies and Health Management

عزيزتي المشاركة

يسعدني مشاركتك الفاعلة في بحث بعنوان

Evaluation of Iron Deficiency Anemia Management among Preschool Children Attending UNRWA Health Centers in the Gaza Strip: A Mixed-Study Approach

دراسة مختلطة لتقييم برامج فقر الدم الناتجة عن نقص الحديد بين الأطفال دون الخامسة في عيادات وكالة الغوث وتشغيل اللاجئين في قطاع غزة

أنا الباحثة ولاء صبري سلامة أقوم بجمع البيانات من أجل البحث الخاص بي والذي سيقدم للحصول على درجة الماجستير من كلية الصحة العامة/ سياسات صحية- جودة وسلامة المرضي - جامعة القدس (أبوديس).

حيث أنك من الفئة المستهدفة للبحث وهي "أمهات الأطفال دون الخامسة الذين يعانون من فقر الدم الناتجة عن نقص الحديد في عيادات وكالة الغوث وتشغيل اللاجئين في قطاع غزة " " فانه من دواعي سروري أن تكون أحد المشاركين في هذه الدراسة التي تم اختيارك بها بطريقة عشوائية وإن مشاركتك في البحث هامة بالنسبة لي

إذا كنت موافقة على المشاركة في هذه الدراسة، يرجى التكرم بقراءة العبارات التالية بدّقة والإجابة عنها بموضوعية لما في ذلك من أثرٍ كبير على صحة النتائج والتوصيات التي ستتوصل إليها الباحثة. مع التأكيد بأن هذه البيانات سوف تستخدم لأغراض البحث العلمي فقط، وسيتم التعامل معها بسرية تامة

ملاحظة / الوقت اللازم لتعبئة الاستبانة كاملة يستغرق من 15-30 دقيقة فقط كما أن مشاركتك في الدراسة طوعية ويحق لك القبول أو الرفض أو حتى الانسحاب في أي وقت.

السرية مكفولة ولن يتم سؤالك عن اسمك كما أن إجاباتك لن تؤثر على الخدمات التي تتلقيها.

أشكرك على حسن تعاونك

الباحثة

ولاء صبري سلامة

كلية الصحة العامة – جامعة القدس (أبوديس)

Annex (5): Interviewed Structured Questionnaire

Interviewed Structured Questionnaire

PART (A): Sample demographics, socioeconomic, and health-related factors for the mother and the anemic child

1- What is the name of PHC health center you attend? ……...
2- Residency (Governorate) □ North Gaza □ Gaza □ Middle-area □ Khan-Younis □ Rafah
3-Residency in relation to camps □ Inside camp □ Outside camp
4- What type of dwelling unit are you living in? □ Villa □ House □ Apartment □Tent □ Marginal\Caravan\Barracks
5- What is the family type you are living with? □ Nuclear Family □Extended Family
6- Mother's Age ……. years
7- Marital age …… years
8- Father's age ……. years
9- Consanguinity of couples □ 1st degree (1st cousin) □ 2nd degree (2nd cousin) □ No relation
10- Mother's educational level □ Illiterate □ Primary □ Preparatory □ Secondary □ Higher education
11- Mother's occupation □ Housewife □ Employed in the public sector □ Employed in the private sector □ Employed in NGOs □ Self-employed
12- Father's occupation □ unemployed □ Employed in the public sector □ Employed in the private sector □ Employed in NGOs □ Self-employed
13- Monthly Family income in NIS from all sources …….. NIS
14- Average monthly expenditure on food items in NIS ……… NIS
15- Household size ……
16- Age of child with anemia ……..…… months **17- Date of Birth (DOB) ……D/……M/……. Y**
18- Gender of the child with anemia □ Male □ Female
19- The child weight and Height: Weight (Kg) ……. Height (cm) ……..
20- The child weight at birth: Weight (Kg) …….

Part(B): Health Belief Model

I am going to ask you some questions about anaemia and iron-rich foods. Please let me know if you need me to clarify any of my questions. Feel free to ask any questions you may have.

part (II): Health belief model *(For each of the below statement, please select one of the five options: 1=Strongly disagree 2= Disagree 3-Natural 4=Agree 5=Strongly agree)*						
Items		**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1) Perceived severity						
A) Perceived Severity of anemia among children	**1.** I believe that anemia among children is a severe health problem in general that need intervention					
	2. If my child anemia doesn't improve, he will get sick					
	3. If my child anemia doesn't improve, he may die					
B) Perceived Severity of not using anemia prevention and control program I feel that without this service my child	**4.** Won't be able to have normal growth pattern					
	5. Won't be able to have normal physical development					
	6. Won't be able to have normal mental development					
	7. Will have a diminished cognitive ability					
	8. Will have behavioral problems					
	9. Will have a shorter attention span					
	10. Will be irritable					
	11. Will be more likely to become sick (less immunity to infections)					
	12. Will be craving to eat non-food items like ice, dirt, paint or starch.					
	13. Will lack of energy and fatigue					
	14. Nails will become brittle					
	15. Will have a pale face and his tongue will look redder than normal with cracks on the side of the mouth.					

2) Perceived susceptibility ***My child could become susceptible to being anemic if:***						
A) Mother related factors	**16.** I am suffering from chronic illness that affect my ability to take care of him/her					
	17. If I had too many children, it may affect my ability to pay more attention and care to my child health and nutrition					
	18. If there is short space between my pregnancies					
	19. I was anemic (has low HB level) during my pregnancy with my anemic child					
	20. There is a family history of hereditary blood disease					
	21. I suffered from adverse events while I was pregnant with my child					

B) Child related factors	**22.** The child was born before 37-week gestation (premature)					
	23. The child suffers from chronic disease					
	24. The child suffers from more than three frequent loose stool in the day (diarrhea)					
	25. The child suffers from parasitic infestation					
	26. The child complains from chronic bowel inflammation and malabsorption disorders					
C) Hygiene related Factors	**27.** Household don't have improved latrine (toilet)					
	28. Household don't have improved handwashing facility with water and soap					
	29. We don't utilize a good type of toilet facility					
	30. We don't take the deworming medication in regular base					
D) Nutritional related factors	**31.** I feed my child an exclusive breastfeeding (only breast milk in the first 6 months of life)					
	32. I didn't introduce to my child after age 6 months timely complementary feeding (Age-appropriate complementary feeding)					
	33. The child diet contains an excess amount of milk, which is a poor source of iron					
	34. My child didn't receive an iron-rich or iron-fortified food that is specially designed for infants and young children					
	35. The child diet contains beverages that could decrease iron absorption when taken with meals such as tea and milk					
	36. My child diet not containing foods that help the body absorb and use iron (such as vitamin-C-rich foods and fresh citrus fruits like orange, lemons, etc.)					
	37. The child diet is poor of iron					
<u>Lack of iron-rich foods</u> **38.** From the list of food given, the kind of iron rich food you could afford to feed your child regularly	- Organ meat (such as Liver, Kidney, Heart)					
	- Flesh meat (such as Beef, Goat, Rabbit, Dove, Chicken, Duck)					
	- Fish and seafood					
	- Eggs					
	- Nuts					
	- Dried fruit					
	- Iron-fortified bread					
	- Iron-fortified breakfast cereal					
	- Legumes (such as beans, lentils, chickpeas)					
	- Dark leafy green vegetables (spinach, broccoli)					
	- Oats					
<u>Minimum dietary diversity (MDD)</u> **39.** From the eight food groups listed below, the food that your anemic child consumes in regular and daily basis:	- Breast milk					
	- Grains, roots, and tubers					
	- Legumes and nuts					
	- Dairy products					
	- Flesh foods					
	- Eggs					
	- Vitamin A rich fruits and vegetables					
	- Other fruits and vegetables					
<u>Minimum meal frequency (MMF)</u> **40.** The number of times the child receives solid, semi-solid, or soft foods is	- 1 time					
	- 2 times					
	- 3 times					
	- More than 3 times					

E) Factors related to food insecurity **Household Food Insecurity Experience Scale (HFIES)** **41.** During the last 12 months (because of lack of money or other resources) was there a time when:	- You were worried that you and your family would not have enough food to eat?					
	- You and your family were unable to eat healthy and nutritious food?					
	- You and your family ate only a few kinds of foods?					
	- You and your family had to skip a meal?					
	- You and your family ate less than you thought you should?					
	- Your family household ran out of food?					
	- You and your family were hungry but did not eat?					
	- You went without eating for a whole day?					

3) Perceived barriers						
A) Availability and affordability of iron rich diet	**42.** I don't buy beverages, foods, and snacks rich in iron because they are too expensive					
	43. I don't prepare iron rich food because grocery shopping and preparing healthy foods would take up too much of my time					
	44. I don't prepare iron rich food because I don't know where to find accurate information about achieving and maintaining a healthy diet rich in iron					
	45. I don't prepare iron rich food because I don't know how to prepare healthy beverages, foods, or snacks.					
B) Availability of iron prevention and control services I don't utilize iron prevention and control services from the clinic due to	**46.** Inappropriate designated health center building					
	47. Lack of appropriate waiting area					
	48. Inadequate seating space					
	49. Inappropriate separate areas for consultation and examination with sufficient privacy					
	50. Inappropriate health center facility for electricity					
	51. Inadequate natural light and ventilation					
	52. Inadequate toilets with water supply					
	53. Shortage of appropriately-trained health personnel					
	54. Health centers don't have nutritionists available to explain more					
	55. Lack of health awareness material that provide me with information I need to take care of my child nutrition and diet					
	56. Iron supplementation drops is not always present in the health center					
	57. Lack of appropriate lab service that provide accurate HB blood test to diagnose and follow my child condition					
C) Accessibility of iron prevention and control services I don't utilize iron prevention and control services from the clinic due to	**58.** It is not easy to reach the health center because the health center is far from my residence					
	59. It cost me a lot (money, time and effort) to reach the health center					
	60. I don't know that the health center provides iron prevention and control services					
	61. I do not know where to go for questions					
	62. Provider office is not welcoming					
	63. Providers are not trustworthy					
	64. Providers do not understand and respect my beliefs and culture					
	65. Unfair treatment due to gender/ educational level/ social class					

	66. The working hours in the clinic is not appropriate for me due to my family/work responsibilities					
	67. It takes me too much time to receive the service from the clinic					
D) Acceptability barriers	**68.** I do not have any motivation to adopt healthy eating for my family					
	69. We enjoy eating fried foods and snacks more than healthy and iron rich food					
	70. From my perspective, Ferrous Sulfate is not very effective for treating anemia due to its side effects					
	71. I don't use Ferrous Sulfate because it causes gastrointestinal upset					
	72. I don't use Ferrous Sulfate because it causes staining of teeth					
	73. I prefer not to give iron supplementation due to poor taste and resultant difficulty in administering it to my child					
	74. I am not very adherent to iron supplement because I want to minimize my child's negative or traumatic experiences related to both therapy and ongoing follow-up care					
	75. I prefer to prevent and treat my child with a well-balanced diet					
E) Contact barriers Unclear and Limited Health Information Received from Health Providers	**76.** I was not given full explanation, in clear language about the benefits of iron supplement to prevent IDA when my child was 6 months old					
	77. I was not provided with clear information on my child health condition and the aim of Hb screening during my child first birthday visit					
	78. I was not provided with clear information on my child Hb result					
	79. I was not provided with clear information on my child diagnosis?					
	80. I was not provided with clear information about the rational of iron supplement use to treat my child condition when he was diagnosed to have anemia					
	81. I was not involved in preparing the treatment plan of my anemic child					
	82. I was not directed for the proper ways that enhance iron absorption					
	83. I was not educated about food and beverage that prevent iron absorption such as tea and dairy products					
	84. I was not given instruction on how to improve my child's diet					
F) Effective coverage barriers	**85.** The health care provider is not respectful					
	86. From my perspective, the time I spent with the health provider is not enough.					
	87. The health provider not always evaluate my child treatment plan and modify it when needed.					
	88. The health provider doesn't do a monthly follow up HB test to follow the progress of my child health condition and doesn't explain the progress in my child HB level clearly.					
	89. The health provider doesn't make me feel comfortable asking questions about my child's health					

	90. The health care provider doesn't use simple language and doesn't give simple information and advice that can be easily remembered					
	91. The health care provider doesn't check what is practical and possible for me to do regarding my child's nutrition					
	92. I was not informed about the adverse effects of the iron drops					
	93. I was not informed about the duration of drug use					
	94. I was not informed about the drug dose					
	95. The health care provider doesn't set a date for the next appointment for follow-up					
	96. I don't always attend to the health center in the agreed appointment					
	97. I am not adherent to the prescribed iron drops as being told by the health care provider					
	98. I don't apply the received instruction as being told					
	99. The health services that I received from the clinic didn't meet my expectations					
	100. The health services that I received from the clinic didn't meet my child's needs					
	101. I am not satisfied with the care provided to my child from the health center					

4) Perceived benefits						
A) Perceived benefits from prophylaxis iron supplementation	**102.** Prevent the development of iron deficiency anemia					
	103. Prevent the development of long-lasting diminished mental functioning					
	104. Prevent the development of long-lasting diminished psychomotor and cognitive developments					
	105. Prevent the development of long-lasting diminished behavioral functioning					
	106. Prevent the development of long-lasting diminished motor functioning					
	107. Prevent the development of long-lasting diminished growth and developmental functioning					
	108. Improve the long-term productivity of my children					
B) It would benefit my child to be more adherence to iron drop treatment regimen to	**109.** Increase his/her chances of having good health now and in the future					
	110. Improve skin color					
	111. Feel more energetic					
	112. Will be less likely to become sick (more immune to infections)					
	113. Become less pica					

5) Cue to action *I would adopt healthy eating and be more adherent to iron treatment if:*						
Internal cues	**114.** Health care providers acknowledging me that I have a choice in therapy decisions (autonomy)					
	115. Health care providers consider alternative treatment approaches for me based on my individual values and preferences					

	116. Health care providers highlighting my sense of parent-child connection (relatedness)					
	117. I feel that I have the ability to successfully give iron therapy (competence).					
	118. Received extra medical care and support					
	119. A child of a close friend developed a serious health problem due to anemia					
External cues	**120.** A family member or close friend advised me to eat a well-balanced iron rich diet.					
	121. The health care provider emphasis in the importance of implementation of his medical orders to benefit my child state of health.					
	122. The health care provider emphasis in the importance of the regular follow up in the clinic to improve my child health.					
	123. The health care provider emphasis in the importance of iron supplement intake according to the prescribed dose and period					
	124. The health care provider emphasis in the importance of doing the recommended follow up HB exams.					
	125. Improving communication channels between caregiver and health care provider					
	126. I was presented information in radio, television or social media website about the health risk of anemia among young children					
	127. A family member or close friend informed me about the benefits of iron therapy					
	128. Receive Medical Brochure especially designated to inform me about the best ways to enhance my child diet and health					
	129. Provide me with health awareness session inside the clinic through a trained health staff to enhance my child diet and health					

6) Perceived self-efficacy						
A) General self-efficacy scale	**130.** I can always manage to solve the anemic status of my child if I try hard enough					
	131. If something opposes me, I can find the means and ways to improve my child health					
	132. It is easy for me to stick to my aims and enhance my child health					
	133. I am confident that I could deal efficiently with unexpected events					
	134. Thanks to my resourcefulness, I know how to handle unforeseen situations to enhance my child health					
	135. I can solve most problems if I invest the necessary effort to improve my child health condition					
	136. I can remain calm when facing difficulties to improve my child health condition because I can rely on my coping abilities					
	137. When I am confronted with a problem related to my child health, I can usually find several solutions					
	138. If I am in trouble regarding adherence to my child treatment, I can usually think of a solution					

	139. I can usually handle whatever comes my way to improve my child health					
B) Perceived self-efficacy in dieting	**140.** I can feed iron-rich foods and having a diet rich in iron					
	141. I can give Vitamin-C-rich foods during or right after meals					
	142. I can halt the beverage that prevent iron absorption from my child diet such as tea during or right after the meal					
	143. I feel confident in preparing meals with iron-rich foods					
	144. I like the taste of iron-rich food					
	145. We can eat fresh food rather than processed one					
C) Perceived self-efficacy in iron supplement treatment	**146.** I can give iron supplements when prescribed					
	147. I feel confident that if I give supplement to my child, he will improve					
	148. I can follow the health provider advices related to iron treatment					
	149. I can be more adherent to Hb follow up test to improve my child health					
	150. I can be more adherent to follow up visit appointment					

Annex (6): Questionnaire (Arabic Version)

أنيميا نقص الحديد

سوف أسألك بعض الأسئلة عن موضوع الأنيميا والأغذية الغنية بالحديد. من فضلك أعلميني إذا كنت تحتاجين مني أن أوضح أي سؤال من الأسئلة التالية

الجزء الأول: معلومات حول الوضع الاجتماعي والاقتصادي للأسرة
1- ما اسم المركز الصحي التابع لمراكز الرعاية الأولية الذي ترتادين عليه؟ .....
2- مكان السكن (حسب المحافظة) □ محافظة شمال غزة □ محافظة غزة □ محافظات وسط غزة □ محافظة خانيونس □ محافظة رفح
3- مكان السكن بالنسبة للمخيمات □ داخل المخيمات □ خارج المخيمات
4- ما نوع الوحدة السكنّية التي تعّيشون فيها حالّيا؟ □ فيلا □ منزل □ شقة □ خيمة □ الهوامش/ منزل متنقل/ باراكس
5- ما طبيعة العائلة التي تعيشون فيها □ عائلة نووية □ عائلة ممتدة
6- عمر الأم ..... سنة
7- عمر الأم عند الزواج..... سنة
8- عمر الزوج ..... سنة
9- هل أنت وزوجك أقارب □ أقارب درجة أولى □ أقارب درجة ثانية □ لا يوجد صلة قرابة
10- درجة التحصيل العلمي للأم □ غير متعلم □ ابتدائي □ إعدادي □ ثانوي □ جامعة □ تعلّيم عالي
11- مهنة الأم □ العمل للحساب الخاص □ موظفة في المؤسسات الغير حكومية □ موظفة في القطاع الخاص □ موظفة في القطاع العام □ ربة منزل
12- مهنة الزوج □ العمل للحساب الخاص □ موظف في المؤسسات الغير حكومية □ موظف في القطاع الخاص □ موظف في القطاع العام □ عاطل عن العمل
13- متوسط دخل الأسرة الشهري من جميع المصادر بالشيكل..... شيكل
14- متوسط الإنفاق الشهري على المواد الغذائية (بالشيكل) ..... شيكل
15- عدد أفراد الأسرة.....
16- عمر الطفل المصاب بفقر الدم (فحص الدم HB أقل من 11) ..... شهر
17 تاريخ ميلاد الطفل المصاب بفقر الدم .....يوم/.....شهر/.....سنة
18- جنس الطفل المصاب بفقر الدم: □ ذكر □ أنثي
19- طول ووزن الطفل المصاب بفقر الدم الطول..... (سم). الوزن ..... (بالكيلوجرام)
20- وزن الطفل عند الولادة الوزن..... (بالكيلوجرام)

<u>الجزء الثاني: نموذج المعتقد الصحي</u> *لكل فقرة مذكورة في الجدول أرجو اختيار أحد الإجابات الخمسة المذكورة: 1= لا أوافق بشدة، 2= لا أوافق، 3= محايد، 4= أوافق، 5= أوافق بشدة*

البنود		لا أوافق بشدة	لا أوافق	محايد	أوافق	أوافق بشدة
1) إدراك الخطورة						
أ) ما مدي تصورك لدرجة خطورة إصابة طفلك بفقر الدم	**1-** بشكل عام، أنا أؤمن أن إصابة الطفل بفقر الدم هي مشكلة صحية خطيرة تحتاج إلى تدخل صحي					
	2- إذا لم أقم بعلاج مشكلة فقر الدم لدي طفلي فسوف تتدهور حالته الصحية					
	3- إذا لم أقم بعلاج مشكلة فقر الدم لدي طفلي ربما يؤذي ذلك إلى وفاته					
ب) درجة الخطورة المتصورة من عدم تلقي خدمة مكافحة وعلاج فقر الدم أنا أشعر بدون تلقي هذه الخدمة فإن طفلي سيعاني من الأمور التالية:	**4-** لن يستطيع النمو بطريقة طبيعية مثل الأطفال الأخرين في عمره					
	5- لن يستطيع التطور بطريقة طبيعية مثل الأطفال الأخرين في عمره					
	6- لن يستطيع الحصول على التطور النفسي الطبيعي مثل بقية الأطفال في عمره					
	7- لن تتطور مهاراته العقلية والفكرية مثل بقية الأطفال في عمره					
	8- قد يؤدي ذلك لحدوث اضطرابات سلوكية لديه					
	9- سيصبح لديه قدرة أقل على التركيز					
	10- سيصبح أكثر توترا					
	11- ستصبح مناعته أضعف، وبالتالي سيصبح أكثر عرضة للإصابة بالأمراض المعدية					
	12- ستصبح لديه الرغبة في تناول أشياء ليست طعاماً (مثل الثلج أو الطين أو مواد الطلاء أو أشياء غريبة أخرى)					
	13- سيصاب بالهزال والضعف والشعور بالدوخة من أقل مجهود يمارسه					
	14- ستصبح أظافره هشة وأكثر عرضة للتكسر					
	15- سيصبح وجهه شاحب مع احمرار اللسان ووجود تشققات على أطراف فمه					

2) إدراك القابلية *من وجهة نظري أعتقد أن العوامل التالية قد تزيد من احتمالية إصابة طفلي بفقر الدم*						
أ) عوامل لها علاقة بالأم	**16-** إذا كنت مصابة بمرض مزمن يمنعني من تقديم الرعاية الكافية لطفلي					
	17- إذا كان لدي العديد من الأطفال، لن أستطيع الاهتمام وتقديم الرعاية المناسبة للحفاظ على صحة وتغذية طفلي					
	18- إذا كانت الفترات متقاربة بين حمولاتي السابقة					
	19- إذا كنت مصابة بفقر الدم أثناء فترة حملي بطفلي المصاب					
	20- إذا كان هناك تاريخ مرضي في العائلة للإصابة بفقر الدم					
	21- إذا عانيت من مضاعفات صحية أثناء فترة حملي بالطفل المصاب					
ب) عوامل لها علاقة بالطفل	**22-** إذا كانت ولادة الطفل المصاب بفقر الدم ولادة مبكرة (قبل انتهاء الأسبوع 37 من الحمل)					
	23- إذا كان الطفل يعاني من مرض مزمن					
	24- إذا كان الطفل يعاني من اسهال متكرر (براز لين أكثر من ثلاث مرات في اليوم)					
	25- إذا كان الطفل يعاني من عدوي طفيلية مثل الإصابة بالديدان					
	26- إذا كان الطفل يعاني من أمراض سوء الامتصاص والالتهاب المزمن في القولون					
	27- إذا لم يكن هناك دورة مياه صالحة للاستعمال في المنزل					

ج) عوامل لها علاقة بالنظافة الشخصية	**28-** إذا لم تتوفر لدينا وسائل غسل اليدين المناسبة باستعمال الماء والصابون					
	29- إذا لم نستعمل نوع جيد للصرف الصحي في المنزل					
	30- إذا لم تقم العائلة باستخدام الأدوية الخاصة بمكافحة الديدان بصورة دورية					
د) عوامل لها علاقة بالتغذية	**31-** إذا أرضعت طفلي رضاعة طبيعية خالصة (أي حليب الثدي فقط بدون طعام أو شراب إضافي في أول ست شهور من عمره)					
	32- إذا لم أقم بإدخال الأطعمة التكميلية لطفلي بعد عمر 6 أشهر (بما يتناسب مع عمره)					
	33- إذا تناول طفلي الكثير من الحليب الذي يعد من الأغذية التي تفتقر لعنصر الحديد					
	34- إذا لم يتناول طفلي أغذية مدعمة بالحديد مخصصة لتغذية الأطفال والرضع					
	35- إذا تناول طفلي أثناء الوجبة الغذائية مشروبات تقلل من عملية امتصاص الحديد مثل الشاي والحليب					
	36- إذا لم يتناول طفلي الأغذية التي تساعد الجسم على امتصاص الحديد عند تناوله للوجبة مثل الحمضيات كالليمون والبرتقال والأطعمة الغنية بفيتامين C					
	37- إذا كانت الأغذية التي يتناولها طفلي تفتقر لعنصر الحديد					
<u>الأغذية التي تفتقر لعنصر الحديد في غذاء طفلي</u> **38-** من قائمة الغذائية التالية، من الأغذية الغنية بالحديد التي يستطيع طفلي الحصول عليها باستمرار (بطريقة يومية/شبه يومية)	- الأحشاء الداخلية (مثل الكبد أو الكلى أو القلب)					
	- اللحوم والدواجن (مثل لحم العجل أو الخروف أو لحم البط أو الحمام أو الدجاج أو الأرانب)					
	- الأسماك أو المأكولات البحرية					
	- البيض					
	- المكسرات					
	- الفاكهة المجففة					
	- الخبز المدعم بالحديد					
	- حبوب الإفطار المدعمة بالحديد					
	- البقوليات (مثل الفاصوليا، العدس، الحمص)					
	- الخضار ذات الأوراق الخضراء الداكنة (مثل السبانخ، القرنبيط)					
	- الشوفان					
<u>(الحد الأدنى من التنوع الغذائى)</u> **39-** من المجموعات الغذائية الثمانية التالية، أي من هذه الأغذية يستطيع طفلك الحصول عليها بشكل يومي	- حليب الثدي					
	- الحبوب والجذور والدرنات					
	- البقوليات والمكسرات					
	- منتجات الألبان (مثل الحليب أو اللبن أو الجبن).					
	- البيض					
	- اللحم (مثل اللحوم الحمراء أو الأسماك أو الدواجن أو الكبد أو أعضاء أخرى)					
	- الفواكه والخضروات الغنية بفيتامين أ					
	- فواكه وخضروات أخرى					
<u>(الحد الأدنى لتكرار الوجبة اليومية)</u> **40-** عدد المرات التي يحصل فيها طفلي على أطعمة صلبة أو شبه صلبة أو طرية خلال اليوم	- مرة واحدة					
	- مرتان					
	- 3 مرات					
	- أكثر من 3 مرات					
	- كنت قلقة من أنه لن يكون لدي أسرتك طعام كافٍ لتأكلوه					

ه) عوامل لها علاقة بانعدام الأمن الغذائي (مقياس تجربة انعدام الأمن الغذائي) **41-** خلال الاثني عشر شهرًا الماضية، هل كان هناك وقت بسبب نقص الأموال أو الموارد الأخرى:	- كانت أسرتك غير قادرة على تناول طعام صحي ومغذي					
	- أكلت أسرتك أنواعًا قليلة فقط من الأطعمة					
	- كان عليك تخطي وجبة أساسية لأسرتك					
	- تناولت الأسرة أقل مما كنت تعتقدين أنه يجب على أسرتك تناوله					
	- نفد طعام أسرتك					
	- كانت أسرتك جائعة ولكن لم تستطع أن تأكل					
	- مر يوم كامل دون أن تأكل الأسرة					

3) إدراك الحواجز						
أ) عقبات بخصوص توفر الأغذية الغنية بالحديد والقدرة على تحمل تكاليفها	**42-** لا نقوم بشراء الأغذية أو المشروبات الغنية بالحديد لأنها غالية الثمن					
	43- لا يوجد لدي وقت كافي للتسوق وتحضير وجبات صحية غنية بالحديد					
	44- لا أمتلك المعلومات الكافية حول الأغذية الصحية الغنية بالحديد					
	45- أنا لا أقوم بتحضير الوجبات الغنية بالحديد لأنه ليس لدي مهارات الطبخ الكافية لتحضير هذه الوجبات أو اعدادها بالمنزل					
ب) عقبات بخصوص توافر خدمة مكافحة وعلاج فقر الدم لدي الأطفال أنا لا أحصل على خدمة مكافحة وعلاج فقر الدم لدي الأطفال من مركز الرعاية الأولية للأسباب التالية:	**46-** مبني مركز الرعاية الصحية الأولية مصمم بطريقة غير ملائمة لتلقي الخدمة					
	47- عدم توفر مساحة مناسبة للانتظار في داخل المبني					
	48- لا يوجد أماكن مهيأة لجلوس المرضي في داخل المبني					
	49- لا يوجد أماكن مناسبة تحترم خصوصية المرضي أثناء عملية الفحص والحصول على المشورة الطبية					
	50- عدم توافر خدمة الكهرباء بطريقة جيدة داخل مبني العيادة					
	51- لا توجد إضاءة وتهوية جيدة بداخل المبني					
	52- لا توجد مراحيض تحتوي على إمدادات مياه كافية					
	53- نقص في الكوادر الصحية المدربة لتقديم هذه الخدمة في المركز					
	54- عدم توافر أخصائي تغذية بداخل المركز لتزويدي بالمعلومات اللازمة					
	55- لا توجد نشرات تثقيفية لتزودني بالمعلومات المطلوبة حول طرق تغذية الطفل والحفاظ عل صحته					
	56- لا تتوفر نقط الحديد باستمرار في داخل المركز الصحي					
	57- لا تتوفر التحاليل الطبية المطلوبة لتشخيص ومتابعة نسبة الدم (HB) لطفلي بطريقة دقيقة في داخل المركز					
ج) عقبات بخصوص إمكانية الوصول لخدمة مكافحة وعلاج فقر الدم لدي الأطفال أنا لا أحصل على خدمة مكافحة وعلاج فقر الدم لدي الأطفال من مركز الرعاية الأولية للأسباب التالية:	**58-** من الصعب الوصول إلى المركز الصحي بسبب بعد المسافة عن مكان سكني					
	59- يكلفني الكثير من المال والوقت والجهد الذهاب إلى المركز الصحي					
	60- أنا لم أكن على دراية بتوفر خدمة مكافحة وعلاج فقر الدم لدي الأطفال في مركز الرعاية الأولية					
	61- أنا لا أعرف لمن أتوجه للحصول على المعلومات المطلوبة وللإجابة عن تساؤلاتي					
	62- لا ألقي ترحيب من قبل مزودي الخدمة في المركز					
	63- مزودي الخدمة في المركز غير جدرين بالثقة					
	64- مزودي الخدمة لا يحترمون ولا يتفهمون عاداتي ومعتقداتي					
	65- عدم العدل والتمييز من قبل مقدم الخدمة في المعاملة حسب الجنس والدرجة الاجتماعية والعلمية لمتلقي الخدمة					
	66- ساعات العمل داخل المركز لا تتناسب مع مسئولياتي الاجتماعية والعملية					
	67- احتاج الكثير من الوقت لتلقي الخدمة من داخل المركز الصحي					

د) عقبات تتعلق بدرجة قبولية مكافحة وعلاج فقر الدم لدي الأطفال	**68-** لا يوجد لدي الدافعية لإعداد غذاء صحي غني بالحديد لعائلتي					
	69- نحن نستمتع بتناول المسليات والأغذية الجاهزة والمقلية أكثر من استمتاعنا بتناول الأغذية الغنية بالحديد					
	70- من وجهة نظري نقط الحديد غير فعالة في مكافحة فقر الدم بسبب الأعراض الجانبية الناتجة عنها					
	71- أنا لا استعمل نقط الحديد لأنها تسبب اضطرابات في الجهاز الهضمي					
	72- أنا لا استعمل نقط الحديد لأنها تسبب اسوداد وتآكل في الأسنان					
	73- أنا لا أفضل استعمال نقط الحديد لأنها سيئة الطعم مما يجعلني أعاني في طريقة تقديمها لطفلي					
	74- أنا غير ملتزمة بإعطاء نقط الحديد والمتابعة بخدمة مكافحة وعلاج فقر الدم لتقليل مرارة تجربة العلاج والمتابعة لطفلي في داخل المركز					
	75- أنا أفضل تجربة المعالجة الغذائية عن المعالجة الدوائية باستخدام نقط الحديد					
ه) عقبات تتعلق بالاتصال الأول مع مقدم الخدمة في مركز الرعاية الأولية مدي تلقي معلومات واضحة وكافية من قبل مزود الخدمة في الاتصال الأول	**76-** لم يقم مقدم الخدمة بتزويدي بتوضيح شامل باستخدام أسلوب واضح لأهمية استخدام الحديد المدعم لمنع إصابة طفلي بفقر الدم علي عمر 6 شهور					
	77- لم يقم مقدم الخدمة بتزويدي بمعلومات واضحة حول حالة طفلي الصحية والهدف من إجراء فحص نسبة الهيموجلوبين (الدم) للكشف المبكر عن مرض فقر الدم لدي الأطفال علي عمر السنة					
	78- لم يقم مقدم الخدمة بتزويدي بمعلومات واضحة حول نتيجة فحص الدم					
	79- لم يقم مقدم الخدمة بتزويدي بمعلومات واضحة حول طبيعة مرض فقر الدم الذي تم تشخيص إصابة الطفل به					
	80- لم يقم مقدم الخدمة بتزويدي بمعلومات واضحة حول الهدف من استخدام الحديد المدعم لعلاج طفلي بعد أن تم تشخيصه بالإصابة بفقر الدم					
	81- لم يقم مقدم الخدمة بإشراكي في وضع الخطة العلاجية لطفلي المصاب بفقر الدم					
	82- لم يقم مقدم الخدمة بتزويدي بمعلومات حول أفضل الطرق التي تساعد في امتصاص الحديد المدعم (مثل تناول الحديد المدعم مع أغذية أو عصائر تحتوي على فيتامينC)					
	83- لم يقم مقدم الخدمة بتزويدي بمعلومات حول الأغذية والمشروبات التي يجب الابتعاد عن تناولها أثناء الوجبة الغذائية والتي تمنع امتصاص الحديد بطريقة جيدة مثل الشاي ومنتجات الألبان					
	84- لم يقم مقدم الخدمة بتزويدي بنصائح وارشادات لتحسين تغذية طفلي					
و) عقبات تتعلق بالتغطية الفعالة في مركز الرعاية الأولية	**85-** لم يقم مقدم الخدمة باحترامي واحترام اختياراتي					
	86- من وجهة نظري الوقت الذي قضيته مع مقدم الخدمة داخل المركز لم يكن كافيا					
	87- لا يقوم مقدم الخدمة بتقييم مستمر للخطة العلاجية والتعديل فيها حسب احتياجات الطفل المطروحة					
	88- لا يقوم مقدم الخدمة بفحص دوري شهري لمتابعة درجة التحسن في نسبة الدم لطفلي ويفسر لي هذا التطور بصورة واضحة					
	89- لا يجعلني مقدم الخدمة أشعر بارتياح لطرح الأسئلة حول حالة طفلي الصحية					
	90- المعلومات والنصائح الصحية التي يزودني بها مقدم الخدمة معقدة ويصعب على تذكرها					
	91- لا يقوم مقدم الخدمة بالتأكد دائما ما إذا كانت الحلول المطروحة لتحسين تغذية طفلي ممكن تطبيقا أم لا					
	92- لم يقم مزود الخدمة بتزويدي بمعلومات واضحة حول الأثار الجانبية لنقط الحديد المدعم					
	93- لم يقم مزود الخدمة بتزويدي بمعلومات واضحة حول مدة العلاج					
	94- لم يقم مزود الخدمة بتزويدي بمعلومات واضحة حول الجرعات العلاجية/ الوقائية					
	95- لم يقم مقدم الخدمة بإعطائي ميعاد قادم لمتابعة حالة طفلي الصحية					
	96- لا ألتزم بإحضار طفلي في الموعد المحدد للفحص لعدم أهمية المتابعة					

	97- لا أواظب على إعطاء نقط الحديد بالجرعات المحددة باستمرار لطفلي					
	98- لم أقم باتباع الارشادات والنصائح التي تم تزويدي بها علي أكمل وجه					
	99- لم تكن الخدمة الصحية لمعالجة فقر الدم لدي طفلي في المركز كما توقعت أن تكون ولا اشعر باستجابة طفلي للعلاج					
	100- لم تكن الخدمة الصحية التي تلقيتها لمعالجة فقر الدم لدي طفلي ملبية لاحتياجاته					
	101- أنا لا أشعر بالرضي عن الخدمة الصحية التي تلقيتها لمعالجة فقر الدم لدي طفلي في داخل المركز					

4) إدراك الفوائد						
أ) الفوائد التي يمكن أن يحصل عليها طفلي من جرعات الحديد الوقائية	**102-** الالتزام بجرعة الحديد الوقائية ستمنع الإصابة بمرض فقر الدم لدي طفلي					
	103- ستمنع حدوث اضطرابات في التطور النفسي لطفلي على المدي البعيد					
	104- ستمنع حدوث اضطرابات في المهارات العقلية والفكرية لدي طفلي على المدي البعيد					
	105- ستمنع حدوث اضطرابات سلوكية لدي طفلي على المدي البعيد					
	106- ستمنع حدوث اضطرابات في التطور الحركي لدي طفلي على المدي البعيد					
	107- ستمنع حدوث اضطرابات في مراحل النمو والتطور الطبيعية لدي طفلي على المدي البعيد					
	108- ستحسن من الإنتاجية لدي طفلي على المدي البعيد					
ب) الفوائد التي يمكن أن يحصل عليها طفلي من جرعات الحديد العلاجية	**109-** ستصبح لدي طفلي فرصة أفضل للحصول على صحة أفضل في الوقت الحالي وفي المستقبل					
	110- لن يصبح طفلي شاحب اللون بعد أن يتم علاجه من فقر الدم					
	111- سيصبح طفلي أكثر نشاطا وحيوية بعد أن يتم علاجه من فقر الدم					
	112- ستصبح مناعته أقوي وبالتالي سيصبح أقل عرضة للإصابة بالأمراض المعدية					
	113- ستزول لديه الرغبة في تناول الأشياء الغريبة مثل الطين ومواد الطلاء التي كان يتناولها فترة إصابته بالمرض					

5) الإشارات إلى العمل *سوف أهتم بصحة طفلي وأجعله يتخلص من مشكلة فقر الدم وذلك إذا:*						
إشارات إلى العمل داخلية	**114-** وضح مزود الخدمة أن لدي الخيار لعلاج مرض فقر الدم لطفلي					
	115- قدم مزود الخدمة لي اقتراحات لعلاج فقر الدم لطفلي بما يتناسب مع أطباعي وعاداتي					
	116- قام مزود الخدمة بتثمين وتعزيز دوري كأم لتحسين حالة طفلي الصحية					
	117- شعرت بقدرتي على النجاح في إعطاء طفلي نقط الحديد المدعم					
	118- حصلت على المزيد من الاهتمام والرعاية الصحية لعلاج طفلي من مرض فقر الدم					
	119- حدثت مضاعفات خطيرة مع طفل صديقي المقرب نتيجة اصابته بفقر الدم					
إشارات إلى العمل خارجية	**120-** قام فرد من العائلة/صديق بإعطائي نصائح حول الأغذية الغنية بالحديد وكيفية تحضير غذاء صحي متوازن مناسب لطفلي					
	121- قام مزود الخدمة بالتأكيد على أهمية الالتزام بالنصائح والارشادات فيما يخص تحسين الحالة الصحية لطفلي					
	122- جعلني مزود الخدمة أشعر بأهمية الالتزام بمواعيد المتابعة المعطاة لطفلي					
	123- جعلني مزود الخدمة أشعر بأهمية الالتزام بنقط الحديد المدعم التي تم تزويدي بها وبالجرعة والمدة المطلوبة					

	124- جعلني مزود الخدمة أشعر بأهمية تحليل الدم المطلوب لمتابعة حالة طفلي الصحية					
	125- قام مزود الخدمة بتحسين سبل التواصل بيني وبينه فيما يخص علاج طفلي					
	126- استمعت إلى معلومات حول خطورة فقر الدم لدي الأطفال عبر الراديو أو التلفاز أو من خلال منصات التواصل الاجتماعي					
	127- قام صديق مقرب أو فرد من عائلتي بنصحي حول أهمية استعمال الحديد المدعم لطفلي					
	128- تم تزويدي بنشرات صحية مخصصة لتحسين تغذية وصحة طفلي من قبل مزود الخدمة بداخل العيادة					
	129- تم إعطائي ندوات تثقيفية حول تحسين تغذية وصحة طفلي من قبل مزود الخدمة بداخل العيادة بواسطة كوادر طبية مدربة ومتخصصة في هذا الجانب					

6) إدراك الكفاءة الذاتية						
أ) مقياس توقع الكفاءة الذاتية العام	**130-** أستطيع دائما حل المشاكل الصعبة إذا أجهدت نفسي بما فيه الكفاية لعلاج مشكلة فقر الدم لدي طفلي					
	131- إذا عارضني شخص ما أستطيع ايجاد الطرق والوسائل لتحسين حالة طفلي الصحية					
	132- يسهل على تحقيق أهدافي ونواياي إذا ما قررت حل مشكلة فقر الدم لدي طفلي					
	133- إذا فوجئت بمواقف غير متوقعة أعرف دائما كيف أتصرف					
	134- أعتقد بأني قادرة على حل المشاكل بشكل جيد حتى ولو كانت مفاجئة عندما يتعلق الأمر بصحة طفلي					
	135- انظر إلى المصاعب بنفس هادئة وبرزانة فيما يتعلق بصحة طفلي وذلك لاعتمادي الدائم على قدراتي الذاتية					
	136- لا يعنيني ما يحدث لي من مشاكل على الاطلاق لأني أستطيع التخلص منها بكل بساطة إذا كان الموضوع يتعلق بصحة طفلي					
	137- أجد حلا لكل مشكلة أواجها عندما يتعلق الموضوع بصحة طفلي					
	138- عندما أواجه مشكلة تتعلق بحل مشكلة طفلي وطرق علاجها أعرف كيف أتعامل معها					
	139- عندما يضعني أحدهم أمام مشكلة تتعلق بصحة طفلي أعرف كيف أتخلص منها بسهولة لأنني امتلك أفكار عديدة تساعدني على حلها					
ب) توقع الكفاءة الذاتية فيما يخص تغذية طفلي	**140-** أستطيع تزويد طفلي بالأغذية الغنية بعنصر الحديد					
	141- أستطيع إعطاء طفلي الأغذية الغنية بفيتامين C أثناء أو بعد الوجبة مباشرة					
	142- أستطيع التوقف عن إعطاء طفلي أثناء الوجبة الغذائية مشروبات تقلل من عملية امتصاص الحديد مثل الشاي والحليب					
	143- أشعر بالثقة حول قدرتي على إعداد وجبات غنية بالحديد لطفلي					
	144- أحب مذاق الأطعمة الغنية بالحديد					
	145- نستطيع الاعتماد على الغذاء الصحي والطازج بدلا من الوجبات السريعة					
ج) توقع الكفاءة الذاتية فيما يخص استعمال الحديد المدعم	**146-** أستطيع استعمال نقط الحديد المدعم الذي يتم تزويدي به بداخل المركز الصحي					
	147- أنا على ثقة أن استعمال نقط الحديد المدعم الذي يتم تزويدي به بداخل المركز سيحسن فقر الدم لدي طفلي					
	148- أستطيع الالتزام بالتعليمات والارشادات المقدمة لي من مزود الخدمة فيما يخص علاج مرض فقر الدم لدي طفلي					
	149- أستطيع الالتزام بالفحص الدوري لنسبة دم طفلي					
	150- أستطيع الالتزام بموعد الزيارة الدوري لمتابعة حالة طفلي الصحية					

Annex (7): Medical records review checklist

Items	Yes	No	N/A
1- Document essential and accurate information about the child health condition include growth and developmental anthropometric measurements			
2- Reviews past medical history that is relevant to the IDA problem			
3- Documents an appropriately detailed and focused physical examination			
4- Prophylactic Iron supplementation to infants and young children were provided in timely manner and at a correct dose and duration according to UNRWA technical guidelines			
5- Infants and children registered in the child care program was screened for anemia using the hemoglobin concentration test according to UNRWA technical guidelines			
6- When the child was diagnosed with anemia, he/she was treated with daily iron supplementation at a correct dose and duration according to UNRWA technical guidelines			
7- Repeated hemoglobin test after one month of treatment was conducted for infants and children who are anemic.			
8- Repeated hemoglobin tests after the second visit were done to the anemic child according to UNRWA technical guidelines			
9- When anemia status did not respond to iron treatment, further investigation for other causes of anemia was considered and documented including CBC, MCV, MCH and RDW			
10- When anemia status did not respond to iron treatment, referral to a specialist for further evaluation and treatment was considered			
11- Documentation is carried out regularly and periodically manner for every provided session, and appointment for the next session is documented appropriately as well			
12- The medical record is used effectively to communicate the assessment and plan of care to the health care team			
13- Effectively documents instructions given to patients and families			
14- Follow-up notes are written in a way that permits making comparisons and tracking the improvement or deterioration in the health status of the patient over time.			
15- Documents a multi-disciplinary plan of care			

Annex (8): Focus Group Discussion Questions with Mothers of the Anemic Child

- Ice-breaking activity

I. Understanding of IDA

⇨ Probing questions

- How could you describe anemia to your close friend, what are anemia causes in your opinion, and how can you know whether someone has anemia or not?
- How could you describe the status of anemia among Palestine refugee children? How does iron deficiency anemia affect child's health (either in a good or bad way)?
- What were your reasons for giving your child the iron supplement?
- Do you know what could increase iron absorption? And what could prevent iron absorption from your child diet or from iron supplement provided to your child?
- Did the health care providers' advice you about how and what you should feed your child and/or give you suggestions on how to improve your child's diet?
- Did the health care provider check what is practical and possible for you to do regarding your child's nutrition?
- Did the health care provider set a date for the next appointment for follow-up?

II. Attitudes about provider recommendations

⇨ Probing questions

- Tell me about the iron supplement that your child received. Do you know why did the health care provider in the clinic give your child iron supplements? At what age did you start giving your child iron supplements? How much of iron syrup supplements you give your child? And for how long you give the iron supplement to your child?
- What was it like to give the iron supplement to your child? What, if anything, made it hard to give the iron drops to your child? What, if anything, made it easier to give the drops to your child?
- Do you know what possible side effects of iron supplements may happen to your child? If you face any of these side effects, how can you manage them?
- What would help parents take care of a child with iron deficiency anemia?
- In your opinion, what could be done to motivate parents to complete iron deficiency anemia treatment?
- Did your provider discuss with you other ways to treat iron deficiency anemia? If so, what were they?

- Tell me your thoughts about the best ways for you to be more adherent to provider recommendation to manage IDA in your child?

III. Barriers to IDA control

⇨ Probing questions

- Limited Health Information from Health Providers about IDA and ways for management
- Limited access to health care services
- Poor socio-economic condition
- Limited access to iron-rich diet
- Limited access to appropriate sanitation services

Annex (9): Focus Group Discussion Questions with Health Care Providers

➢ Ice-breaking activity

I. Understanding of IDA and ways for appropriate management

⇨ Probing questions

- What is anemia, what are the underlying causes of anemia, what is the most common type of anemia and what is signs and symptoms related to anemia?
- How could you describe the status of anemia among Palestine refugee children? What are the consequences of iron deficiency anemia on child's health?
- Why do you give infants and children registered in the child care program iron supplements? At what age do infants and children registered are given prophylactic iron supplementation? And what is the dose for prophylactic iron supplementation?
- At what age do infants and children registered in the child care program screened for anemia?
- How could you diagnose IDA? What happen when a child is diagnosed with anemia? How much is the dose of iron syrup supplements in case the child has been diagnosed with IDA? And for how long the child should take the iron supplements?
- What are the commonest side effects of iron supplements and how to manage these side effects?
- What are the factors that enhance iron absorption? And what are the factors that could inhibit iron absorption?

II. Compliance to guidelines and protocols

➢ Do you have written protocols and technical instructions about IDA management?

⇨ Probing questions

- Do you have access to such protocols, if available?
- Do you think your colleagues fully apply the written protocols and fully compliance? If not, why?
- Have you received training on those protocols?
- Are these protocols up-to-date?
- If you have the option, what could you add to the current protocol?

III. Barriers to IDA control

From your perspective, do you think the mothers of the anemic child is committed to the management plan? If not, explain why?

⇨ Probing questions

- Lack of knowledge and awareness about IDA and the importance of supplementation
- Insufficient contact time to provide adequate information
- Lack of adequate attitude and health practices related to IDA management
- Mother and child-related issues such as poor adherence to instruction, poor sanitation, parasite infection, inappropriate dietary habits
- Limited availability of services

➢ From your perspective, what are the health care provider's barriers to effective IDA control

⇨ Probing questions

- Workload
- Lack of effective communication
- Short contact time
- Inadequate counselling and advices being given
- Lack of effective training and supervision
- Limited support from the administration

➢ Do you get the needed support from your administration?

- If yes, how?
- If not, why?
- How do you evaluate the interaction with your direct line manager?

➢ Do you have an in-service training program for IDA management?

⇨ Probing questions

- If yes, how often do they offer trainings
- What training do you wish to have?
- Do you receive regular feedback on your performance?

Annex (10): Key-Informant Interviews

1- May you give us a small introduction about you sir? How long have you been in this place? Please tell us more about your responsibilities.
2- What is childhood anemia? What is the comments type of childhood anemia diagnosed inside UNRWA PHC centers? What is its impact on under five children? May you give some numbers
3- What are the policies and strategies followed in Gaza Strip to reduce IDA among preschool children? Do you think they are effective? Why?
4- Compared with other IDA control programs provided by other service providers, what makes you special? (Regarding the cost of services, quality of care, availability of qualified staff and accessibility of services)
5- Do you have written protocols and technical instructions? Do you think that your staff is compliant with applying the written protocols? If no, why?
6- Have your staff received training on those protocols? Are these protocols up-to-date? If you have the option, what could you add to the current protocol?
7- From your perspective, to what extent do your health care providers meet the needs of clients?
8- From your perspective, do you think the available human resources are sufficient to provide all the needed services with good quality? Is the workload suitable? Whether the number of providers is appropriate? Providers are qualified, knowledgeable and have all the required skills?
9- Do you have a monitoring system in place? What are the available monitoring tools?
10- How do you evaluate the quality of IDA control programs provided services? What could be done to improve the quality of services?
11- From your view, what are the main barriers that prevent clients from utilizing your services?
12- What are your aspirations in the future regarding this topic?

Would you like to add anything to this interview?

Thanks a lot for your time and efforts.

Annex (11): List of arbitrators

Series	Name	Position
1.	Dr. Bassam Abu Hamad	Al-Quds university
2.	Dr. Yehia Abed	Al-Quds university
3.	Dr. Khitam Abu Hamad	Al-Quds university
4.	Dr. Ihab Naser	Al-Azhar university
5.	Dr. Ahmed Najim	Al-Azhar university
6.	Dr. Riham El-Farra	Al-Azhar university
7.	Dr. Tysir El-Afifi	UGH Pediatric Department
8.	Dr Mohammed Salama	UGH Pediatric Department
9.	Dr. Imad El-Awour	UNRWA
10.	Dr. Hend Harb	UNRWA

دراسة بعنوان: دراسة مندمجة لتقييم مكافحة فقر الدم الناتجة عن نقص الحديد بين الأطفال في مرحلة ما قبل المدرسة في مراكز الرعاية الصحية التابعة للأونروا في قطاع غزة.

إعداد الطالبة: ولاء صبري عاشور سلامة

إشراف: د. محمد اللولو

الملخص:

يعتبر فقر الدم الناتج عن نقص الحديد من أكثر أنواع سوء التغذية شيوعا والذي يحظى باهتمام واسع النطاق في مجال الصحة العامة حيث أنه يؤثر على حوالي 2 مليار شخص حول العالم. ولقد كشفت عدة دراسات أجريت مؤخرا في قطاع غزة عن حدوث تدهور كبير في معدلات الإصابة بسوء التغذية بين الأطفال في مرحلة ما قبل المدرسة على الرغم من تنفيذ برامج واسعة النطاق تستهدف مكافحة فقر الدم.

تقدم وكالة الأمم المتحدة لإغاثة وتشغيل اللاجئين الفلسطينيين في الشرق الأدنى (الأونروا) خدمات الرعاية الصحية الوقائية والعلاجية للأمهات والأطفال مجانا لجميع اللاجئين في جميع مراكز الرعاية الصحية التابعة لها في قطاع غزة. تهدف هذه الدراسة إلى تقييم برامج مكافحة فقر الدم الناجم عن نقص الحديد بين الأطفال في مرحلة ما قبل المدرسة الذين يترددون على مراكز الأونروا الصحية في قطاع غزة.

اعتمدت هذه الدراسة طريقة البحث المندمج، حيث قامت الباحثة بجمع وتحليل البيانات والنتائج من خلال طرق وأدوات البحث الكمية والنوعية على حد سواء، وقد تم جمع البيانات الكمية من خلال استبيان قدم لأمهات الأطفال الذين تقل أعمارهم عن خمس سنوات والذين يترددون على خدمات الرعاية الصحية الأولية للأطفال في مراكز الرعاية الصحية التابعة للأونروا. وقد بلغ عدد المشاركات في الجزء الكمي من الدراسة إلى 400 مشاركة وبلغ معدل الاستجابة 100٪، بالإضافة إلى أنه قد تمت مراجعة 100 ملف طبي من ملفات الأطفال المستفيدين من خدمات الأونروا. فيما يتعلق بالجزء النوعي، أجريت تسع مقابلات مناقشة بؤرية (ثلاثة منها تم عقدها مع أمهات الأطفال دون سن الخامسة الذين كانوا يعانون من فقر الدم وتعافوا، وثلاثة مقابلات مع أمهات الأطفال دون سن الخامسة وما زالوا يعانون من فقر الدم، وثلاثة مقابلات مع مقدمي الرعاية الصحية الأولية) كما أجريت أربع مقابلات معمقة مع المدراء العاملين في برنامج الأونروا الصحي. تم استخدام الحزمة الإحصائية لبرنامج العلوم الاجتماعية لإدخال البيانات الكمية وتحليلها، في حين تم استخدام تحليل MAXQDA لتحليل البيانات النوعية.

وقد أظهرت نتائج الدراسة أن لدي أمهات الأطفال (الذين تقل أعمارهم عن خمس سنوات المصابين بفقر الدم الناتج عن نقص الحديد) مستوى عال من الإدراك لخطورة فقر الدم لدى أطفالهم الصغار مع إجمالي

متوسط النسب المئوية للخطورة المتصورة والقابلية المتصورة 72.2٪ و65.2٪ على التوالي. كما حصل المشاركون على نسبة مئوية عالية فيما يتعلق بالفوائد المتصورة من الاندماج في برامج مكافحة فقر الدم (78.4%) وعلى نسبة مئوية منخفضة فيما يتعلق بالصعوبات المتصورة (45.8 %). ومن وجهة نظر العملاء، كانت الصعوبات الرئيسية أمام مكافحة فقر الدم ضمن الأطفال هي الممارسات الغذائية الخاطئة للأطفال (بنسبة 71.6 %)، وعدم القدرة على تحمل تكاليف الأطعمة الغذائية الغنية بالحديد (54.6 %)، ودرجة القبولية المتدنية لمكملات الحديد الناتجة من آثارها الجانبية (54.6 %)، ووجود فجوات في الاتصال بين مقدمي الرعاية الصحية والمستفيدين من الخدمة (40.4 %). كما أوضح 76.8% من المشاركين استعدادهم لتبني سلوكيات صحية أكثر إذا تم تحفيزهم للقيام بذلك وكذلك أظهرت 72.6% من المشاركات درجة عالية من الثقة بكفاءتهم الذاتية تجاه اتخاذ إجراءات صحية لمكافحة فقر الدم الناتج عن نقص الحديد بين أطفالهم الصغار. كذلك كشفت نتائج استعراض السجلات الطبية عن ارتفاع مستوى امتثال مقدمي الرعاية الصحية لسياسة الأونروا القائمة لمكافحة فقر الدم الناتج عن نقص الحديد في مجال الأطفال، بما في ذلك تنفيذ الفحص الطبي وتقديم الجرعات الوقائية والعلاجية كما هو منصوص عليه، ولكن تبين أن هناك حاجة إلى مزيد من التحسين في توثيق المعلومات الطبية فيما يخص توثيق خطة علاجية شاملة متعددة التخصصات للرعاية المقدمة وكذلك في توثيق الملاحظات لمتابعة درجة التقدم المحرز في مكافحة فقر الدم. واعتبر برنامج الأونروا لمكافحة فقر الدم ذا صلة ومترابط مع الجهات المعنية وفعال، ولكن يجب الأخذ بعين الاعتبار أثر المحددات الاجتماعية للصحة على فعالية البرنامج في مكافحة فقر الدم، كما أن الأزمة المالية التي تعاني منها الأونروا كان لها أثرها في كفاءة البرنامج واستدامته.

ولذلك يلزم بذل مزيد من الجهد في مجال التوعية الصحية بشأن المسائل المتعلقة بمكافحة فقر الدم الناتج عن نقص الحديد ضمن الأطفال على صعيد المجتمع المحلي ومراكز الرعاية للتخفيف من الحواجز التي تحول دون الاندماج في الخدمات المقدمة بجانب ضمان التدريب المستمر وبناء قدرات الموظفين الصحيين فضلا عن تعزيز قنوات الاتصال مع الجمهور، والتأكيد على أهمية الدور الذي تلعبه المراقبة والإشراف الفعال لتوفير خدمات أكثر جودة.

كما يلزم إجراء مزيد من الدراسات البحثية واسعة النطاق لتقييم برامج مكافحة فقر الدم المقدمة من قبل بقية الجهات المعنية بتقديم الخدمات الصحية، كما يوصي الباحث بتقييم الاستراتيجيات الأخرى التي تعتمدها الأونروا مثل برامج تدعيم الأغذية والصرف الصحي ومكافحة الديدان للحصول على صورة أشمل وأوضح.