كليــة الصحــة العامة

AL-QUDS UNIVERSITY

SCHOOL OF PUBLIC HEALTH

القدس – فلسطين

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Deanship of Graduate Studies
Al-Quds University

Compliance with Iron Supplementation among Women during Postnatal Period at UNRWA Clinics in Gaza Governorates

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MPH Thesis

Jerusalem Palestine

2009/1430

Compliance with Iron Supplementation among Women during Postnatal Period at UNRWA Clinics in Gaza Governorates

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A Thesis Submitted in Partial Fulfillment of Requirements for the Degree of Master of Public Health/ Health Management
School of Public Health - Al- Quds University

2009/1430

Dedication

For my father and the soul of my beloved mother

For my husband for his constant encouragement,

unwavering support and tremendous patience

And

For my children,

I dedicated this work

Najwa Mossleh

Declaration

I certify that this entire thesis submitted for the degree of Master is the result of my own research, except where otherwise acknowledged, and that this thesis (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed: ***Dr. Najwa Mossleh***

Date: February 2009

Acknowledgement

It is my great pleasure to express my sincere gratitude to my respected teacher, ***Dr. Yehia Abed*** Associated Professor, Al Quds University, my academic supervisor for his guidance, supervision, concern and encouragement in carrying out this research work. He has been a constant source of inspiration in all stages of this work. I am highly indebted to him for his valuable advice, kind concern and continuous guidance.

I would also like to express my sincere thanks and appreciation to the people who assisted me throughout the study period, without their support this study would not have been straightforwardly done;

Extremely special thanks go to ***Dr. Bassam Abu Hamad***, BSN, MSC, PHD who gave me support and guidance, for Dr***. Amna Shurbasi***, Deputy Chief Field Health Program, of UNRWA, for her support and facilitation of the study, for ***Dr. Mohammad Maqadma***, Field Family Health Officer, for his help and support.

I would like to acknowledge and gratitude, all Primary Health Care, staff who provided their helpful recommendation, suggestion and support, especially Dr Younis Awadalla, Dr Jehad El Hissi, Mr.Sadi Awwad, And Mr Mahmoud Adaama.

I would like to acknowledge the staff and personnel in School of Public Health, especially, Mrs.Suna Abed, Mr.Shaban Mortaja, and Mrs Samah for their kind assistance and help.

.

Deep thanks go to colleagues especially, Mrs Ahlam Shaqura, Miss Niveen Jadalla, and Mr Khalid Abu Saman, for their help, assistance and support.

I am obliged to all staff in Primary Health Care clinics, Beit Hanoun, Rimal, and Rafah who helped make this study possible.

I am thankful to all who provided helpful recommendation and suggestion during preparation of the research instruments.

I am greatly indebted to my husband and my children for their endless patience and tolerance throughout the study period.

Most of all, I would like to thank all women for their willingness to participated in this study.

Abstract

Iron-deficiency anaemia is one of the most neglected and wide spread nutrition related disorders; it is the most common type of anaemia among women in reproductive age, in spite of all effort to combat it. Iron supplementary is a tool in the battle, struggling against iron deficiency anaemia. UNRWA adopted the WHO strategy for prevention and treatment of iron deficiency anaemia, through providing iron supplementation since the early 90^{s}, however anemia prevalence is still high among target group, and compliance to supplement is suffering from low prevalence rate during pregnancy and post-natal period. The postnatal period is a neglected issue in most of the world countries and in Palestine specially.

This study aimed to estimate the prevalence rate of compliance with iron supplementation among women during post natal period at UNRWA clinics in Gaza Governorates, to define the factors affecting the compliance, and to examine the trend of compliance during post-natal and antenatal period.

The study was conducted at UNRWA PHC clinics in Gaza Governorates. A quantitative, analytic, cross sectional design was conducted, to collect data from randomly selected three health centers. The sample of 400 subjects was randomly selected and met the inclusion criteria.

An exit interviewed questionnaire was used as a tool for data collection with structured closed ended questions, after data collection analysis of data was done using SPSS.

The study results showed that the compliance rate of 46.7% was among women during postnatal period, while the compliance rate reached 94.5% among women during antenatal.

Factors significantly associated with compliance of post natal women regarding iron supplementation, at p-value $\leq$ 0.05, were governorates, place of residency and husband education level. From among the obstetric variables of the study; number of visits to the health centers during pregnancy, number of times receiving the iron supplement and Hb level during antenatal and postnatal period showed statistically significant differences in respect to iron compliance. Moreover reasons of noncompliance and the specified side effect reflected statistically significant differences. All counseling variables of this study were found to have statistically significant association with compliance like counseling about anemia and iron supplementation. Regarding the practice variables; Hb level & decision to take iron, receiving iron or not, the number of times receiving the supplements and the regularity of receiving it were significantly associated with compliance.

From among the study variables, many have failed to prove statistically significant differences; women age, education level and work status of both women and husband, family income and the household number, marital age, parity, time of registration, breast feeding, and complication during pregnancy and mode of delivery.

The results of this study suggest that minimum, consistent and easily understandable information and counseling are key elements to ensure effective programmes for iron supplementation. Health personnel should encourage and provide information and recommendations to women during both of their antenatal and post natal visits, promote benefits of taking iron tablets and perception of susceptibility of women of getting anemia.

ملخص الدراسة

الانيميا الناتجة عن نقص الحديد تعد احدى اكثر المشاكل المنتشرة والمهملة الناجمة عن الخلل في التغذية وتعتبر من اكثر انواع الانيميا انتشارا بين النساء في سن الانجاب بالرغم من الجهود المبذولة لمكافحتها ويعد تناول الحديد الداعم الاداة المستخدمة لمكافحتها والتغلب عليها.

تتبنى وكالة الغوث استراتيجية منظمة الصحة العالمية لمنع وعلاج الانيما الناتجة عن نقص الحديد من خلال تقديم الحديد الداعم منذ اوائل التسعينات: ورغم ذلك مازال انتشار الانيما عاليا بين الفئة المستهدفة ومازال الالتزام بهذه الاستراتيجية يعاني من مشاكل بعدم الالتزام به في فترة الحمل وما بعد الولادة وتعد فترة ما بعد الولادة قضية مهملة في بعض بلدان العالم عامة و في فلسطين بشكل خاص.

وتهدف هذه الدراسة الى تقييم مدى الالتزام بالحديد الداعم خلال فترة ما بعد الولادة في مراكز الرعاية الاولية بوكالة الغوث في محافظات غزة " ومعرفة العوامل التي تؤثر على الالتزام به خلال فترة الحمل وبعد الولادة.

اجريت الدراسة في مراكز الرعاية الاولية بوكالة الغوث بمحافظات غزة واستخدم بها التحليل الكمي والمقطعي. بالاختيار العشوائي ل398 سيدة في ثلاث مراكز تابعة لوكالة الغوث في محافظات غزة، حيث تم تعبئة الاستبيان من خلال مقابلة السيدات التي تنطبق عليهم المواصفات من بين المترددات على عيادة صحة الام والطفل.

وقد اظهرت النتائج ان معدل الالتزام بتناول الحديد الداعم كانت 46.7 % في فترة ما بعد الولادة بينما كانت 94.5% في فترة الحمل.

بالتحليل تبين انه من بين العوامل ذات الدلالة الاحصائية المرتبطة بالالتزام بتناول الحديد الداعم في فترة ما بعد الولادة كانت في المحافظات، مكان السكن، مستوى تعليم الزوج، أما العوامل المتعلقة بالولادة فكانت عدد الزيارات التي تقوم بها السيدة في مراكز الرعاية أثناء الحمل، عدد مرات تلقي الحبوب الداعمة، نسبة الدم بالإضافة الى اسباب عدم الالتزام وكانت الآثار الجانبية المصرح بها ايضا كانت ذات دلالة احصائية.

جميع عوامل المشورة في هذه الدراسة كانت لها علاقة ذات دلالة احصائية بالالتزام مثل المشورة حول فقر الدم و عن أقراص الحديد الداعمة، وكذلك العوامل التي تؤثر على تناوله كانت ايضا ذات دلالة احصائية مع التزام بتناول الحديد الداعم.

ومن بين عوامل الدراسة التى فشلت في ابراز أية دلالة إحصائية: العمر، مستوى التعليم، مستوى الدخل، عدد افراد الاسرة، العمر عند الزواج، وقت التسجيل للحمل، الرضاعة الطبيعية، المضاعفات أثناء الحمل وكذلك نوع الولادة.

خلصت هذه الدراسة ان وجود الى أن قليل من المعلومات البسيطة والسهلة والداعمة هى العوامل الاساسية لتحقيق نجاح برامج فعالة للحديدالداعم وأن العاملين الصحيين عليهم أن يشجعوا ويوفروا المعلومات والتوصيات للسيدات في كل الزيارات أثناء فترة وبعد الولادة ويحفزوا فوائد أخذ الحبوب الداعمة ومفهوم التعرض الاصابة بالأنيميا. وبناء على نتائج هذه الدراسة فقد أوصى الباحث بعدة توصيات يرجى اخذها بعين الاعتبار.

Contents

List of abbreviations

A N	***Ante natal***
CI	***Confidence Interval***
CS	***Caesarean section***
EMR	***Eastern Mediterranean Region***
EMRO	***Eastern Mediterranean Region Organization***
Epi-info	***Epidemiological Information program***
Hb	***Hemoglobin***
IDA	***Iron deficiency anemia***
MCH	***Mother and Child Health***
MOH	***Ministry Of Health***
NGOs	***Non Governmental Organization Sector***
NIS	***New Israeli Sheqalim***
OR	***Odds Ratio***
P N	***Post natal***
P.H.C	***Primary Health Centers***
PCBS	***Palestinian Center Bureau Of Statistics***
PHC	***Primary Health Center***
SD	***Standard Deviation***
SPSS	***Statistical Package Of Social Science***
T.I	***Technical instruction***
TV	***Television***
UNICFE	***United Nation International Children's Emergency Fund***
UNRWA	***United Nation Relief And Work Agency***
WHO	***World Health Organization***

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Chapter 1: Introduction

1.1 Introduction

Iron-deficiency anaemia is one of the most neglected and wide spread nutritional related disorders, it is the most common type of anaemia among women in reproductive age, it affect about 47% of non pregnant women and 60% of pregnant women world wide (Stoltzfus, and Rebecca, 2001). In Palestine the prevalence of anaemia in pregnancy was 38.5% among women attending the governmental MCH primary health care centres for antenatal care(27.2% in the GS and 50% in the WB), while in UNRWA the prevalence of anaemia among refugee pregnant women was 35.7% and 45.7 % among nursing mother (MOH, 2005).

Anaemia develops slowly after normal stores of iron have been depleted and as results haemoglobin levels are low. Haemoglobin is an oxygen-carrying constituent built into the red blood cells. Since the red blood cells are responsible for delivering oxygen to other cells in the body, any problem with the oxygen delivery system will result in the body struggling to work properly (Nancy et al, 2002).

The postpartum period is challenging enough for most new mothers. Recovering from the birth, learning to parent, and taking care of herself requires a lot of energy. Having anaemia in the postpartum can make the process much more difficult. The problem of anaemia in post natal women has been relatively neglected, yet a new mother may enter the post natal period having exhausted her iron stores through pregnancy and child birth. They may even be a survivor of one of the anaemia related condition that kills other women during pregnancy and child birth. Prevention and treatment of anaemia in post natal

women is essential for reducing maternal mortality and morbidity, improving quality of life as well as improving work performance (Massawe, 2002). Maternal mortality rates are significantly higher among anaemic women, they have much lower tolerance for blood loss and less effective functioning of the immune system and they are more susceptible to puerperal infection (Brabin et al, 2001). Attention has been mainly focused on anaemia during pregnancy and it's consequences on child birth out come and it is a neglected issue during post natal period.

The provision of iron supplementary is one of the most widely practical public health measures, yet little is known about the benefits of supplemental iron for the pregnant and post natal period (Sserunjogi et al, 2003). As being a medical officer at UNRWA health centre in the MCH department and during her frequent contact with the women during pregnancy and post-natal period, the researcher observed some degree of compliance for iron supplementation during pregnancy while there is denial and negligence during post-natal period. Non compliance is a big problem because Iron-deficiency anaemia is the most common type of anaemia among women in reproductive age (Galloway, 2002).

UNRWA adopts the WHO and UNICEF strategy for prevention and treatment of iron deficiency anaemia providing medicinal iron supplementation as prophylactic and treatment during antenatal and post natal period for three months after delivery (60 mg iron with 400 mcg of folic acid as prophylactic and 120 mg iron + 800 mcg of folic acid for treatment) (UNRWA TI, 2000). In addition to maintaining the strategy for providing iron and folic acid supplements to nursing mothers and to improve the iron intake during post natal period, estimating the prevalence of compliance to iron supplementation during post natal period is of great importance as well as during pregnancy in Palestine.

1.2 Problem Statement

Prevalence of anemia among women during pregnancy and post-natal period is still high in spite of all efforts of preventive and curative measures. The provision of prophylactic iron supplementation and treatment faces a low compliance rate among target women all over the world and in Palestinian territories specially, iron supplement provided through MOH, UNRWA and Non-Governmental Organization Sector (NGOs) to all women attending antenatal care in Palestinian territories, and during post-natal period in UNRWA PHC. Large doses of iron are most often prescribed in the different health facilities in Palestine, but the prevalence of anemia is still high among women in reproductive age especially during pregnancy and postnatal period. According to study of Al lilly, compliance to supplement was suffering from low compliance rate (56.1 %) in Gaza during pregnancy (Al lilly, 2002). Compliance to iron supplementation during postpartum period observed to be neglected by women attending UNRWA clinics, which is a critical period for women, and anemia during it is a serious problem and of great importance as a key issue that seriously affecting women health.

1 .3 Justification of the study

The importance of the study emerges from the fact that it deals with an issue concerns a wide proportion of our Palestinian society, as well as it focuses on a health problem that affects the life cycle of tens of thousands of women in our country. Anemia deprives people of vitality, productivity, earning capacity, the ability to learn, and makes them more susceptible to infections (WHO, 2007-a). Also it reflects a negative impact on women health through their reproductive life; increased maternal and perinatal mortality; increased number of preterm and low birth weight births; impaired cognitive development of

children and reduced adult work productivity, and finally increases morbidity and mortality (Viteri, and Berger, 2005).

Iron supplementation has been carried out for several decades in antenatal clinics to control iron deficiency and anaemia in pregnancy. In spite of these efforts, the problem persists essentially unabated, particularly in the developing world. Many reasons have been given for this relative failure; poor compliance to the required daily dosage has been suggested by the WHO as one of those factors. Poor compliance was related to inadequate motivation or forgetfulness, misconceptions on the effect of iron supplementation and the development of side-effects (WHO, 2002).

The postnatal period is an important and challenging time for a woman and her family, iron supplementation during post natal period is observed by the researcher to be an issue which has been neglected despite the presence of guidance of the strategies in UNRWA to provide iron supplementation for the prevention and treatment of iron deficiency anemia in that period.

Many of the previous studies deals with issues related to pregnancy and the way to prevent this problem during pregnancy, little information however, is available regarding post-natal compliance to iron supplementation, so estimating the prevalence rate of compliance to iron supplementation during post natal period is of great importance as well as during pregnancy to improve the health status of target women.

The Palestinian women have a fundamental right to enjoy the highest possible level of health and quality of life and it is our ethical responsibility as health care providers to study and to find out ways to help our women improving their health and to overcome their problems.

1. 4 Objectives of the study

1 .4 .1 General objective:

To assess the compliance status with iron supplementation during post-natal period among women attending UNRWA heath centers in Gaza Governorates.

1. 4 .2 Specific objectives:

- To estimate iron supplementation compliance among women attending UNRWA health centers during post-natal period.
- To determine factors influencing iron supplementation compliance among mothers during postnatal period attending UNRWA health centers.
- To examine the trend of iron supplementation compliance rate during antenatal care and postnatal care among women attending UNRWA health centers.
- To assess the level of satisfaction among women attending UNRWA health centres regarding iron supplementation.
- To conclude recommendations that could help improving compliance with iron supplementation during pregnancy and post-natal period.

1. 5 Research Questions

To achieve the research objectives, the study attempted to answer the following research questions:

- What is the prevalence rate of iron supplementation compliance among women during postnatal period?
- What are the factors that influencing iron supplementation compliance among women during postnatal period?
- What are the demographic factors associated with compliance to iron supplementation?
- To what extent socio-economic factors affect compliance rate to iron supplementation?
- Is there a relationship between education and compliance to iron supplementation?
- Is there a relationship between compliance to iron supplementation and its side effects?
- Is there a relationship between compliance to iron supplementation and Hb level?
- Are there differences between compliance rate during antenatal and postnatal period?
- Is there sufficient educational programs targeting iron supplementation and anemia in UNRWA health centers?
- To what extent women are satisfied with the iron supplementation at UNRWA health centers?

1 .6 Context of the study

In this section the researcher will present background information about the Palestinian population, geography, demography, socio-economy and political situation.

The current study will be conduct in UNRWA MCH clinics during women visit to well baby clinic after four month from delivery.

1 .6 .1 Demographic context

Palestine (historical Palestine) is a small country 27,000 Square Kilometers (Annex 1). The entire area of Palestine is about the size of Wales in the United Kingdom or New Jersey in the United State of America (Cattan, 1988). Now Palestine comprises two areas separated geographically, the West Bank and Gaza Strip (MOH, 2005). The total area is 6,020 sq km; the total population living in was estimated in 2007 at 3,662,205 individuals. Out of the total number 2,274,929 in West Bank and 1,387,276 in Gaza Strip with percentages of 62.1% and 37.9% respectively. Al Khalil governorate had the highest rate of population at 13.9% of the total population, followed by Gaza governorate at 13.2%. Jericho governorate had the lowest rate of population at 1.2% (PCBC, 2007).

The Gaza Strip (Annex 2) is a narrow band of land located on the south of Palestine, constituting the coastal zone of the Palestinian territory along the Mediterranean Sea between Egypt and Israel. It is 45 Kilometers long and 6-12 Kilometers wide with an area of 362 square kilometers (MOH, 2005). The strategic position of it, is being at the cross road of Africa, Asia and Europe made it target for and conquerors over the centuries. Currently, the Gaza Strip is composed of five provinces: North Gaza, Gaza City, Mid-zone, Khan Younis and Rafah. There are five towns in Gaza Strip, eight refugee camps and fourteen villages (MOH, 2005). Demographic reports indicated that the Gaza Strip is

the second most densely populated area on earth after Hong Kong (World Bank, 2002). Out of the total population in the Gaza Strip with about 1 million 68% of them are, United Nation registered refugees, mainly concentrated in the cities, small village, and eight camps that contain two thirds of population of Gaza Strip with density of 3,808 inhibitants|km^2 (UNRWA, 2007). Around 19.3% of the population resides in the north of Gaza the total number is 265,932 individual with capita per sq km 4,360, 35% in the Gaza city, total population is 487,904 with capita per sq km 6,593. In Mid-Zone resides about 14.5 % , 201,112 with capita 3,467 and 32% in the southern area, 19.4% in Khanuonis 269,601 with capita per sq km 2,496 and 11% in Rafah is 165,240 with capita per sq km 2,582 (PCBS, 2006).

Moreover, age structure of Palestinian population (Annex 3) is similar to that in many developing countries, where nearly half of the total population is under 15 years 48.8% and only 2.6% above 65 years (PCBS, 2006). Dependency ratio still considered high in Gaza Strip around 1.07%.

1.6 .2 Socio-Political context

Currently, the Gaza Strip is suffering form a critical political situation since Israel withdrawal from Gaza, Israel continues its military activities, engaging in missile attacks, artillery fire, house searches, arrests, detentions, land requisitions and leveling, curfews, house demolitions, closure-caused food shortages, the limitation of access to basic health and educational services, and the limitation of access to agricultural lands and other natural resources (World Bank, 2004).

Israel still hold overalls sovereignty over the Gaza Strip, it has the upper hand over borders, movement of goods and travelers in and out of the Gaza, the majority of Gaza's

has been hit harder due to the current closure policy and siege after Hammas takeover of Gaza Strip, trade and labour was shut out of Israel, frequent disruption to electrical services due to Israel's bombing of Gaza's only power station, shortage of fuel is common nowadays. All these conditions reflect deteriorating of economic situation, limited income and lack of work opportunities which leads to low standards of living and inadequate health facilities, poor families cannot pay for health insurance or private fees (WHO, 2006).

1.6. 3 Socio-economic context

Today's, economic crisis has been caused by restriction on the movement of people and goods. The Palestinian recession is among the worst in the modern history; average personal incomes have been declined by more than a third since 2000, and nearly a half of Palestinian now live below the poverty line, 43% still live below the poverty average (World Bank, 2004). According to the Palestinian Central Bureau of Statistics, the subsistence poverty was 23% and that 56% of all households in the occupied Palestinian territory are living below the poverty line (80% in 2006 – versus 63% in 2005 – in the Gaza Strip, and 43% in the West Bank), and that means that over two million people are attempting to subsist on less than US$ 2 per person per day (PCBS, 2006). According to World Bank approximately 3 out of 5 Palestinians live under the income poverty line and one third of the Palestinians live under the consumption poverty (Madhoun, 2006). Refugees are affected particularly hard as they have been traditionally more dependent on wage labour in Israel and have fewer assets that they can sell (PCBS, 2006).

Poverty is one of the most important determinants of health and invariably leads to general malnourishment, micronutrient deficiencies, stunting in children, increased mortality and

morbidity of high-risk groups, and weakened population immunity the poverty rate was 44% during 2005 (MOH, 2005).

1.6. 4 Health care context

Palestine experience in health care system is rather unique and complicated. The several years of occupation and the following unilateral withdrawal of the Israeli government did strongly influence the health care system in Palestine. The consequences of closures and separation formed a great challenge for the ministry of health as it created obstacles regarding the accessibility to health care services and affects the unity of the health care system in all Palestinian governorates (MOH, 2004).

Health care services in Palestine are provided by four sectors, which is Ministry of health, Non governmental institutions, UNRWA, Private sector. Primary health centres in Palestine 654 centers (MOH 63.6%, UNRWA 8.1% and 28.3% NGOS) (MOH, 2005).

UNRWA plays an important role in health service delivery, providing free of charge primary health care through 55 centres in Gaza and West Bank (18 primary health centres in Gaza Strip and 37 in West Bank), and purchasing secondary and tertiary health care for the registered Palestinian refugees (UNRWA, 2006-a). The aim of UNRWA health programs in to protect, preserve, and promote the health status of Palestinian refugees, consistent with WHO concepts.

According to UNRWA registration statistics the total number of Palestine refugees registered in the Agency's area of operation by the end of 2007 was 4,562,820 of them 1,048,125 in the Gaza Strip (UNRWA, 2007).

Postnatal care is provided in UNRWA in the first week after delivery and within 42 days from delivery through 1 - 2 visits, the total number of women who received post natal care

in the UNRWA clinics was 30,920 women, 98.4% of total live birth. It is worth to mention that according to the WHO guidelines on postnatal care, postnatal visits are recommended within six to 12 hours after birth, three to six days, six weeks, and at six months (6-6-6-6 model) (WHO, 1998-b). In MOH the postnatal care is provided through home visit program and it was 1950 women in 2005, 4.1% of total live births (MOH, 2006).

Antenatal care is provided for pregnant women in 353 MCH clinics in the MOH and 55 in the UNRWA, the average number of antenatal visits paid per pregnant woman was 5.5 in Palestine (6.5 in G and 4.8 in WB). In UNRWA it was reported that the average number of antenatal visit was 7.6 visits per pregnant women in Gaza Strip and 6.8 in West Bank, the percentage of women who paid 7-9 visits was 47.5% (MOH, 2005).

1.7 The health status in Palestine

The fiscal consequences of political developments in the occupied Palestinian territory in 2006 have had an impact on the Ministry of Health's budget, and consequently on the delivery of health services and programmes. For instance, they affected its capacity to maintain a stock of pharmaceuticals and consumables, which negatively affect the health service delivery, to maintain in a state that can met the increase demand of the population (WHO, 2006).

In the year 2005 the percentage of women of childbearing age (15-49) from total population was 22.3% and the total fertility rate in 2005 was 4.6 births; in the Gaza Strip it was as high as 5.8 births (MOH 2005). The maternal mortality ratio was 15.4/100,000 live births among women aged 15-49 years in the Gaza Strip and 1.8/100,000 live births in West Bank according to Demographic and Health Survey (DHS) 2004 and Health status

annual report 2005 (MOH, 2006). This low ratio doesn't reflect the real situation in both areas especially because of the present problem of under diagnosis and under reporting.

WHO estimate that more than 50% of women of child bearing age suffer from anemia, 60% of children less than 2 years suffering from anemia, malnourished and stunted growth is prevalent (WHO, 2006). According to study conducted by UNRWA's Department of Health in 2006 the prevalence of anemia among pregnant women was 44.9% in the Gaza Strip and 31.1% in the West Bank, while prevalence of anemia among children 6 to 36 months of age was 57.5% in the Gaza Strip and 37.1% in the West Bank, a sharp increase from 54.7% and 34.2% respectively, as observed in the 2004 survey (WHO, 2006).

Many studies were conducted to estimate the prevalence of anaemia during pregnancy and level of compliance to supplementation, but little was done to estimate the level of compliance to iron supplementation during the post natal period. In spite of the high prevalence of anaemia among the nursing mothers and the high non compliance rate to supplementations, it is still a neglected issue and lacks the needed follow up and intervention.

1. 8 Definitions of terms

***Compliance*:** The Long man dictionary defines compliance as the act of behaving to a particular rule, or belief, or supporting a particular idea, even in difficult situations.

The tern compliance also been defined by WHO as "faithful adherence by the patient to prescribed instruction" (WHO, 2006). *Compliance or Adherence,* in a medical context refers to a patient both agreeing to and then undergoing some part of their treatment program as advised by their doctor or other healthcare worker (Wikipedia, 2008).

***None compliance*:** Inconsistency of the definition of compliance and the difficulty of assessment may partly explain the compliance variation. It is only regularly documented fact that their wide spread occurrence of non compliance with therapeutic regimen (Stephenson, 1999).

***Anemia*:** The World Health Organization (WHO) defines anaemia in pregnancy and postpartum as a haemoglobin concentration below 11g/dL (WHO, 1992, 2007).

***Postnatal period*:** The postpartum period starts immediately after delivery to six weeks after delivery (WHO, 1998a).

***UNRWA programs*:** UNRWA plays an important role in providing health care services to all Palestinian, the main activities provided by the health centers it includes Antenatal (AN), postnatal (PN) and family planning (FP) services.

***Antenatal care*:** is an essential part of modern health care; such care is every woman's right. It is estimated that 96.5% of pregnant women attended antenatal care out of total live births. Antenatal care services are provided by four main sectors, the MOH, UNRWA, NGOs, and the private sector (MOH, 2005).

***Postnatal care services*:** UNRWA provided postnatal care according to WHO standards, through one to two times after delivery and within 42 days. The aims of postpartum care are based on the needs of mothers and newborns (WHO, 1998-a). Today, WHO guidelines on postnatal care, postnatal visits are recommended within six to 12 hours after birth, three to six days, six weeks, and at six months (6-6-6-6 model) (WHO, 1998- b).

***Postnatal period*:** Post natal period is defined as the period immediately after delivery till three months after the postpartum period is challenging enough for most new mothers.

***Iron supplementation*:** UNRWA adopted the WHO and UNICEF strategy for prevention and treatment of iron deficiency anaemia compromising medicinal iron supplementation as prophylactic and treatment during antenatal and post natal period (three months after delivery), (60 mg iron with 400 mcg of folic acid as prophylactic and 120 mg iron + 800 mcg of folic acid for treatment).

Chapter 2: Literature review

2.1 Introduction

Iron deficiency anaemia is a problem of serious public health significance, given its impact on psychological and physical development, behaviour and work performance. It is the most common nutritional disorder in the world.

Iron is a mineral that the body needs to produce red blood cells. When the body does not get enough iron, it cannot produce the number of normal red blood cells needed to keep good health. Much of the iron in the body is attached to hemoglobin molecules in red blood cells, thereby delivering oxygen to all of the tissues, it is essential to most life forms and to normal human physiology, as it is a necessary mineral for the proper function of hemoglobin, the protein in red blood cells that carries oxygen, and it is also needed for muscle and organ function (medicine, net.com, 2007).

Postpartum anaemia is a serious health problem that disturbs the life cycle of women affected by this disorder, as well as it affects the families and society in our country. Fatigue is a frequent presenting complaint in patients with postpartum anemia. Although the hemoglobin concentration and the hematocrit fluctuate in the first few days following delivery, these values should return to pre pregnancy levels within one week. Anemia that persists beyond one week after delivery is usually due to excessive blood loss. When iron or folate deficiency anemia is present after delivery, appropriate supplementation should result in normal values within 12 weeks.

2.2 Iron deficiency and anaemia: an overview

In public health terms, iron deficiency is by far the most important cause of nutritional anemia. Iron deficiency develops gradually and usually begins with a negative iron balance, when iron intake does not meet the daily need for dietary iron. Significant deficiency in iron leads to anemia. Iron deficiency may result from a combination of several factors, it is also reported that even in developed countries, where the diet quality is good, only 20% of women have normal iron stores at the end of pregnancy and postpartum in the absence of supplementation (Milman et al, 1999). The most common cause of anemia in pregnancy and postnatal worldwide is iron deficiency (WHO, 1992).

The World Health Organization (WHO) defines anaemia in pregnancy and postpartum as a haemoglobin concentration below 11g/dL (WHO, 2007). The diagnosis of iron-deficiency anaemia will be suggested by these features and by such blood tests as low haemoglobin, low ferritin, and low iron level. Treatment includes iron supplementation and dietary changes such as increasing the amount of iron-rich foods (Ojukwu, and Okebe, 2007).

2.3 The extent and magnitude of iron deficiency and anaemia

2.3.1 The global picture of anaemia

Anaemia is a major public health problem world-wide. WHO rates iron deficiency as one of the top ten causes of mortality and disability adjusted life years lost globally (WHO, 2001). Iron deficiency continues to be the leading single-nutrient deficiency in the world, affecting the lives of more than 2 billion persons despite considerable efforts to decrease its prevalence for the past 3 decades (WHO, 2004). Many of these affected individuals live in the developing world, it estimated that around 30% of the world populations are affected (Massawe, 2002, World Bank, 2004). More than half of the pregnant women in the world have haemoglobin levels indicative of anaemia (WHO, 1992). Although only 15% of

pregnant women are anemic in developed countries (WHO, 1993), the prevalence of anaemia in developing countries is relatively high (33% to 75%) (Cyril, 2005). It also estimates that 30% of all non-pregnant women of reproductive age who live in the developing world are anemic. Anaemia prevalence increases to 42% during pregnancy (WHO, 2007-b). According to WHO there are 468 million non-pregnant women and 56 million pregnant women who are anemic, it is reported that 56% of pregnant women in developing countries and 18% in the developed countries are anemic (WHO, 2000), as it is in the Eastern Mediterranean Region (EMR), a total of 149 million people in the EMR are iron-deficient or anemic according to WHO criteria 83 million of them anemic women (WHO, 1998-a). And in Africa the estimated_prevalence in pregnant women is 50%-60% (WHO, 1992). For the non-pregnant women the estimated prevalence is 43% and 12% in the developing and developed countries, respectively (WHO, 1992).

The prevalence of anaemia was estimated in America 30%, Asia 44%, Europe 11%, North America 10% and Oceania 70% (Scrimshaw et al, 1998). The prevalence of IDA in the United States varies widely by age, sex, and race, it is 12% among women aged (12-49), Non-Hispanic white 10%, Black 19%, and among Mexican who are living in the United States 22 % (Killip et al, 2006).

In the industrialized world, estimates suggest that 30% of pregnant women will have depleted iron stores by the end of pregnancy, and in some population groups (e.g., adolescents) depleted iron stores could occur in 80% of the population (CDC ,1998). In the developing world, these estimates are higher. For example, 47% of pregnant women in Africa, 39% of pregnant women in Latin America, 80% of pregnant women in Southeast Asia, 65% of pregnant women in the eastern Mediterranean, and 40% of pregnant women in the West Pacific are believed to be anaemic (Beard, 2000). WH0 estimated that 41% of world anaemic women are residing in South –East Asia (WHO, 2007-b). In sub-Saharan

Africa, the prevalence of iron-deficiency anaemia is estimated around 60 % (Ojukwu, and Okebe, 2007).

In Cambodia anaemia remains a major public health problem a study conducted estimate that approximately 50% of anaemia is caused by iron deficiency. The prevalence of Anaemia remains high among women and children, with 47% of women of reproductive age anaemic and 57% of pregnant women anaemic (CDHS, 2005).

2.3.2 Anaemia in the Eastern Mediterranean Region

2.3.2.1 Prevalence of Anaemia in the Eastern Mediterranean Region

Estimates of the extent of anaemia in women in the developing world are shown that prevalence rates in the Eastern Mediterranean Region appear to be moderate when compared with other developing regions. This is to some degree due to underreporting and a lack of sufficient nation wide data in the Region (WHO, 1998-a).

Iron deficiency anaemia (IDA) is the most common nutritional disorder in the world, as it is in the Eastern Mediterranean Region (EMR), (WHO, 1998-a). A total of 149 million people in the EMR are iron deficient or anaemic according to the World Health Organization (WHO) criteria, (WHO, 1998-a) eighty three million of them are women (WHO, 1998-a). In Saudi Arabia the overall country prevalence was 30 to 56% in women in productive age (Joharah, 2001). The prevalence of anaemia in women ranges from around 20% in Jordan, parts of Egypt and parts of Oman to more than 60% in Djibouti (WHO, 1992).

2.3.2.2 Prevalence of anaemia among Palestinian women

The prevalence of anaemia among women in GS and WB is 36.4% and 31.4% respectively, in the year 2002, according to the Palestinian Central Bureau of Statistics

(PCBS, 2004). This figure is different from UNRWA study that shows higher prevalence in WB refugee camps. A nutritional assessment of Gaza Strip and West Bank projected increasing malnutrition and anaemia among Palestinian women, and as a consequences iron deficiency anaemia increase the risk of maternal death during and after child birth and diminishes the mother's ability to fight infection (John Hopkins et al, 2003).

The prevalence of anaemic mother who visited the governmental MCH for ante natal care 35.5% (24.9% in GS and 46% in WB), while a study conducted in UNRWA in the year 2004, projected the prevalence rate of anaemia among pregnant women was 34.6% and 48.9% among nursing mothers visited UNRWA P.H.C for antenatal and postnatal services in Gaza (MOH, 2004).

According to annual report 2005 the prevalence of anaemia in pregnancy was 38.5% among women attending the governmental MCH primary health care centres for antenatal care (27.2% in the GS and 50% in the WB), according to study conducted in UNRWA for refugees women in the year 2005, the prevalence of anaemia among pregnant women was 35.7% and 45.7 % among nursing mother attending UNRWA primary health centres for antenatal care in Gaza Strip (MOH, 2005).

A later study conducted by UNRWA's Department of Health in 2006 revealed that the prevalence of anaemia among pregnant women was 44.9% in the Gaza Strip and 31.1% in the West Bank, while prevalence of anaemia among children 6 to 36 months of age was 57.5% in the Gaza Strip and 37.1% in the West Bank, a sharp increase from 54.7% and 34.2% respectively, as observed in the 2004 survey (WHO, 2007-a).

2.4 Risk group of iron deficiency anaemia

Women of childbearing age, particularly pregnant women, postpartum, nursing mother, adolescents, Infants, pre-school children, and are at greatest risk of developing anaemia, some studies showed that preschool children are more severely affected than women, with reported prevalence in many countries of more than 60%. Only a few countries report data from school-age children; values range from 32% in Bahrain to 78% in Oman (Verster, and Pols, 1995).

Adolescents and school age children are also vulnerable groups, and an estimated 37% of school age children are affected. Adolescent pregnancies are common in developing countries and anaemia is one of the serious health problems for the girls (Brabin et al, 1998). Too many pregnancies that are closely spaced are also common in Africa, and put a heavy burden on women of reproductive age in Tanzania (Massawe et al, 1999).

The Palestinian women suffer from similar problem of the developing countries; common adolescent pregnancies and frequent pregnancies that are closely spaced as well nutritional demand on the woman who, after a pregnancy and lactation, has no time for physiological recovery before a subsequent pregnancy. And effort should be emphasis on building up iron stores prior to conception (Meier et al, 2003). Postnatal supplementation preparation for next pregnancy, as the treatment period in pregnancy is too short to correct it (Galloway, and McGuire, 1994).

2.5 A etiology of iron deficiency anaemia

In many populations, the amount of iron absorbed from the diet is not sufficient to meet many individual's requirements. This is especially likely to be true during infancy, pregnancy, and postpartum, when physiological iron requirements are the highest, so it is

necessary that if the amount of absorbable iron in the diet cannot be immediately improved, iron supplementation will be a necessary component of programs to control iron deficiency anaemia (UNICEF et al, 1998).

Inadequate dietary intake, normal menstrual blood loss, or recent pregnancy is the most common reasons for low iron reserves in pregnant women. During late pregnancy, especially during the last trimester, the rapidly-growing placenta and fetus increase maternal iron requirements. During pregnancy more pronounced increase in plasma volume leads to hem dilution, which cause a drop in RBC count. This drop in red blood cell count makes it nearly impossible for women to build up their iron reserves during that time, also iron is lost in maternal blood and lochia at parturition, a women may inter the postnatal period ,having exhausted iron store through pregnancy and child birth (Bothwell, 1998).

2.6 Consequences of iron deficiency anaemia

Anaemia is a silent killer and it deprives people of vitality, productivity, earning capacity, the ability to learn, and makes them more susceptible to infections (WHO, 2007-a).

Iron deficiency, the most common nutritional deficiency among women of childbearing age, is associated with reduced work capacity, and impairments in cognitive function. In addition, iron deficiency can progress to iron deficiency anaemia, which causes impaired aerobic capacity and is associated with decreased voluntary activity and lower economic productivity (Viteri, and Berger, 2005).

Anaemia and iron deficiency remain at epidemic levels among women in many countries, and reflect a negative impact on women health through their reproductive life, it is increased maternal and perinatal mortality; increased number of preterm and low birth weight births; impaired cognitive development of children and reduced adult work

productivity, increase morbidity and mortality (Viteri, and Berger, 2005). It affects the body's capacity to do work and the brain's capacity to think and learn, by causing permanent neurological damage. Maternal anaemia leads to infant anaemia, with serious consequences for infant health and survival, including stillbirth, infant death and brain damage (Shigeru, 2005). A review of the literature on this issue indicates that indeed, in some studies. Gaspar et al found a relationship between maternal iron and foetal Hb (Gaspar et al, 1993). While Emery et al, conducted several studies to investigate the relationship between maternal and neonatal iron status, and they found that there is no significant relationship exists regarding this issue (Emery et al, 2004).

2.7. Strategies for the prevention and control of iron deficiency

2.7.1 Interventions for the prevention and control of iron deficiency anaemia:

The fact that iron deficiency anaemia frequently develops in pregnancy indicates that, the physiologic adaptations are often insufficient to meet the increased requirements. As a result, iron supplementation during pregnancy and postnatal is a common practice throughout the world (Bothwell, 1998).

The prevention and control of anaemia is an important component of the treatment and care and contributes to slowing the progression of many diseases and reduce morbidity and mortality (Shigeru, 2005). The control of anaemia in women of childbearing age is a priority public health problem (WHO, 1992). The four basic approaches to the prevention of iron-deficiency anaemia are dietary change and diversification to increase iron intake; supplementation with medical iron; fortification of a suitable staple food with iron; and the control of infection through public health activities (UNICEF, 1998). Fortification has been successful in developed countries and is the most direct approach to eliminating

micronutrient deficiencies. Developing countries can learn from the developed countries in this respect. In the USA, two-thirds of the recommended daily allowance for iron comes from fortified foods. Universal fortification avoids the compliance problem and makes the programme sustainable (WHO/EMERO, 2000). Haematinic supplementation is recommended for all pregnant women in high anaemia prevalence areas in developing countries.

2.7.2 International program for prevention and treatment of anaemia:

In the context of the broadened international emphasis on elimination of micronutrient deficiencies, WHO and UNICEF drew up in early 1993 a "Protocol for treatment and Prevention of Anaemia in Pregnancy". The protocol is an effort to accelerate action on anaemia prevention and formulates a proposal for review of national anaemia prevention programmes. Initially 30 countries in the five Regions of WHO were contacted by sending the protocol document to national governments (WHO, 1993). All pregnant women in areas of high prevalence of malnutrition should routinely receive iron and folate supplements, together with appropriate dietary advice, to prevent anaemia. Where the prevalence of anaemia in pregnant women is high (40% or more), supplementation should continue for three months in the postpartum period (WHO, 1998-a). In the EMR, the protocol was sent to all countries, and as of March 1995 eight countries have carried out the first phase of the protocol included Palestine through UNRWA, MOH, and NGOs.

In the early 1990s, WHO and UNICEF recommended daily iron supplementation for women in productive age during pregnancy, postpartum, adolescents, and preconception (WHO, 1993). A daily protocol of iron supplementation is recommended for treatment and prevention of iron deficiency and in order is necessary to prevent morbidity and mortality from severe anaemia, also weekly doses of iron were suggested as a possibly

more effective preventive approach in public health programmes, which would result in fewer side effects and be easier to manage at the community level (Shigeru, 2005).

2.7.3 Regional Intervention programs for prevention and treatment of anaemia

In the Islamic Republic of Iran Iron-deficiency anaemia is a common problem; a formal anaemia prevention programme exists that focuses on routine supplementation through the primary health care system. Health care centres recommend regular iron supplementation during pregnancy, a systemic review for iron supplementation the result showed that, this advice is often ignored. Because there are doubts regarding the relationship between maternal and neonatal iron status and the lack of data regarding maternal iron status in Jahrom in Iran (Emamghorashi, and Heidari, 2004).

In Mali, national policy recommends women to take iron and folic acid supplements daily from first prenatal contact until 3 months postpartum. However, many pregnant women in Mali could benefit from multiple micronutrient supplements (Aguayo et al, 2005).

2.7.4 UNRWA strategy for Anaemia Prevention Programme

UNRWA adopt the WHO/UNICEF strategy and implemented the programme for prevention and control of iron deficiency anaemia through providing iron supplementation as prophylactic and treatment for all pregnant women during pregnancy and three months after delivery (post natal period), UNRWA provided supplement according to WHO recommendation iron with folic acid (60 mg iron with 400 µg of folic acid (UNRWA, 2004).

2.8 Iron supplementation

Iron supplementation is one of various interventions that are designed to prevent and correct iron deficiency anaemia. The appropriate use of iron supplements will be an important part of anaemia control programs, but supplements should be viewed as one of several tools in the battle against iron deficiency anaemia. Iron supplements are essential for the rapid treatment of severe iron deficiency anaemia in order to prevent morbidity and mortality from severe anaemia.

Providing iron tablets to a target population rapidly improves iron status. It is therefore the major short-term strategy for countries with a significant problem of iron deficiency anaemia. Currently supplementation is mostly employed for the treatment of iron deficiency anaemia; however, supplementation should be designed primarily as a preventive public measure.

2.8.1 Target group for iron supplementation

The primary target groups for supplementation programmes in many countries are pregnant and lactating women, not only on account of the relative ease of reaching them but also because of the potential short- and long-term benefits for both mother and child. Iron supplementation for pregnant and lactating women should be national policy in countries with high iron deficiency prevalence.

Pregnant and postpartum women are the priority target groups for both, iron deficiency and the public health benefits resulting from its control. Supplementation would also benefit women of reproductive age.

During the postpartum period, women are thought to be at lowest risk of iron deficiency. Iron stores are expected to be enhanced after delivery because a large proportion of the 450

mg of iron required for red cell production during pregnancy returns to maternal stores when the red cell mass contracts (Beard, 2000). According to Lisa study, the postpartum period is conventionally thought to be the time of lowest iron deficiency risk because iron status is expected to improve dramatically after delivery (Lisa et al, 2002).

The problem of anaemia in post natal women has been relatively neglected, yet a new mother may enter the post natal period having exhausted her iron stores through pregnancy and child birth. They may even be a survivor of one of the anaemia related condition that kills other women during pregnancy and child birth (Massawe, 2002).

A therapeutic approach to iron supplementation is used throughout much of the world but suffers from real, or perceived, problems of compliance. Large doses of iron are most often prescribed and are associated with side effects and the prevalence of anaemia is still high all over the world and in Palestinian territories.

In several countries supplementation programmes have had some positive impact in lowering iron deficiency in the target population (WHO/EMERO, 1992).

2.8.2 Protocol for Iron Supplementation for Pregnant and Postpartum Women

The high physiological requirement for iron in pregnancy is difficult to meet with most diets. Therefore, pregnant women should routinely receive iron supplements in almost all contexts. WHO recommended that where the prevalence of anaemia in pregnant women is high (40% or more), supplementation should be provided and will continue into the postpartum period to enable women to acquire adequate iron stores.

2.9 Population experience on prevention and treatment of anaemia

According to Shirgeru Omi, declaration in 2007, that over 30 years, many countries adopt the treatment and prevention of anaemia program, by giving daily iron supplements,

usually with folic acid, especially in pregnancy, postpartum, and children, but they know that compliance with the daily supplementation regime is often poor, for a variety of reasons, including side effects and problems in health system delivery, especially in less developed countries (WHO, 2007-b).

The experience in combating iron deficiency in industrialized countries and identifies the reasons for the considerable success and future challenges was studied by Ramakrishnan and Ray, they report that a significant progress has been made over the last century in reducing and even eliminating iron deficiency in many industrialized countries. According to them the prevalence of iron deficiency has declined to less than 20% in many of these countries, even among women and young children, compared with 30 to 70% in many developing countries (Ramakrishnan, and Ray, 2002).

2.10 context of compliance

2.10.1 Compliance definition

Compliance (or Adherence) in a medical context refers to a patient agreeing to and then undergoing some part of a treatment program as advised by a doctor or other healthcare worker. Most commonly it is a patient taking medication (Wikipedia, 2008). In many studies the word "adherence" is preferred by many health care providers, because "compliance" suggests that the patient is passively following the doctor's orders. Patients should not be passive: a treatment plan must be based on a therapeutic alliance or contract between the patient and the physician (Osterberg, and Blaschke, 2005). Yet it is at least one reference implies that both terms are flawed, giving no meaningful information (Sabate, 2003).

Galloway and McGuire found through their study that the reasons for non-compliance with iron deficiency treatment include: inadequate program support (lack of political commitment and financial support); insufficient service delivery (poor provider-user dynamics); lack of supplies, access, training, and motivation of health care professionals); and patient factors (misunderstanding instructions, side effects of iron supplementation include constipation, diarrhoea, vomiting, or epigastric pain. These effects are reported to increase with dose and may have caused some women to abandon therapy or take less than the recommended dose (Galloway, and McGuire, 1994). Although many of the studies we reviewed report that adherence was a problem, few measured compliance. Adherence to iron supplementation was found to be poor (approximately 42%) in a study that carefully measured this factor in Tanzania (Ekstrom et al, 1996). It was better (61%) with a slow-release gastric delivery system in another study (Simmons et al, 1993).

Amsel, et al conducted a retrospective study to investigate the compliance of parents in supplementing iron-containing medications to their infants in Israel. they looked for possible socioeconomic characteristics(family income, high and low socioeconomic classes) of the parents, who declined to give their infants these drugs, and they found that the reasons for non-compliance with ID treatment include the following: inadequate program support, insufficient service delivery, and patient fac**to**rs (misunderstanding instructions, side effects, frustration about length of treatment, and fear of side effects related to the medication) (Amsel et al, 2002). In addition, iron and folic acid supplementation have been used mostly in pregnancy, leaving non-pregnant women unprotected. This approach has had only limited success, except under well-controlled conditions. The reasons for this vary, but general problems are logistics to ensure availability and distribution of tablets within primary health care (PHC) settings of care, as well as inadequate supervision of providers (UNICEF et al, 1998; Yip, 1994).

2.10.2 Non compliance definition

According to Wikipedia definition, an estimated half of those for whom medicines are prescribed do not take them in the recommended way. Until recently this was termed "non-compliance", and was sometimes regarded as a manifestation of irrational behavior or willful failure to observe instructions, although forgetfulness is probably a more common reason (Wikipedia, 2008).

2.10.3 What factors influence compliance?

Iron supplement compliance has been studied, but little is known about compliance with multiple supplements among populations in developing countries. With iron, the side effects color, stability of the supplement, information provided to the consumer, and recommended frequency of use all are known to affect compliance, also tablet size is another factor likely to affect compliance (Mother Care, 1997). Other study conducted have shown that tablet size, the different forms of iron and newer forms of iron such as sprinkles, candies , have reduced side effects, and were another factor likely to affect compliance (Aikawa et al, 2006).

The amount of iron in the tablet also influences compliance. Higher iron levels are associated with more symptoms, including gastrointestinal problems and nausea (Galloway, and McGuire, 1994). Social marketing efforts can increase compliance of supplements, and the messages used will need to be context specific. Special packaging and messages may be used to focus on selected target populations; this will affect compliance as well (Schultink et al, 1993). In a study reviewed compliance to iron-supplementation programmes carried out in 1991, Gillespie S identified several causes for non compliance to iron supplementation; “low accessibility and utilization of antenatal care, inefficient supply and distribution of supplement, inadequate training and motivation

of first line health workers, insufficient and inappropriate counseling of mothers, and failure of effective screening and referral procedures" (Gillespie et al, 1991). According to study done by Dairo and Lawoyin in Nigiria, they found that the single and teenage mothers and those aged 35 years and above were less likely to be compliant. Married women, those in urban location, and those aged 20-29 years were more compliant with iron supplementation (Dairo, and Lawoyin, 2006).

2.10.4 Postnatal compliance with supplementation:

Postnatal iron supplementation lacks compliance with prophylactic medication by women, which is another possible contributing factor in increasing prevalence of anaemia in postpartum period. Several studies have shown that logistic problems inherent in PHC programmes such as lack of supplies, distribution, supervision of health providers and adequate information to pregnant mothers were more significant (Galloway, and McGuire, 1994). Nancy, et al presented a comprehensive review of the impact of prenatal iron supplementation on maternal haemoglobin in studies from developed and developing countries published between 1966 and 1998 in refereed journals, they identified and reviewed approximately 70 studies of iron supplementation in pregnant women; two thirds of these studies were from developing countries. The review indicated that Adherence to the regimen affects the effectiveness of the supplementation (Nancy et al, 2002).

A study conducted by Ziauddin S, et al, shows that the Compliance (ratio between observed and recommended tablet intake) was significantly higher in the weekly-supplementation regimen (93%) than in the daily-supplementation regimen (61%). Overall, gastrointestinal side-effects were not significantly associated with compliance. However, the presence of nausea and/or vomiting reduced compliance in both the regimens. The findings support the view that gastrointestinal side-effects generally have a

limited influence on compliance, at least in the dose ranges studied. Efforts to further reduce side-effects of iron supplementation may not be a successful strategy for improving compliance and effectiveness of antenatal and post-natal iron supplementation (Ziauddin et al, 2002). A systematic review on iron supplementation trials found that the distribution of iron supplements which is practiced in many antenatal, and postnatal care programs in developing countries, it has often been alleged that pregnant women do not take them. Poor compliance arises not only because of patient behavior but also from factors out of the patient's control (Galloway, 2002). The review showed that compliance with iron therapy is a specific case of medical compliance. Reasons for non-compliance with iron deficiency treatment include: inadequate program support (lack of political commitment and financial support); insufficient service delivery (poor provider-user dynamics; lack of supplies, access, training, and motivation of health care professionals); and patient factors (misunderstanding instructions, side effects, frustration about the frequency and number of pills taken, migration, fear of having big babies, personal problems, nausea that accompanies pregnancy, and the subtlety of anaemia which makes demand for treatment low). Much has been made about the side effects (nausea, constipation, etc.) that women might experience during iron therapy as the cause of poor compliance with iron supplementation without justification according to this review. Instead, unavailability of iron supplements was the most common reason why women did not take iron supplements (Galloway, 2002). WHO address that, poor compliance may be linked to difficulties with delivery of supplements, low coverage, poor tolerance, and maintenance of compliance for prolonged periods (WHO, 2003).

2.10.5 How to improve compliance:

There have been many studies of the effects of different strategies in improving adherence to therapy. These include reducing the frequency of administration during the day and

reducing the numbers of medicines a patient has to take. However, there is no evidence that such measures are effective. Nevertheless, it seems likely that adherence can be improved by taking care to explain the benefits and adverse effects of a drug.

In the early 1990s, weekly doses of iron were suggested as a possibly more effective preventive approach in public health programmes, which would result in fewer side effects and be easier to manage at the community level. In the past 15 years, a number of studies have been conducted to determine the efficacy of the weekly approach for the prevention of anaemia. Many of these studies compared weekly supplements with daily supplements, mostly under supervised conditions, in preschoolers, primary and secondary schoolchildren and in pregnant women. Supplementation trials in pregnant women that included intermittent dosing schedule were also performed in Guatemala Sixty milligrams of elemental Fe daily or 180 mg Fe weekly was provided to women. Sixteen percent of women who received daily iron supplements and 25% of women who received weekly iron supplements were anemic at term. Six to eight times more side effects were reported by women taking iron supplements daily than by those taking iron supplements weekly (Eskeland,1997). Also, Ziauddin found in a study conducted in Bangladesh that compliance to iron supplementation was higher in the weekly –supplementation regimen (93%) than in the daily supplementation regimen (61%) (Ziauddin et al, 2002). A review on the efficacy of daily and weekly iron supplementation in 1999, concluded that both daily and weekly iron have an impact in reducing anaemia and iron deficiency, especially under supervised conditions (Shigeru, 2005). In a study done by Solvell L he found that keeping the dose as low as is compatible with unimpaired effectiveness is an important principle because the side effects of iron therapy, which can seriously limit compliance, are dose-dependent phenomena (Solvell et al,1970). In a busy clinic it is too easy for the prescriber to give out a prescription with little or no explanation, Opaseereevith S. who

found that cues to action like received information and advices from different sources had a positive association with the competency of pregnant women to take care themselves (Opaseereevith, 1998). A study in Philippine showed that perceived health benefits from taking the supplements and higher health programme knowledge were positively associated with pill consumption (compliance),(Lutsey et al, 2006). Another study conducted by Aikawa in Vietnam demonstrated that a longer period of taking iron tablets (5–9 months) duration, was significantly associated with receiving information from health providers and radio/TV (Aikawa et al, 2003).

2.10.6 Factors affecting non compliance

Non-compliance is the result of both an aversion to the side effects of taking iron supplements and the failure of many primary health care systems to adequately motivate both health care providers to issue the iron tablets and pregnant women to take them (Galloway et al, 1996). In a study conducted by Pamela Lutsey in Bicol, Philippine, the researcher found that women experiencing side-effects and disliking the taste of the supplements were associated with lower pill consumption (Lutsey et al, 2006). In two studies the problem of non-compliance was highlighted. One study, in Tanzania, found that the only 42% of pregnant women adhered to a twice-daily schedule of 60 mg Fe as ferrous sulphate (Ekstrom et al, 1996). In the other study, in Indonesia, it was found that 36% of the women who had been receiving 60 mg ferrous iron daily had positive results on stool tests for iron (Schultink et al, 1993).

2.11 Post natal studies

A study conducted by Beard L, et al to determine whether iron deficiency anaemia (IDA) in mothers alters their maternal cognitive and behavioural performance, the mother-infant

interaction, and the infant's development, the researcher found that there is strong relation between iron status and depression, stress, and cognitive functioning in poor African mothers during the postpartum period, and IDA in postpartum mothers is associated with behavioural changes consistent with negative effects on the mother's interaction with her infant and on the infant's development (Beard et al, 2005). Another study showed that iron deficiency has an effect on behaviour and cognitive functioning (Beard, 1995). Haemoglobin (Hb) concentration was also observed to be significantly related to postpartum depression and fatigue in mothers despite the fact that they were of high socioeconomic status (Corwin et al, 2003). This observation is consistent with a general association between improved iron status and the ability to concentrate as well as a reduction in fatigue with iron therapy (Beard et al, 2005).

2.12 Previous studies of anemia and compliance to iron supplementation in Palestine

Many studies have been conducted to measure prevalence of anemia in the last century.

In 1993 UNRWA conducted a survey in West Bank and Gaza refugee camps in order to assess and evaluate anaemia prevalence and prevention (WHO/EMERO). The objectives of the study were, apart from determination of the prevalence and severity of iron deficiency in pregnant women, to assess the success of attempts to raise the women's iron reserves at time of delivery and to determine compliance of UNRWA's medical personnel with the technical iron deficiency prevention guidelines (WHO/EMERO, 1992). It was noted in the study that women did not usually come for antenatal care until well into their second trimester. If women would come for care earlier in their pregnancy, supplementation could start sooner for better prevention of anaemia. Supplementation was found to be almost universal (97%) but compliance was only 77%. The main three reasons for non-compliance were side-effects, forgetfulness and "wrong belief. Less than half of the women knew what type of tablet they were taking (UNRWA, 1993).

In 1995 across-sectional study was conducted by Eddaama to estimate anemia prevalence. According to his result the prevalence was 45.1%, where 62.4% of them were iron deficiency anemia; there was significant decrease in use of iron, where it was dropped from 53, 5% in the last pregnancy at time of study. Compliance was low among pregnant women who used supplement. He concluded that low compliance is attributed to women tendency to have supplement from private source, side effect, lack of knowledge, ignorance of its importance, lack of staff commitment, shortage of supply (Eddama, 1995).

In 2002 a cross-sectional study conducted by Al-llily for factor associated to compliance among women during pregnancy, in his study he found that the rate of compliance with iron supplement among his sample about 56.1, the prevalence of anemia was 60% which is still high and it is within the prevalence range in the developing countries, the low rate of compliance was attribute to the women related factor which was, education level, socio-economic status, gravity and parity. And factor related to system availability, and mode of distribution (Al-llily, 2002).

A survey conducted in 2002 by local partners Al Qudes University, Center for Development in primary Health care and Global Management Consulting Group and International partners Care International and John Hopkins University, found that 43.9% of children 6-59 months of age in the WB/GS and 47.0% of non-pregnant women 15-49 years of age were anemic (John Hopkins et al, 2002).

Maram Project survey in 2003 reported that only 25, 2% of women mentioned iron tablets as an IDA prevention measure, and 63, 4% recognized iron tablets, while 11.4% of women did not know about the iron tablet supplementation(Maram, 2003).

In 2005 Hanan project Technical paper, reported that, anemia is a prevalent and important public health problem among pregnant women in WB and GS. The Prevalence of anemia during pregnancy ranges from 21% to 31%, and can be as high as 70% in the postnatal of

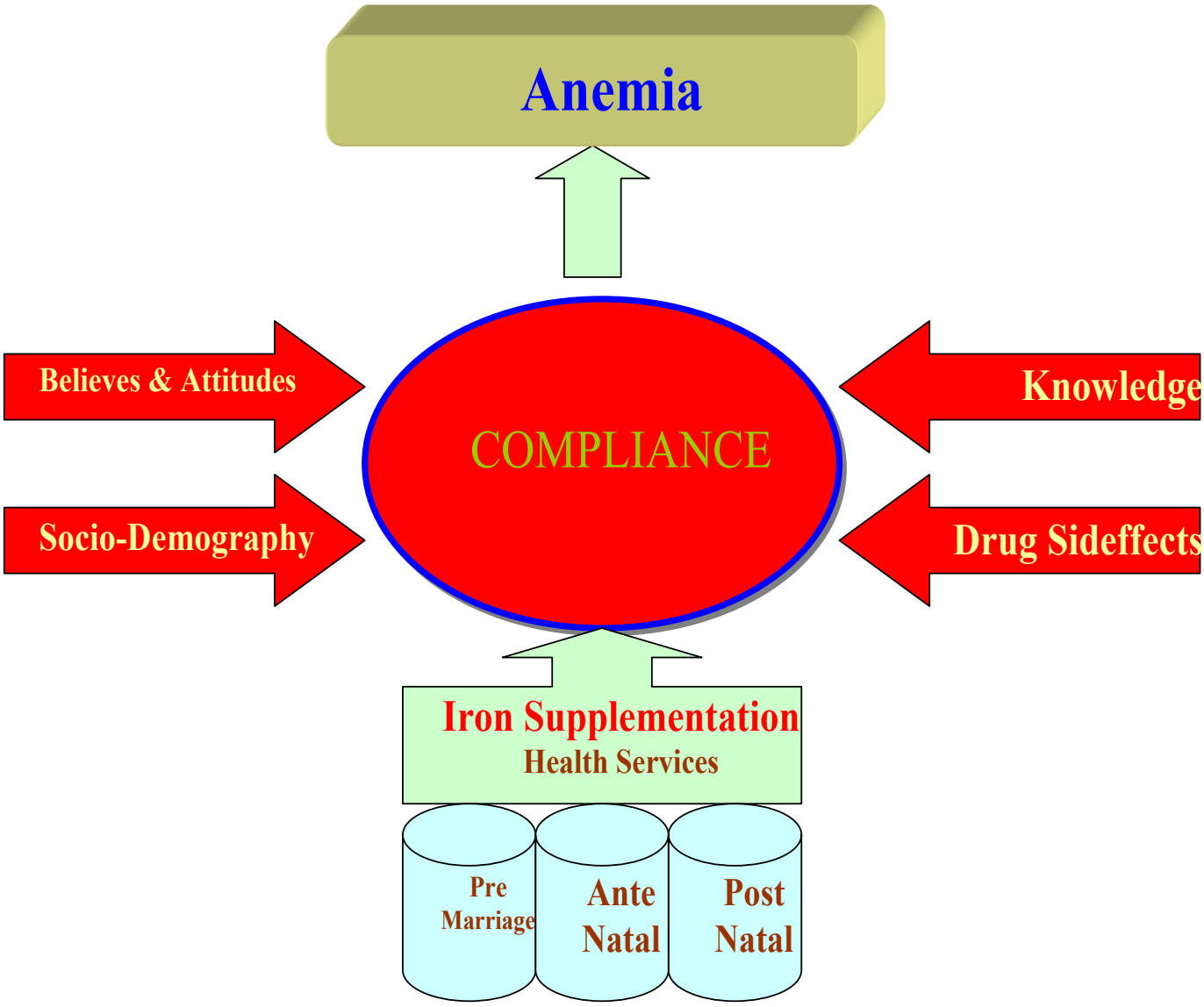
high risk pregnancies. Severe anemia in women is the main causal factor in up to 20% of maternal deaths according to data from the WHO (UNDP MDG Report, 2002). Up to 31.1% of pregnant women are anemic (PCBS, and Birzeit University survey, 2002), and only half of those anemic women 53.5% receive iron supplementation (Hanan, 2005).

2.13 Conceptual frame work

The researcher draws ideas extracted from different compliance concepts, which have been incorporated into the study conceptual framework.

Attention is paid keeping these concepts open and flexible to accommodate the diversity of different factors affecting compliance. A conceptual model is described as an attempt at organizing and donating a symbolic representation of conceptualization of phenomena with the minimal use of words (Burns, and Grove, 2001). Frame work is the conceptual under pining of a study and used to guide and direct the research process and to make research finding more meaningful and generalizable. Also, frame work is efficient mechanisms for drawing together and summarizing accumulating facts as shown in the figure there are many factors related and affecting the client compliance, with iron supplement, some are related to personal, like degree of knowledge, level and years of education, information about the iron supplement, attitude towards acceptance of the supplement, and beliefs. On the other hand socio-demographic factors that contribute extremely to high level of compliance, and factors related to supplement, a viability, side effect, package, taste, etc. All these factors affecting the level of compliance, which reflect there impact on prevalence of anemia. In other hand iron is provided to women through there attendance to health centre to have antenatal and postnatal care, iron supplement is distribute to women as prophylactic and therapeutic to combat iron deficiency and to reduce the prevalence of iron deficiency anemia according to WHO strategy (WHO,1992).

Conceptual framework



2.13.2 UNRWA Health Program

UNRWA plays an important role in providing health care services to all Palestinian, the main activities provided by the health centers it includes Antenatal (AN), postnatal (PN) and family planning (FP) services.

2.13.3 Antenatal care services

Antenatal care is an essential part of modern health care; such care is every woman's right. 96.5% of pregnant women attended antenatal care out of total live births. Antenatal care services are provided by four main sectors, the MOH, UNRWA, NGOs, and the private sector (MOH, 2005).

2.13.4 Postnatal care services

UNRWA provided postnatal care according to WHO standards, through one to two times after delivery and within 42 days. The aims of postpartum care are based on the needs of mothers and newborns (WHO, 1998).

2.13.4.1 Postnatal period:

Post natal period is defined as the period immediately after delivery till three months after the postpartum period is challenging enough for most new mothers.

2.13.5 Anaemia

The World Health Organization (WHO) defines anaemia in pregnancy and postpartum as a haemoglobin concentration below 11g/dL (WHO, 2007).

2.13.6 Iron supplementation

The provision of iron supplementary is one of the most widely practical public health,

Iron supplementation is almost universally recommended during pregnancy to correct or prevent iron deficiency (Nancy et al, 2002). UNRWA strategy regarding Iron

supplementation, it adopted the WHO and UNICEF strategy for prevention and treatment of iron deficiency anaemia compromising medicinal iron supplementation as prophylactic and treatment during antenatal and post natal period for three months (60 mg iron with 400 mcg of folic acid as prophylactic and 120 mg iron + 800 mcg of folic acid for treatment).

2.13.7 Compliance

The term compliance is generally used in medical trails to describe the adherence of patient or any person to take their medicines or follow order as describe, Compliance is basically adherence to a drug regimen as in taking medications correctly and on time. It encompasses the patients active participation in his or her own healthcare; seeking medical advice, keeping appointments, following recommendations concerning lifestyle, as well as following medical regimens(Wikipedia, 2008). According to dictionary compliance is Willingness to follow a prescribed course of treatment (American dictionary, 2008).

WHO; define compliance as faithful adherence by patient to instruction. Adherence to the regimen affects the effectiveness of the supplementation and many factors are related to compliance.

2.13.7.1 Socio-demographic and socioeconomic factors:

Socio demographic and socioeconomic factors that may affect the compliance to iron supplement were age, educational level and family income. The prevalence of anaemia increases with age and low socioeconomic status (Lisa et al, 2002). The incidence of anaemia increased as socioeconomic decreased and higher incidence was among patient with lower age group and multipara.

2.13.7.2 Obstetric factors

Obstetric history of the participant includes many factors that could predispose to occurrence of anaemia; these factors include gravidity, parity, previous abortions, previous caesarean section, history of complication during pregnancy, delivery, and postpartum. The prevalence of anaemia significantly increases with increasing number of previous pregnancy and gestational weeks (Nancy et al, 2002).

2.13.7.3 Side effects

Side effects of iron supplementation include constipation, diarrhoea, vomiting, or epigastric pain. These effects are reported to increase with dose and may have caused some women to abandon therapy or take less frequent than the recommended dose (Galloway et al, 1994).

Chapter 3: Methodology

This chapter describes the study methodology, research design, target population, sample size and sampling, eligibility criteria, data collection and analysis as well as ethical consideration and limitation of the study.

3.1 Setting of Study

The study was conducted in UNRWA clinics in Gaza Strip, which rendering comprehensive primary health care services including antenatal care and six weeks postnatal care services.

3.2 Study Design

A quantitative, analytic, cross sectional design was chosen in order to give a detailed description of factors that influence women's compliance with iron supplementation or not. According to Burns and Grove, this type of design is objective and systematic process for generating information about the world (Burns, and Grove, 2001). The specific research questions addressed will generate knowledge and stimulate further research. Furthermore, this type of design is economical and cost effective and it's useful for analysis of the study variables.

3.3 Population and sample

3.3.1 Target population:

The target population of the study consisted of all postnatal women attending the well baby UNRWA clinics at Gaza Strip, whose children aged four months. The mothers were attending maternal and child welfare clinic for baby immunization and growth monitoring.

3.3.2 Eligibility Criteria:

3.3.2.1 Inclusion criteria:

The inclusion criteria for the study were postnatal mothers who reside in Gaza Strip and registered in the UNRWA health centers, and attending the well baby clinics with their babies completed four months of age.

3.3.2.2 Exclusion criteria:

The exclusion criteria for the study were postnatal mothers who were not residing in the Gaza Strip or registered in the UNRWA centres and who refused to be interviewed, and women who had dead baby.

3.4 Sampling method

Sampling involves a process of selecting a subset of population that represents the entire population in order to obtain information regarding the phenomenon of interest.

The investigator utilized three stage stratified random sample, the first stage aimed to select three provinces out of five provinces randomly, then, the second stage aimed to select one health centres randomly from each provinces being selected. Finally, from each health centres being randomly selected the participants were randomly selected from a sampling frame. The sample frame contains of about 1800 subjects in two months of data collection period. To select a random sample, the researcher used the systematic method and selected 400 subjects for the study. The sample consisted of 400 mothers comprising those who attended the well baby clinic and who met the inclusion criteria.

3.5 Sample Size

By using Epi info statistic program, the study sample was calculated according to prevalence of compliance in pregnancy in the region which is about 50% and with 95% confidence interval. The sample was calculated 380 subjects and the researcher decided to take 400 subjects to compensate the non responding subjects.

3.6 Research instrument

An exit interview questionnaire was used for the women after they finished their visit and received the service for their babies at the age of four months. The questionnaire was used by the researcher, through meeting the women after receiving the care, asking them the questions and filling the answers to the questionnaire.

A questionnaire with closed ended questions was designed as the data collection instrument. The structured questionnaire was selected because it enables the investigator to be consistent in asking questions and data yielded was easy to analyze. Its benefit is saving time and effort, less costly, requires less energy in administration complete the questionnaire adequately and minimized as much as possible missing information. The questionnaire consisted mainly with closed ended questions; the questions were clear, unambiguous and were arranged in such a way that data collection was easy.

The questionnaire was divided into three sections:

Section **A** comprised of socio-demographic data which sought to obtain respondents age, educational status, residency and average family income.

Section **B** sought to determine the obstetric and antenatal history

Section **C** was aimed at the utilization and compliance of mothers with iron and folate.

3.7 Ethical Considerations

Approval for the study was sought from Helsinki Committee, as well as UNRWA Field Office/Gaza. Participants were selected from those wishing to participate in the study based on the inclusion criteria. The participants were given a copy of the informed consent prior to filling out the study, and a signed consent form was obtained from each participant.

Client confidentiality was assured by coding each participant form with a corresponding number. The researcher was the only persons who had a record of the names that correspond to the numbers. This information was kept in a locked file-box in a secure office. At the completion of the study, data sheets was coded and reported as group data.

3.8 Data collection

Data was collected using a structured questionnaire by face to face interview. The respondents attending the well baby clinic were approached to participate in the study. Detailed information about the study was given to the clients using their own Arabic language, before consent to participate was obtained. Face to face interviews was conducted in a private room to maintain privacy. During each individual interview the respondent was given the chance to ask questions concerning the research, debriefing sessions were conducted at the end of each individual interview and the researcher thanked the respondents for their participation.

3.9 Content Validity

The content validity was achieved through critical review of the instrument by the supervisor and other experts in the area of the study. Changes were made according to the

feedback of the experts and the supervisor. A pre-test was also carried out to ensure validity.

3.10 Pre testing (pilot study)

The purpose of the pre-test is to check the time taken to complete the questionnaire and to check the clarity of the questionnaire and to eliminate ambiguities in wording. Before starting the actual data collection process. Pilot study was done prior to the beginning of data collection to check applicability, identify problems in the research questionnaire and test data collection for validity and reliability. Sample of 15 mothers who were not be part of the actual study was selected randomly and interviewed by the researcher from one clinic, and the required modification of questionnaire was done according to piloting result to avoid ambiguity and misunderstanding.

3.11 Data entry and Statistical analysis

During data collection of the sample, the completed questionnaires was entered by the researcher using the Statistical Package for Social Science (SPSS) version 15 computer program for the data entry and analysis. Descriptive and relevant inferential statistical tests were used in the data analysis. The analysis of data was conducted as:

- Review of the filled questionnaire
- Coding the question
- Appropriate entry model
- Coding variables
- Data cleaning
- Frequency and cross tabulation of the result
- Advanced statistical analysis

Statistical relationship between variables and iron compliance were assessed using, cross tabulation and Chi-Square analysis.

P value equal or less than 0.05 was considered statistically significant.

Analysis used to illustrate distribution of level of compliance among women.

3.12 Limitations of the study

- Time limitation
- Political situation. During data collection Gaza Strip
- The study deals with one dimension of compliance to iron supplementation due to time limitation.

3.13 Response rate:

From among the sample size 400 subjects (women), 398 women (99.5%) responded.

Chapter 4: Results and Discussion

In this chapter the results and findings of the study are described and the analysis of the data are presented and discussed. The results describe information on the characteristics and the distribution of the respondents of questionnaires from the 3 health centers included in the study concerning the compliance to iron supplementation during post natal period. In addition the analyses provide relationship between some variables in regards to iron compliance. Some findings were also compared with other studies' findings.

4.1 Descriptive statistics

4.1.1 Characteristics of the study population

4.1.1.1 Socio-demographic characteristics:

The represented sample of the women included in this study was 398, who were distributed in regards to selected socio-demographic characteristics of the women and their husbands including, age, employment status, education and residency of the women, and husband's education and employment status as shown in Table (4.1).

Table4.1: Socio-demographic characteristics of women and their husbands:

characteristics	No.	%
Localities		
Beit Hanoun	50	12.6
Rimal	175	44.0
Rafah	173	43.0
Total	**398**	**99,5**
Residency		
Inside camp	50	12.6
Outside camp	348	87.4
Total	**398**	**100**
Age group		
25 Yrs and less	135	33.9
From 26 to 35 Yrs	175	44
More than 35 Yrs	88	22.1
Total	**398**	**100.0**
Employment status of the woman		
Employed	27	6.8
Unemployed	371	93.2
Total	**398**	**100.0**
Employment status of the husband		
Employed	329	82.7
Unemployed	69	17.3
Total	**398**	**100.0**
Women educational level		
Less than 9 years	115	28.9
9-12 years	182	45.7
More than 12	101	25.4
Total	**398**	**100.0**
Husband's educational level		
Less than 9 years	91	22.9
9-12 years	184	46.2
More than 12	123	30.9
Total	**398**	**100.0**
Family Income		
Below poverty line(<1700 NIS)	281	70.6
1700 -2100	58	14.6
More than 2100	59	14.8
Total	**398**	**100.0**
Type of family		
Nuclear family	254	63.8
Extended family	144	36.2
Total	**398**	**100.0**
Household number		
Less 5	120	30.2
6-10	178	44.7
10 and more	100	25.1
Total	**398**	**100.0**

4.1.1.1 Residency

The distribution of study population among the three randomly selected localities as shown in table (4.1) were (44%) from Gaza city followed by Rafah (43.5%) and (12.6%) from North Gaza Beit Hanoun.

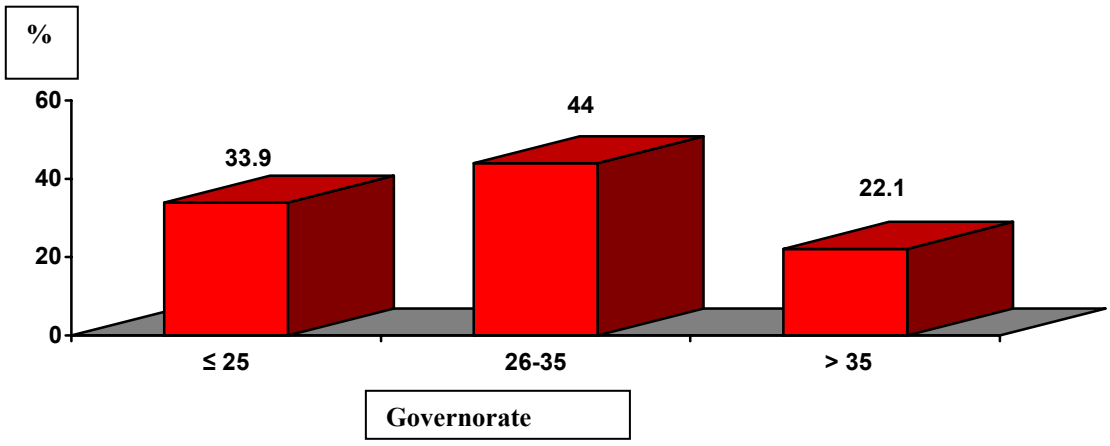


Figure 4.1: Distribution of study population by provinces

The distribution of participants regarding living area shows that 87.4% were living outside camps and 12.6% were living inside camps as depicted in Figure (4.2).

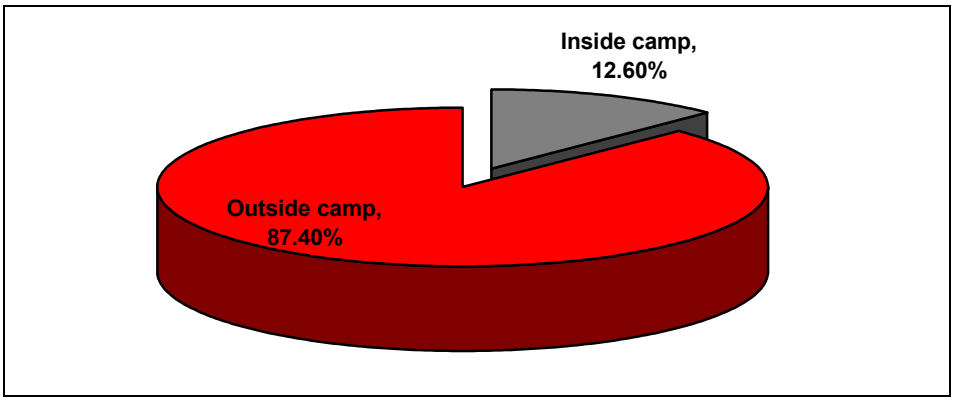


Figure 4.2 Distribution of women by place of residency

In this study, two of the three selected clinics were outside the camp. This finding is consistent with other studies conducted in Gaza Strip, Al Najar found that more women residing outside camps 67.4% (Al Najar, 2008). Also a KAP study about family planning demonstrated that about 69% of the study populations were living outside camps and 31% inside camps (Abu Nahla, 2006).

4.1.1.2 Respondents Age groups

The age of study population was divided into three main age groups; figure (4.3) shows the majority of population at age group between 26-35years (44%) which represented approximately half of population, followed by age group ≤ 25 years, which represented 33.9% of population, followed by age group > 35years (22.1%). The mean age for participant was 27.05 years with median of 26 years, and standard deviation (SD) 6.02. This result is nearly similar to other studies where the majority of the participated women (84.7%) were aged 35 years or less (MARAM, 2004), and the mean age was similar to the mean age of 27.1 in the study done in West Bank and Gaza.

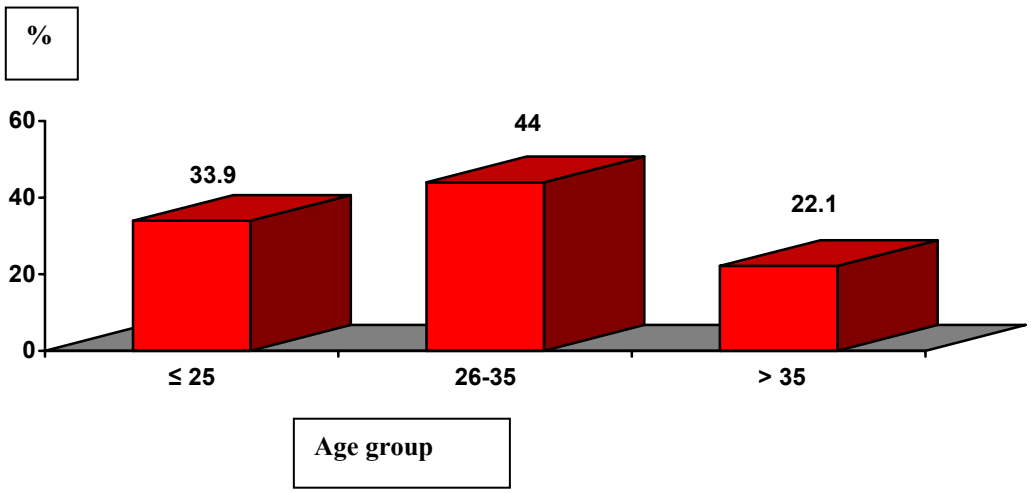


Figure 4.3: Distribution of study population by age

4.1.1.3 Educational level of the women and their husbands

Figure (4.4) shows the distribution of study population and their husbands by educational levels. The majority of cases were middle educational level (9 - 12 years) which represented approximately one half of the population (45.7% and 46.2% respectively), followed by low educational level (28.9% and 22, 9% respectively), the population of high educational level represented (25.4% and 30.9% respectively). The mean year of education for participant was (11.4 and 12 years respectively) with median of 12 years, and standard deviation (SD) 2.92 and 3.1 respectively. These findings are nearly similar to findings in other studies with very few differences. The mean educational years of the women and their husbands were 11.5 and 12.0 years respectively. The median was 12.0 years for both and the SD was 3.3 and 4.1 respectively (Abu Nahla, 2006). Also in a study in WB it is revealed that the mean schooling years completed for the women was 9.6 years and for their husbands it was 10.8 years respectively (Nawar et al, 2003).

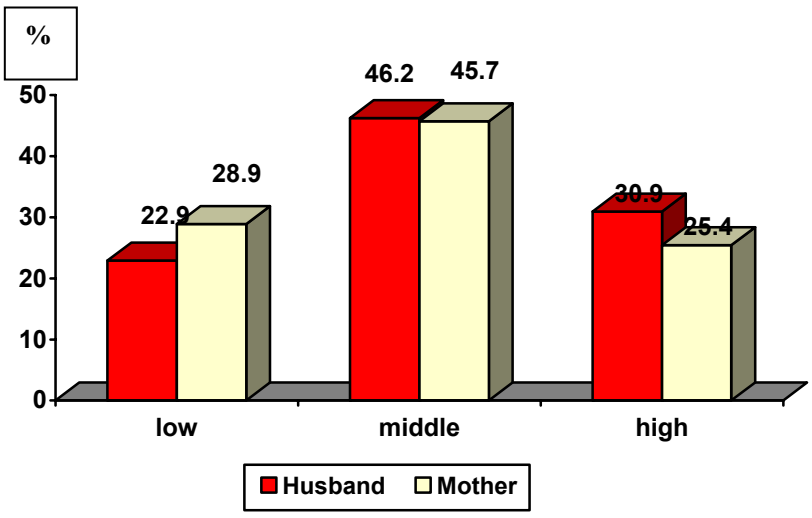


Figure 4.4: Distribution of women and their husbands by Educational levels

4.1.1.4 Employment status of the women and their husbands

Regarding employment status, figure (4.5) shows that, the majority of women were not work which represented 93.2% of total sample and only 6.8% of women were work. In contrast of this finding, the employment among husband was higher than women represented 82.7% compared with 17.3% of total husband not employed. This finding is similar to finding from MARAM study where the percentage of employed women was 7.9%, and different from the MOH findings which was 4.4% (MARAM, 2004; MOH, 2005).

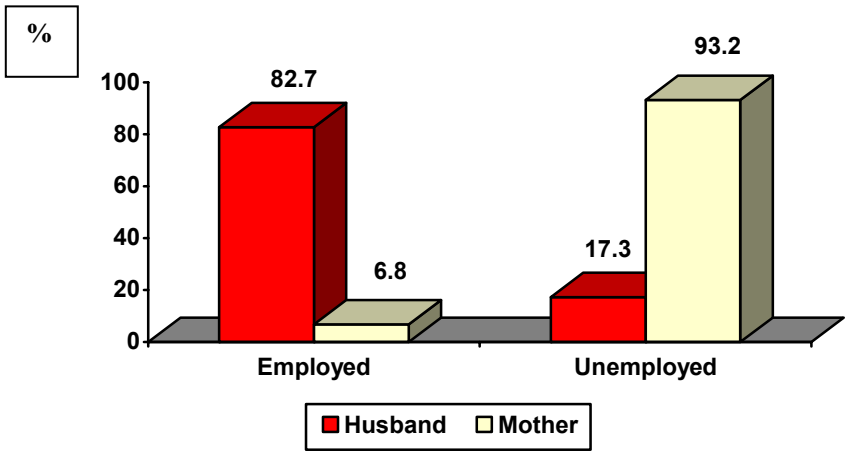


Figure 4.5: Distribution of study population by work status

The finding regarding husband's employment status shows that the percentage of employed husbands was higher than that of women and reached 82, 7% of them, but it is worth to mention that a proportion of them were working as Palestinian authority military employees at the time of the study. At present they are not working actually, but receiving their salaries from Ramalla authority. This result was not consistent with result of World Bank, showed that unemployment rate of 29, 8% was in Gaza during the year 2008 (World Bank, 2008).

4.1.1.5 Family type

As shown in (4.6) figure, the majority of study population lived in a nuclear family which represented 63.8%, while the population lived in extended family represented only 36.2%. This finding is consistence with Al Majdalawi study that showed that the majority of study population lived in nuclear family (Al Majdalawi, 2008).

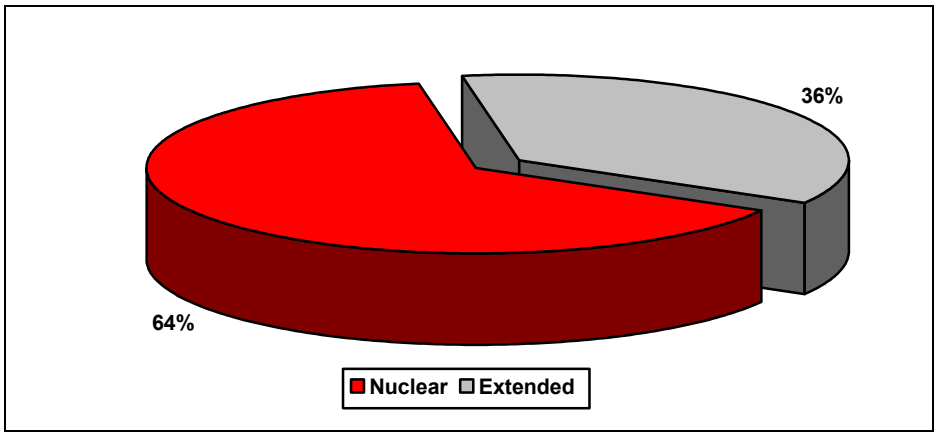


Figure 4.6: Distribution of study population by Family type

4.1.1.6 Average monthly income

The researcher divided monthly income into three categories as shown in figure (4.7), according to the classification of PCBC (2006). The finding revealed poor economic situation among the population study, unfortunately, 85.2% of total sample was below poverty line (less than 2100 NIS) , they were classified into 2 groups: 70.6% was less than 1700 NIS (extreme poverty), and 14.6% was average monthly income between 1800- 2100 NIS. On the other hand, the population which was above poverty line (more than 2100) represented only 14.8% of total study population. This reflects the bad economical situation of people.

This result was similar to that of Abu Nahla where 79% of families were below poverty line (Abu Nahla, 2006).

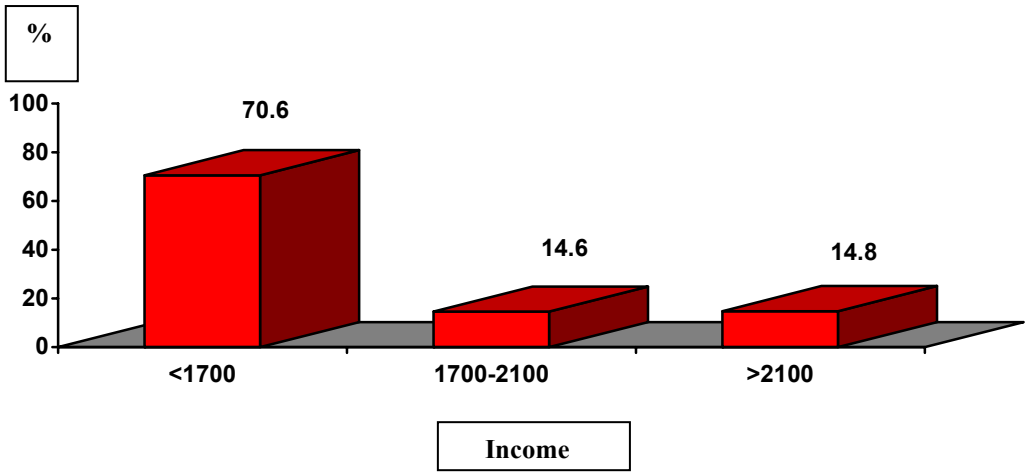


Figure 4.7: Distribution of study population by average monthly income

A review of the literature suggests that in developing countries, the use of iron supplementation during adolescent, pregnancy and post natal can be influenced by the socio-demographic characteristics of women, the cultural context, and the accessibility of these services (Aikawa et al, 2003).

5.1.2 Obstetric history related factors

As shown in table (4.2), the marital age of the women was 17 years and less in 35.4% while 64.6 % of the mothers aged 18 years and more the mean marital age of the respondents was 18.9 years old, the median was 18.0, with SD 3.2.

Table (4.2) Distribution of women by previous obstetric history and some related factors

Variable	No.	%
Marital Age		
17 years and less	141	35.4
18 years and more.	257	64.6
Total	**398**	**100.0**
Number of pregnancies		
2 and Less	135	33.9
3 to 5	143	35.9
6 and above	120	30.2
Total	**398**	**100.0**
Time of registration		
1st trimester (< 14 weeks)	303	76.1
2ed trimester(>14-28 weeks)	92	23.1
3ed trimester >28 weeks	3	.8
Total	**398**	**100**
Breast feeding		
Exclusively breast feeding	226	56.8
Not exclusively breast feeding	172	43.2
Total	**398**	**100.0**
Nr of visits during antenatal care		
1 -3 times	8.0	2.0
4-7 times	169	42.5
>7times	221	55.5
Total	**398**	**100**
complications		
No complication	284	71.4
Hypertension	50	12.6
Blood problems(bleeding , severe anemia)	37	9.3
Diabetes	3.0	0.8
Premature labor	9.0	2.3
Others	15	3.8
Total	**398**	**100**
Hb level at 1st registration in pregnancy		
<11	118	29.6
11 and more	280	70.4
Total	**398**	**100**
Hb level at last visit in pregnancy		
<11	155	38,9
11 and more	228	57.3
Total	**383**	**96.2**
Mod of delivery		
Normal	350	87.9
C.S	48	12.1
Total	**398**	**100**

According to MOH annual report 2005 the mean marital age of the women visited at home after delivery was 19.4 years which is similar to the result in this study (MOH, 2005) and according to UNRWA study done in the year 2005 the mean marital age was 19.1 years

old which is similar to the result of this study, too (UNRWA, 2006-b). The study result is consistence with result of the Palestinian Central Bureau of Statistics (PCBS) for the median age of women at marriage in Gaza which was 18.0 years, too (PCBS, 2005). The early marriage that resulted in long reproductive period gives again an indication about the importance of iron supplementation before marriage, during pregnancy and during post natal period.

The number of pregnancies was two and less in 33.9% of the women, 3 to 5 in 35.9% of them and 6 and above in 30.2%, the mean number of parity was 3.8 the median was 3.0. On evaluating the time of registration for antenatal care, the results show that 76.1% of the women were registered during their first trimester of pregnancy, 46.2% of them were registered in the second trimester and 0.8% in the 3rd trimester. The study result is consistent with the UNRWA annual report 2007 which revealed that 75.9% of women were registered at 1st trimester, 23,1% were registered at 2^{ed} trimester, and 1,0% were registered at 3rd trimester (UNRWA, 2007). For the frequency of visits to antenatal care clinics the researcher classified the women into three groups as shown in table (4.2), women who paid 1 -3 visits were 2% while 42.5% paid 4-7 visits and 55.5% paid more than seven visits these result is similar with data from UNRWA, MOH, and MARAM (UNRWA,2007; MOH,2005; MARAM,2004).

Referring to complications during pregnancy and delivery, results show that 71.4% of respondents had no complications and 12.6% had hypertensive disorders. Blood problems (bleeding or severe anemia) constituted 9.3% of complications while 0.8% of the cases had diabetes and 2.3% complained of premature labour. These findings are similar to the findings of the UNRWA annual report related to hypertensive disorders 12.3%, and differ in the prevalence of diabetes and blood disorders which were in lower rate 1.7% and 28.1% respectively (MOH, 2005).

On reviewing the women records for Hb level at 1st registration the researcher found that 29.6% of them were aneamic (Hb level less than 11) while 70.4% of them were not aneamic at registration (Hb level 11 and more). The researcher also examined the women Hb status at last visit, 38.9% of the women were aneamic 57.3% of them were not aneamic on their last visit for antenatal care. The study result does not match the finding of anemia study conducted in Gaza during 2006 revealed that percentage of anemia was 44.9% among pregnant women, but also these results indicate that in Gaza the prevalence of anemia is still high among women and these data reflect the bad socio economic status. Regarding the mode of delivery results show that 87.9% of the respondents passed a normal delivery while 12.1% of them delivered by cesarean section. These findings came in accordance with two studies, one conducted by MARAM and revealed a rate of 12.7% and the second is based on C.S rate approximately 12.8%. (PCBS, 2005: MARAM, 2004). This finding is higher than the percentage of women (10%) who were delivered by cesarean section among all reported deliveries in the Gaza Strip according to the annual report of UNRWA (UNRWA, 2007). The lower rates rate is may be due to under reporting as mentioned in the same report.

4.1.3 Postnatal care related factors

Table (4.3) shows the distribution of mothers by some factors related to postnatal care; the percent of women having post natal care was 84.9%, while 15.1% of them did not have post natal care done. Among the women who received post natal care, 76.9% of them having it one time while 8% of them had post natal care twice. These findings differ from results of a study conducted for post natal assessment in Gaza and revealed that 98.9% of pregnant women had postnatal care (Al Najar, 2008). It is worth to mention that postnatal care provided through one to two visits at UNRWA clinics, while WHO recommendation is according to (6-6-6-6 model) (WHO,1998-b).

The researcher reviewed the women records for Hb level during post natal period, the researcher found that 49.2% of the women had their Hb checked while 50.8% of them had not, 40.3% of the women were anemic (Hb level less than 11) while 59.7% of them were not anemic during post natal period (Hb level 11 and more) these result dose not match the prevalence of anemia among nursing mother 45.7% in UNRWA annual report 2007 (UNRWA, 2007).

Table (4.3) Distribution of mothers by some factors related to postnatal care

Variable	No.	%
Post natal care		
Number of women having post natal care	338	84.9
Number of women not having post natal care.	60	15.1
Total	**398**	**100.0**
Number of post natal care visits		
once	306	76.9
twice	32	8
Total	**338**	**84.9**
Hb status during post natal		
checked	196	49.2
Not checked	202	50.8
Total	**398**	**100**
Hb level during post natal		
<11	79	40.3
11 and more	117	59.7
Total	**196**	**100**
Hb level and decision to take iron supplementation		
yes	341	85.7
No	57	14.3
Total	**398**	**100**
Iron supplementation during post natal care		
Received	218	54.8
Not Received	180	45.2
Total	**398**	**100**
Number of times received iron supplementation postnatal care		
One time	200	51.2
2 times	12	2.1
3times	6	1.5
Total	**218**	**54.8**

Regarding that, I explained these findings by the fact that not all of women attending for post natal care have possess for Hb checking. On evaluating the effect of Hb level on the women decision to take iron supplementation, 85.7% of the women thought that their Hb

level did affect their decision of taking iron supplementation however 14.3% did not agree with them.

The study shows that 54.8% of the respondents received iron supplementation during post natal care, 51.2% of them received it once, while 2.1% received it twice and the others 1.5% received iron supplements three times, meanwhile 45.2% did not receive at all. These results indicate that in Gaza the rate of iron supplementation during post natal is not high but it is better than other countries. In a study done among Scandinavian women, 27% of the women complied with the guidelines that recommended continuous iron supplementation during pregnancy, while another 41% reported non compliance, and one third of women reported no iron supplementation (Nordeng et al, 2002). This reflects the need for increasing awareness of the Palestinian people about the importance of iron supplementation during post natal. Therefore it is a great opportunity to the health provider to focus on the importance of iron supplementation on prevention and promotion of the health status after delivery.

5.1.4 Counselling related factors

On examining the counseling practices at the postnatal checks sessions the results revealed that 51% (102) of total anemic women were counseled about anemia while 49% were not. From total study subjects 33.9% were counseled about iron supplementation, but 52% were not. The women claimed that counseling in general did have an effect on the decision to take iron supplementation were 87.9% while 12.1% of them thought that it did not. Referring to the effect of counseling during service on their own decision to take iron supplementation 46.7% thought that counseling did have an effect on their decision to take iron supplementation, while 53.3% did not.

On questioning who provided the counseling for the respondents, results reveal that the majority 83.3% of cases received information from a midwife, in 14.5% information was provided by Doctor, and in the least 2.2% information was provided by the staff nurse.

Table (4.4) Distribution of women by counselling factors

Variable	No.	%
Counseling about anemia		
Yes	52	51
No	50	49
Total	**102**	**100**
Counseling about iron supplementation		
Yes	135	33.9
Yes but not sufficient	56	14.1
No	207	52.0
Total	**398**	**100**
Counseling about duration of iron supplementation in postnatal		
Yes	64	16.1
No	334	83.9
Total	**398**	**100**
Effect of counseling in general in convincing to take iron		
Yes	350	87.9
No	48	12.1
Total	**398**	**100**
Effect of counseling during service on decision to take iron supplementation		
Yes	186	46.7
No	212	53.3
Total	**398**	**100**
Degree of counseling effect		
Very high	25	13.5
High	67	36.2
Moderate	80	42.2
Low	14	8.1
Total	**186**	**100**
Information provided		
Doctor	27	14.5
Midwife	155	83.3
Staff nurse	4.0	2.2
Total	**186**	**100**

Our study result controversy with a study in Lao municipality which reported that 83.9 % of pregnant women received information about anemia from doctors and 55% of them received information from other health personnel (Vongvichit et al, 2004).

4.1.5 Factor related to knowledge and practice

4.1.5.1 Iron supplementation knowledge

The researcher examined the degree of women knowledge about iron supplementation and duration to take it by number of questions classified into two groups, first group deals with the importance of iron supplementation for women and their babies and the second deals with; when to start and duration that it must be taken.

Table 4.5 Distribution of supplementation knowledge according to questions groups

Item		Percentage	
		Yes	No
1	Prevent and treat anemia	96.7	3.3
2	Improve health status	56	44
3	Protect from diseases	37.9	62.1
4	Improve work performance	32.7	67.3
5	Protect my baby	45.2	54.8
6	Knowledge about taken for three month duration in post natal period	58.3	41.7
7	Knowledge when to start iron supplementation in pregnancy	68.6	31.4

Knowledge was composed of 7 questions about the importance of iron supplementation in prevention of anemia, improve health status, protect from disease, improve and protect the fetus duration of iron consumption and when to start it.

The prompted correct answer was given one score, incorrect answer was given 0 score. The total score was 0-7. The knowledge score was classified into 3 groups: good level ***(>70%)*** of total score, middle level ***(51- 70%)***, and low level ***(≤ 50%)***.

The women who knew that iron supplementation prevents and treats anemia were 96.7%, and of them 56% knew that it improves the health status. Of the respondents 37.9% understood that it protects from diseases, while 32.7% stated that it improves work

performance, and only 45.2% knew that it protects their baby. Among the respondents 58.3% have knowledge about taking iron supplements for three month duration in post natal period, 68.6% knew when to start iron supplementation in pregnancy.

Table 4.6: Distribution of supplementation knowledge score

Score	supplementation knowledge Importance and duration	
	frequency	percentage
low level ***(≤ 50)***	173	43.5%
middle level ***(51- 70)***	154	38.7%
good level ***(>70)***	71	17.8%

As shown in table (4.6), interestingly, the majority of knowledge score for the women groups was less than 50% which reflect low knowledge among populations study.

Regarding to knowledge related to supplementation, only 17.8% of women scored more than 70%, while 38.7% scored between 51-70 %, and 43.5% of women scored ≤50%.

Despite the importance and the essential needs for the information regarding iron supplementation, not all the women received them even that the opportunity to do is very high in this period. So, health providers should exert more effort to provide such information and care to the women because increasing awareness of the women is crucial in helping her to promote her own health. Therefore it is a great opportunity to the health providers to pay attention in providing information to women through their attendance to have care during pregnancy and postnatal period, and also for stakeholder to expand the services to cover the adolescent's girls whose are highly needed because of prevailing of early marriage among Palestinian population. In this regard it is important to ensure proper and well trained health providers in health facilities and to strengthening of increasing of public and community awareness. In general the results have a great

indication that the women knowledge about iron supplementation is very low which needs more concentration on health education and information in this regard. Training workshops could be helpful in upgrading the provider's knowledge to empower them and to increase their skills and knowledge. This will enable them to better provision of information.

4.1.5. 2 Factor related to practice

On assessing respondents compliance to iron supplementation the results show that 46.7% of them did take it while 53.3% did not. These results indicate that the compliance rate for iron supplementation is low among women in postnatal period and by reviewing the literature it is similar with a study conducted in USA among women with low socio-economic status whose frequently receive inadequate or no prenatal or postpartum care and they reported low compliance rate for iron supplementation during pregnancy and postnatal period (Lisa et al, 2002), while in other study conducted in Mali revealed that the Malian women adhere to prenatal/postpartum iron supplementation - no matter what supplement is chosen - when access to supplements is guaranteed and when they are provided with minimum, consistent and easily understandable information and counseling (Aguayo et al, 2005).

From the study population who claimed that they have taken iron supplementation, 41.9% always taken iron according to recommended dose while 46.8 % reported that some times they take iron according to recommended dose and 11.3 % was not at all consistent with the recommended does.

To identify the factors that influences the women compliance with their iron supplementations the respondents who did not take were asked why they have not taken it, the study revealed that 37.9% of the women thought they were not anemic as to need the iron supplements, 24.6% of them did not care to take it while 21.7% of women forgot to

take it. 7.9% attributed their non compliance to side effects of the drug, and also 7.9% thought they did not need it because they were eating well,

Table (4.7) Distribution of women by iron supplementation practice factors

Variable	No.	%
Taken iron supplementation in post natal		
Yes	186	46.7
No	212	53.3
Total	**398**	**100**
Taken iron consistent with recommended dose		
Yes always	85	41.9
Some times	95	46.8
Not at all	6	11.3
Total	**186**	**100**
Reason for not taken according to recommended dose		
Side effect	16	7.9
Not care	50	24.6
Not anemic	77	37.9
Eat well	16	7.9
Forget	53	21.7
Total	**212**	**100**
Specified side effect		
Epigastric pain	43	39.8
Taste	16	14.8
Constipation	38	35.2
Allergy	4	3.7
Others	7	6.5
Total	**108**	**100**
Dose effect on acceptance to take iron		
Yes	186	46.7
No	212	53.3
Total	**398**	**100**
Preference to take it		
Once a day	322	80.9
Twice a day	56	14.1
Twice per week	20	5
Total	**398**	**100**
Receiving iron from other source		
Yes	48	12.1
No	350	87.9
Total	**398**	**100**
Asking for iron supplementation		
Yes	14	3.3
No	384	96.5
Total	**398**	**100**
Reason for asking		
Not a viable	7	53.8
Midwife forgot	6	46
Post natal visit not enough	1	0.2
Total	**14**	**100**
Excess of tablets		
Yes	22	5.5
No	376	94.5
Total	**398**	**100**

These findings in this study demonstrated much better situation than the findings in Al Lilly study, which revealed that reason for non compliance was 23.4% related to women forgetness, 31.2% did not care, 27.3% related to side effect and 18.2% don't like to take it (AL Lilly, 2002). Another study found that the causes of low compliance of taking iron tablets among pregnant women were forgetfulness (47.98 %), side effects (18.38 %), long term taking of iron tablets (16.14%), and fear of having big fetus (13 %) (Vongvichit et al, 2004). Some authors indicated that the main reason for the poor compliance with the programs of iron supplementation is the unavailability of iron supplements for the targeted women (Galloway, and McGuire, 1994). In a study conduced in Veitnam the average duration of taking iron tablets was significantly longer in women who received information from radio/TV ($p < 0.01$), had a frequent supply of iron tablets ($p < 0.001$) and who did not experience side effects ($p < 0.005$)(Aikawa et al, 2003).

These findings in our study give an indication that poor compliance is related to special causes attributed to the women's attitude and practice. So, sustainability and improvement of health education programs is needed to improve the situation.

Among respondents who claimed to have side effects 39.8% of them complained of epigastric pain and 14.8% complained of its bad taste. Constipation was a problem for 35.2% of women while 3.7% faced allergy problems and 6.5% of respondents had other problems. Reviewing the literature the finding in our study is similar to many studies in different countries; the majority declared that gastric pain, vomiting, constipation and allergy are the most common side effect (Ziauddin et al, 2002).

As iron supplement dose and frequency could be bothering to some women, they were questioned on the dose effect on their acceptance to take iron, 46.7% of respondents were agreed that the dose does affect the acceptance of the supplement while 53.3% did not think so. This result is consistence with Nancy study, reported that increase in dose, leads

to increase in side effects and may have caused some women to abandon therapy (Nancy et al, 2002).

On asking them how they would prefer to take it; 80.9% of the respondents preferred to have it once a day, while 14.1% preferred it as twice a day and only 5% wanted to have twice per week. The researcher thinks that our respondents may lack the knowledge of the iron supplements of less frequent doses that is proved to be effective, or else they would have chosen the least frequent doses as it is easier to comply with.

Supplementation trials in pregnant women that included intermittent dosing schedule were performed by Eskerland et al study. Sixty milligrams of elemental Fe daily or 180 mg Fe weekly was provided to women. Sixteen percent of women who received daily iron dose and 25% of women who received weekly iron dose were anemic at term. Six to eight times more side effects were reported by women taking iron supplements daily than by those taking iron supplements weekly (Eskerland et al, 1997). In addition, Ziauddin found in a study conducted in Bangladesh that compliance ratio was significantly higher in the weekly –supplementation regimen (93%) than in the daily supplementation regimen (61%, p<0, 05) (Ziauddin et al, 2002). Our finding regarding weekly supplementation does not meet the recent finding in studies done in Western Pacific, India, Cambodia revealed that weekly iron supplementation can be effective in reducing the prevalence of anemia and improve iron status (WHO, 2007-b).

To examine the respondents' source of iron supplementation, they were asked if they have it from another sources, 12.1% did have supplements from a source other than UNRWA while 87.9% did not. This result is similar to finding in a study conducted by Al Najar to assess post natal care at UNRAW health facilities (Al Najar, 2008).

To identify if the respondents have ever at any time had a shortage of their supplements, they were questioned if during their visits to the health center they ever asked for more iron

supplementation. Of respondents 96.5% have never asked for more iron while 3.3% claimed that they have asked for more supplements at some time during their visits. From among 14 respondents who asked for more iron 53.8% justified that it was not available while 46% the midwife forgot to give them their supplements. One respondent (0.2%) said that post natal visit was not enough. These results met the results of a study conducted by Galloway, showed that reason for non compliance were insufficient service delivery and patient related factors (Galloway, 2002).

As to test the validity of women compliance to their supplements; the respondents (claimed that they have taken iron supplementation in post natal) were questioned if they had any excess of tablets and only 5.5% of them did have excess at some time while the majority 94.5% did not. This finding is relatively very low in comparison with Al lilly finding 43.9% have excess of tables and 56, 1% have not (Al llily, 2002). These findings of our study reflect a better level of commitment to follow the instruction of iron supplementations.

4.1.6 Factors related to antenatal period

4.1.6.1 Antenatal practice factors

Table (4.8) shows distribution of mothers by factors related to antenatal period; the researcher reviewed the women records for Hb level during antenatal period, the researcher found that 43.0% had their Hb checked three times, while 32.4% of them had checked it twice. The respondents who had their Hb checked more than three times were 23.9% and 0.8% of the women had their Hb checked only once. These findings are consistent with the recommendations of UNRWA T.I and reflect highly commitment of the health care providers to T.I.

Table (4.8) Distribution of mothers by factors related to antenatal period

Variable	No.	%
Number of Hb checks during pregnancy		
Once	3	0.8
twice	129	32.4
Thrice	171	43.0
More	95	23.9
Total	**398**	**100**
Hb level and decision to take iron supplementation		
Yes	341	85.7
No	57	14.3
Total	**398**	**100**
Opinion about time to start iron supplementation during pregnancy		
1st trimester	273	68.6
2ed trimester	92	23.1
3rd trimester	5	1.3
Don't know	28	7
Total	**398**	**100**
Receiving iron supplementation during pregnancy		
Yes	396	99.5
No	2	0.5
Total	**398**	**100**
Regularity of receiving iron supplementation during pregnancy		
Every visit	325	81.7
Irregular	71	17.8
Total	**396**	**99.5**
Taking iron supplementation		
Yes	376	94.5
No	22	5.5
Total	**398**	**100**
Number of times taken iron supplementation during antenatal period		
Once a day	265	69.7
Twice a day	68	17.9
Irregular	47	12.4
Total	**380**	**100**
Taken iron consistent with recommended dose		
Yes	335	94.2
no	63	5.8
Total	**398**	**100**
Asking for iron supplementation during antenatal period		
Yes	**68**	**17.1**
No	**330**	**82.9**
Total	**398**	**100**
Reason for asking		
Not available	**40**	**58.8**
Midwife forgot	**10**	**14.7**
Use more than recommended	**12**	**17.6**
Supplement spoiled	**6**	**8.8**
Total	**330**	**100**
Suitability of iron supplementation distribution in UNRWA clinics		
Suitable	**396**	**99.5**
Not suitable	**2**	**0.5**
Total	**398**	**100**
Satisfaction level about information provided regarding iron supplementation		
Yes	**234**	**58.8**
No	**164**	**41.2**
Total	**398**	**100**

On evaluating the effect of Hb level on the women decision to take iron supplementation during pregnancy 85.7% of the women thought that their Hb level did affect their decision of taking iron supplements however 14.3% did not agree with them. This finding met the result of a study in USA revealed that Hb does affect the compliance rate with statistically significant level (Beard et al, 2005).

Regarding the respondents opinion about time to start iron supplementation during pregnancy, 68.6% of them said in the 1st trimester while 23.1% thought to start it in the 2ed trimester, fortunately only 1.3% thinks to start it in the 3rd trimester and 7% didn't know. These results reflect mild knowledge level among the study population, and give an indication to focus on health education, training and knowledge improvement of health providers. The study shows that 99.5% of the respondents received iron supplementation during antenatal period 81.7% of them received it at every visit, while 17.8% received it irregularly. These finding were perceived good and adequate program coverage during antenatal care. In general it demonstrates high compliance percentage among women during pregnancy and this finding does not match Al llily finding which revealed that compliance rate to iron supplementation during pregnancy 56.1% (Al llily, 2002).

The findings are different from UNRWA survey in Gaza and WB in 1993 revealed that supplementation was found to be almost universal (97%) but compliance was only 77% during pregnancy (UNRWA, 1993).

To evaluate the midwives compliance with giving the pregnant women iron supplementations at each visit, the respondents were questioned if they ever needed to ask for their supplements at any time during pregnancy. Among them 17.1% did ask for iron supplements at sometime during their antenatal visits. The reason for that varied between the 68 (17.1%) women; it was not a viable in 58.8% and 17.6% use more than recommended. Out of them 14.7% the midwife forgot to give them their supplements and

the other 8.8% had spoiled tablets. The reasons results are similar to other studies, as in Galloway study which revealed that reasons for non-compliance with iron deficiency treatment was lack of political commitment and financial support; poor provider-user dynamics; lack of supplies, access, training, and motivation of health care professionals; (Galloway, 2002). And illustrate the need for paying more effort to improve and correct these reasons.

As to assess the clients satisfaction of the UNRWA services regarding iron supplementation they were asked two questions the first question was on the suitability of iron supplementation distribution in UNRWA clinics, 99.5% thought that it was suitable. These findings are much better than the result of UNRWA survey in West Bank and the Gaza Strip, which demonstrate that women were not pleased when they spent long time for receiving their supplementation from the pharmacy (UNRWA, 2003).

The second question was about their level of satisfaction about information provided regarding iron supplementation, 58.8% were satisfied while 41.2% were not. These finding reflect the need for paying more effort to introduce change. These results lead to that increasing level of satisfaction is needed through providing information, sessions of health education, more training and supervision for health providers as well as identifying best practice to be applied.

4.1.6. 2 Antenatal counseling factors

The counseling factors during antenatal period were assessed through a group of three questions, the first question was if the respondents were counseled during pregnancy 81.4% of them were counseled while 5% were not and 13.6 thought that the counseling they have received was not sufficient.

On asking if counseling affected their decision to take iron supplementation during pregnancy 92.2% of them said that it did, but 7.8% of them did not see any effect of the counseling on their decision to take the supplements.

Table (4.9) Distribution of mothers by counselling factors during antenatal period

Variable	No.	%
Counseling during pregnancy		
Yes	324	81.4
Yes but not sufficient	54	13.6
No	20	5.0
Total	**398**	**100**
Counseling effect on decision to take iron supplementation during pregnancy		
Yes	367	92.2
No	31	7.8
Total	**398**	**100**
Degree of counseling effect		
Very high	67	18.2
High	208	56.7
Mild	77	21
Low	15	4.1
Total	**367**	**100**

Out of the group who thought of the effect of the counseling on their decision to take the supplements; 18.2% found it very high, 56.7% found it has a high effect while 21% thought that the effect was mild, and 4.1% thought it has low effect. In spite of these result which demonstrated low counseling level and its impact on iron supplementation compliance, other studies revealed the effect of counseling on improving skills and knowledge and practice of all concerned persons on increasing women awareness and improving compliance rate (Lutsey et al, 2006). Therefore continues counseling and health education will help much in achieving this goal.

4.2 Inferential statistic:

4.2.1 Socio-demographic factors

4.2 .1.1 Iron compliance and selected socio-demographic variables:

Table (4.10) demonstrates the relationship between iron compliance and selected socio-demographic variables. There were statistically significant differences between the different governorates and residency with respect to compliance with iron supplements (P-value <0.001). The compliance percent in Rimal (67.4%) was higher than Beit Hanoun (60%), the lowest mean was for Rafah (22%) respectively.

Table 4.10: Relationship between iron compliance and selected socio-demographic variables (part 1)

Variables		Compliance		Non compliance		P-value
		Number	Percentage	Number	Percentage	
Governorate	*Beit Hanoun*	30	60.0	20	40.0	<0.001*
	Rimal	118	67.4	57	32.6	
	Rafah	38	22.0	135	78.0	
Residency	*In side camp*	16	32.0	34	68.0	0.033*
	out side camp	170	48.9	178	51.1	
Age group	*<25 yrs*	73	47.1	82	52.9	0.803
	25-35 yrs	64	44.8	79	55.2	
	>35 yrs	49	49.0	51	51.0	
Women work status	*Yes*	12	44.4	15	56.6	0.844
	No	174	46.9	197	53.1	
Husband work status	*Yes*	154	46.2	175	53.2	1.000
	No	32	46.4	37	53.6	

The compliance percent was higher for women outside (48.9%) camps than those who live inside camps (32.0%).

The results of this study correlate with results of a previous study which has been conducted in Scandinavian it was found that there is a statistically significant difference in compliance to iron supplementation among women living in Uppsala and Bergen than women in Trondheim (Nordeng et al, 2002). Also important differences in compliance to iron supplementation guidelines in pregnancy between regions and countries have been found but the explanations to such differences are not fully understood in another study (Svanberg et al, 1975). One hypothesis may be that the place of residence reflects differences in antenatal and post natal care. The results of this study also correlates with a study on Oyo State, Nigerian women found that those in urban location, were more compliant with iron supplementation (Dairo, and Lawoyin, 2006).

In this study there were no statistically significant differences between current age and women work status nor husband work status with respect to compliance with iron supplements. (P value = 0.803, P value = 0.844, P value = 1.000 respectively).

The results of this study correlate with results of a previous study which has been conducted in Vientiane Municipality , Lao, as it was found that there was no association between age, occupation of pregnant women and the compliance of iron supplementation. It could be explained that most of women, regardless to their occupation, education level and family income would have similar opportunities to have knowledge of anemia, perception of benefits and obstacles of preventive action, perception of threat of anemia and cues to action (Vongvichit et al, 2004).

Results of this study were controversial to previous study of Boonserm K. which revealed that pregnant women with older age had better behaviors in prevention and treatment than pregnant women with younger one(Boonserm, 1996). Another study also on Oyo State

Nigerian women, found that teenage mothers and those aged 35 years and above were less likely to be compliant (Dairo, and Lawoyin, 2006).

Table 4.11: Relationship between iron compliance and selected socio-demographic variables (Part 2)

Variables		Compliance		Non compliance		P-value
		Number	Percentage	Number	Percentage	
Women education level	*<9yrs*	60	52.2	55	47.8	0.339
	9-12yrs	83	45.6	99	54.4	
	>12yrs	43	42.6	58	57.4	
Husband education level	*<9yrs*	42	46.2	49	53.8	0.003*
	9-12yrs	101	54.9	83	45.1	
	>12yrs	43	35.0	80	65.0	
Family income	*<1700*	138	49.1	143	50.9	0.121
	1700-2100	20	34.5	38	65.5	
	>2100	28	47.5	31	52.5	
Household number	*<5*	56	46.7	64	53.3	0.720
	5-10	80	44.9	98	55.1	
	>10	50	50.0	50	50.0	

Statistically significant

Table (4.11) also describes the relationship between iron compliance and other selected socio-demographic variables, there were statistically significant differences between husband education levels and the women compliance with iron supplements (P value < 0.001), its illustrated that the higher compliance was among the group of husband

education of 9-12 years (54.9%), while the lowest compliance was among the group of husband education of more than 12 years (35.0%).

No significant differences observed between women education level, the family income nor the household number in respect to the iron supplement compliance (P value = 0.339, P value = 0.121, P value = 0.720 respectively). This study is not consistent with a previous study that odds ratio for non-compliance was higher among women with more than 12 years of education, although this association showed only borderline significance (Nordeng et al, 2003). In an Irish study, education was not associated with compliance but women in higher socio-demographic groups had lower compliance to guidelines of iron supplementation because they believed they had an adequate diet (Alward, and Kevany, 1984). Neither length of education nor age was associated with the use of iron supplements in a Finnish study (Erkkola et al, 1998).

4.2.2 Iron compliance and obstetric variables

Table (4.12) shows the relationship between iron compliance and obstetric variables, concerning the number of visits the woman pays to the health centers during pregnancy there was found a statistically significant differences of (P value < 0.001). The highest compliance was among women paid 4-7 visits (58.0%) while among the group of 1-3 visits was the lowest compliance (37.5%). There were no statistically significant differences between marital age and parity in respect to the iron supplement compliance (P value = 0.295, P value = 0.964 respectively), also no statistically significant differences were found between time of registration nor breast feeding (P value = 0.894, P value = 0.311).

The results of this study correlate with results of a previous study which found no association between non-compliance and parity (Nordeng et al, 2002).

Table 4.12: Relationship between iron compliance and obstetric variables

Variables		Compliance		Non compliance		P-value
		Number	Percentage	Number	Percentage	
Marital age	*17 yrs and less*	71	50.4	70	49.6	0.295
	18 and more	115	44.7	142	55.3	
parity	*0-2*	71	47.3	79	52.7	0.964
	3-5	86	46.7	98	53.3	
	6 and more	29	45.3	35	54.7	
Time of registration	*1st trimester (4-13)weeks*	142	46.9	161	53.1	0.894
	2edtrimester (14-26)weeks	43	46.7	49	53.3	
	3rd trimester >26 weeks	1	33.3	2	66.7	
Number of visits	*1-3visits*	3	37.5	5	62.5	0.001*
	4-7 visits	98	58.0	71	42.0	
	8 visits and more	85	38.5	136	61.5	
Breast feeding	*exclusive*	75	43.6	97	56.4	0.311
	Not exclusive	111	49.1	115	50.9	

Statistically significant

Table (4.13) also reflects the relationship between iron compliance and some other selected obstetric variables, regarding the last Hb level during pregnancy a statistically significant differences of (P value < 0.001) were found. The Hb level of less than 11gms showed a higher compliance (60.6%) than those of Hb level more than 11 (38.2%). This suggests that for the first group, the lack of availability of iron-rich foods might be the main cause

of the problem. On the other hand Hb level at registration did not show any statistically significant differences (P value = 0.226).

Table 4.13: Relationship between iron compliance and selected obstetric variables

Variables		Compliance		Non compliance		P-value
		Number	percentage	Number	percentage	
Hb level at registration	*<11*	61	51.7	57	48.3	0.226
	11 and more	125	44.6	155	55.4	
Last Hb level in pregnancy	*<11*	94	60.6	61	39.4	<0.001*
	11 and more	87	38.2	141	61.8	
Complication	*hypertension*	23	46.0	27	54.0	0.521
	Blood disorder (bleeding, anemia)	19	51.4	18	48.6	
	Others (DM,PremLabour,etc	10	37.0	17	63.0	
Mode of delivery	*Normal*	163	46.6	187	53.4	0.879
	C.S	23	47.9	25	52.1	

****Statistically significant***

The Nigerian study results were not consistent with this study where prevalence of anemia was higher among noncompliant women than those complying (18% vs. 15%). Hemoglobin level was higher among women complying with iron supplements compared with those not complying (11.4 g/dl v 11.0 g/dl), (Dairo, and Lawoyin, 2006).

Also the results of this study shows no statistically significant differences between complications nor the mode of delivery in respect to the iron supplement compliance (P value = 0.521, P value = 0.879 respectively)

5.2.3 Iron compliance and knowledge

Table (4.14) describes the relationship between iron compliance and knowledge as it's illustrated the results show no statistically significant differences between the levels of knowledge in respect to iron supplementation compliance (P value = 0.076). This result is not correlated with some other studies about good level of cues to action promoted pregnant women to have a good knowledge of anemia in Lao.

Table 4.14: Relationship between iron compliance and knowledge

Variables		Compliance		Non compliance		P-value
		Number	Percentage	Number	Percentage	
Knowledge	*Low level <50*	92	53.2	81	46.8	0.076
	Moderate level 50-70	65	42.2	89	57.8	
	High level >70	29	40.8	42	59.2	

* ***Statistically significant***

It was found that cues to action had a significant association with the compliance of pregnant women regarding iron supplementation, with statistical significance ($p < 0.001$). and that could explain good level of cues to action (received information and advices about anemia from different sources) were factors which could promote pregnant women in preventing, treatment of iron deficiency anemia and following recommendation of taking iron tablets (Vongvichit et al, 2004). Interestingly, in a study conduced by Seck BC, Jackson RT women who knew that lack of iron rich foods was a cause of anemia took iron tablets for a shorter period than those who had more knowledge (Seck, and Jackson, 2007). It is hypothesized that those who relied on iron intake by eating iron rich foods did not take iron tablets continuously.

4.2.4 Iron compliance and factors related to supplement

As shown in table (4.15) it describes relationship between iron compliance and factors related to supplement, statistically significant differences were found between the reasons the respondents have given for not taking iron supplements in respect to compliance with iron supplements.

Table 4.15: Relationship between iron compliance and factors related to supplement

Variables		Compliance		Non compliance		P-value
		Number	Percentage	Number	Percentage	
Dose	*Affect*	114	61.3	72	38.7	<0.001*
	Dose not affect	72	34.0	140	66.0	
Regularity	*Yes always*	82	96.5	3	3.5	<0.001*
	Some time	93	97.9	2	2.1	
	Not at all	8	34.8	15	65.2	
Side effect during taken	*Gastric irritation*	12	27.9	31	72.1	0.022*
	taste	3	18.8	13	81.3	
	constipation	21	55.3	17	44.7	
	others	5	45.5	6	54.5	
Other factors Related to non use	*Side effect*	2	12.5	14	87.5	<0.001*
	Not care	11	22	39	78.0	
	Not anemic	0	0.0	77	100.0	
	Eat well	1	6.3	15	93.8	
	others	1	2.3	43	97.7	

* ***Statistically significant***

Of the respondents who thought they were not anemic 100% of them did not comply with iron supplements, while a relatively higher compliance was found among the group who did not care to take it (22%). Among the group complained of side effects (12.5%) compliance was found, the lowest rate (6.3%) was found among the group of respondents who thought they were eating well.

Also results show statistically significant differences between the specified side effects respondents complained of iron supplementation (P value < 0.001) in respect to compliance, the lowest compliance was among the ones complained of the tablets bad taste (18.8%). The respondents complained of constipation showed a relatively better compliance with the supplements (55.3%), the gastric irritation group had compliance of (27.9%). Results show that the availability of a better quality iron tablets of less side effects would ultimately improve the women compliance with it.

A study in Vientiane shows that the causes of low compliance of taking iron tablets among pregnant women were forgetfulness (47.98%), side effects (18.38%), long term taking of iron tablets (16.14%), and fear of having big fetus (13%), (Vongvichit et al, 2004). Also our finding correlated with the study by Winichagoon P. in Thailand, good compliance was retained when pregnant women were assured of the benefits and were prepared to cope with the side effects, close follow-ups and motivation by health personnel were critical to encourage continued supplementation (Winichagoon, 1991).

4.2.5 Iron compliance and practice variables

Table (4.16) illustrates the relationship between iron compliance and some variables related to practice in postnatal period. Results proved statistically significant differences between the number of visits in PN period and receiving or not receiving iron

supplementation (P value < 0.001). A higher compliance was found among respondents who paid tow visits (64.6%) than those who paid only one visit for postnatal care (43.8%).

Table 4.16: Relationship between iron compliance and some variables related to practice

Variables		Compliance		Non compliance		P-value
		Number	Percentage	Number	Percentage	
Number of visit in PN	*once*	128	43.8	164	56.2	0.012*
	twice	31	64.6	17	35.4	
Iron supplementation	*Receiving*	177	81.2	41	18.8	0.001*
	Not receiving	9	5.0	171	95.0	
Nr of times receiving Iron supplementation	*Once*	159	79.5	41	20.5	<0.001*
	twice	10	90.9	1	9.1	
	trice	6	100.0	0	0.0	
Hb level	*<11*	55	69.6	24	30.4	<0.001*
	11and more	35	29.9	82	70.1	

* ***Statistically significant***

In addition, a very high compliance was found among women who received iron supplementation during the postnatal period of (81.2%), while the others who did not receive iron supplements during their postnatal visits show a very low compliance. These results imply that there was lack of compliance among the health centers staff with providing supplements for women during their postnatal visits, more attention should be paid to this matter. There were statistically significant differences between the number of times the respondents receiving iron supplementation during their postnatal period and the Hb level (P value < 0.001). An optimal compliance of (100%) was found among the clients who received it for three times, while (90.9%) compliance observed among group

received iron supplements twice, and the least compliance was noticed among the group who received it once (79.5%).

As previously mentioned this reflects the role of the health care providers in providing supplements for the clients during postnatal period and the results may vice versa mean that the women who do take the pills do come back more visits to receive more pills.

Concerning the Hb level; results illustrate that the respondents of Hb level less than 11 more comply with the supplements (69.6%), while a very low compliance among the group of Hb more than 11 was observed (29.9%). This reflects the lack of knowledge the clients have regarding the need of iron supplements regardless their Hb level, more counseling needs to be enforced in this area of information.

4.2.6 Iron compliance and Counseling variables

Table (4.17) presents the relationship between iron compliance and counseling variables, the results show statistically significant differences between counseling about anemia and counseling about supplementation in respect to iron compliance (P value < 0.001). Much higher compliance observed among the respondents who have been counseled about anemia (76.9%) than those who have not (30.0%). The clients who received counseling about iron supplementation show a high level of compliance (89.6%), a lower compliance was noticed among clients who received insufficient counseling (78.6%), while a very low compliance level was among the group who were not counseled about iron supplementation (10.1%). In addition there were statistically significant differences between counseling about duration of iron supplementation in the postnatal period in respect to compliance with it (P value < 0.001). Results present that the group received counseling about duration of iron supplementation in the postnatal period shows a relatively better compliance (67.2%0) than those who did not (42.8%).

Table 4.17: Relationship between iron compliance and Counselling variables

Variables		compliance		Non compliance		P-value
		Number	Percentage	Number	Percentage	
Counseling About anemia	*yes*	40	76.9	12	23.1	<0.001*
	No	15	30.0	35	70.0	
Counseling About supplementation PN	*Yes*	121	89.6	14	10.4	<0.001*
	Yes but not sufficient	44	78.6	12	21.4	
	No	21	10.1	186	89.9	
Counseling About duration PN	*yes*	43	67.2	21	32.8	<0.001*
	No	143	42.8	191	57.2	
Counseling And practice PN	*yes*	116	91.3	11	8.7	<0.001*
	No	22	10.4	190	89.6	

* ***Statistically significant***

The health care providers continue to play a significant role in improving the clients' compliance through their counseling skills and practice regarding the various issues of iron supplementation; emphasizing the dangers of anemia and the recommended frequency and duration for supplements during pregnancy and after delivery as well. A previous case control study conducted in Senegal by Seck BC and Jackson RT showed that women with high compliance (58%) were motivated by the perception of improved health upon taking the tablets, the insistence by midwives that they take the tablets; and the mention that the tablets would improve health. Women with low compliance (42%) reported; the experience of side-effects that they associated with the tablets, misunderstanding that they needed to continue taking the tablets throughout pregnancy, and forgetfulness. The

Senegal study concluded that compliance with iron/folic acid supplementation in Senegal can be increased by providing women with clear instructions about tablet intake and educating them on the health benefits of the tablets (Seck, and Jackson, 2007).

4.2.7 Iron compliance and Counseling at antenatal care

Table (4.18) illustrates the relationship between iron compliance and counseling at antenatal care.

Table 4.18: Relationship between iron compliance and Counselling at antenatal care

Variables		compliance		Non compliance		P-value
		Number	Percentage	Number	Percentage	
Counseling About supplementation AN	*Yes*	307	94.8	17	5.2	0.242
	Yes but not sufficient	52	96.3	2	3.7	
	No	17	85.0	3	15.0	
Counseling and practice AN	*Yes*	*359*	*97.8*	*8*	*2.2*	*<0.001**
	No	*17*	*54.8*	*14*	*45.2*	

**** Statistically significant***

Results show statistically significant differences between women view of the effect of counseling on the decision of taking the supplement with respect to compliance with the supplements (P value < 0.001). The women who thought that counseling do affect the decision of taking supplements were actually more compliant (97.8%) than those who did not think that counseling affects the decision to take supplements (54.8%). Meanwhile the counseling about supplementation during pregnancy did not show statistically significant difference (P value = 0.242).

4.2.8 Iron compliance and practice during antenatal period

Table (4.19) describes the relationship between iron compliance and practice during antenatal period.

Table4.19: Relationship between iron compliance and practice antenatal care

Variables		compliance		Non compliance		P-value
		Number	Percentage	Number	Percentage	
Hb level and decision	*Yes*	334	97.9	7	2.1	< 0.001*
	No	42	73.7	15	26.3	
Iron supplementation	*Receiving*	376	94.9	20	5.1	0.003*
	Not receiving	0	0.0	2	100.0	
Number of times taken iron supplementation	*once*	307	95.9	13	4.1	< 0.001*
	Twice	54	96.4	2	3.6	
	Trice	13	65.0	7	35.0	
Regularity	*regular*	315	96.9	10	3.1	0.001*
	irregular	61	85.9	10	14.1	
Consistency with dose	*Yes*	180	96.8	6	3.2	< 0.001*
	No	196	92.5	16	7.5	

Statistically significant

As it is illustrated above all the practice variables showed statistically significant differences; Hb level & decision to take iron, receiving or not receiving iron supplements, the number of times receiving the supplements and the regularity of receiving it with (P value < 0.001) for all mentioned variables.

Results show that the respondents who thought that Hb level do affect the decision of taking iron supplements showed higher compliance of (97.9%) than those who did not see effect of Hb level on decision (73.7%). The clients who received supplements showed a very high compliance (94.9%) than those who did not (0.0%).

Regarding to the number of times taken iron supplementation, results show that the women who received the supplement for two times have the highest compliance rate (96.4%) while surprisingly, the lowest compliance was among the group who received it three times (65.0%). Women who were provided with the supplements regularly during antenatal visits show a higher compliance of (96.9%) than those who received it irregularly (85.9%).

This study results came in accordance with the study by Opaseereevith S. who found that cues to action like received information and advices from different sources had a positive association with the competency of pregnant women to take care themselves (Opaseereevith, 1998).

The researcher concludes that the health care providers practice on supplying the clients with the iron supplements during antenatal visits, do strongly enhance and improve their compliance with it. The health staff should be committed to such a practice as to help overcoming the persistent problem of anemia among pregnant and nursing mothers as well.

Chapter 5: Conclusion and Recommendations

5.1 Conclusion

The prevention and control of anemia is a really a challenge, as shown by the limited progress achieved in recent years. Unfortunately, there is still a high frequency of iron deficiency anemia among pregnant and nursing mothers in Palestine in spite of all efforts of prevention and curative measures. The provision of iron supplementary is one of the most widely practical public health measures, yet little is known about the benefits of supplemental iron for the pregnant and post natal period.

The study was conducted to assess the compliance status with iron supplementation during post-natal period among women attending UNRWA heath centers in Gaza Governorates. It was also done in order to asses the various factors that affect compliance to iron supplementation.

A quantitative, analytic, cross sectional design was conducted, using three stages stratified random sample, the first stage aimed to select three provinces out of five provinces randomly, then, the second stage aimed to select one health center randomly from each provinces being selected. Finally, from each health center being randomly selected the participants were randomly selected from a sampling frame. The sample consisted of 398 mothers comprising those who attended the well baby clinic and who met the inclusion criteria. An exit interview questionnaire was introduced for the women in the well baby clinic of which child age four months. A structural closed ended questionnaire was used as the data collection instrument, after data collection analysis of data was done using SPSS.

The study results showed that the program coverage; women who received iron supplementation during post natal care was 54.8%. The compliance rate among women with iron supplementation was 46.7% in post natal period while the program coverage;

during antenatal care was 99.5% and the compliance rate among pregnant women was high 94.5%. In spite of this result of high compliance among pregnant women they still have high prevalence rate of anemia which indicate that it could be related to some other factors that needs more investigation.

The study revealed that different residency places and governorates were associated with different compliance rates that reached statistical significance (P-value <0.001). The compliance percent was higher for women outside camps (48.9%) than those who live inside camps (32.0%). In addition husband education levels showed statistically significant differences (P value < .001), it's illustrated that the higher compliance was among the group of husband education of 9-12 years (54.9%), while the lowest compliance was among the group of husband education of more than 12 years (35.0%).

Regarding the obstetric variables there were statistically significant differences of (P value < 0.001). The highest compliance was among women paid 4-7 visits (58.0%) while among the group of 1-3 visits was the lowest compliance (37.5%).

The last Hb level during pregnancy a statistically significant differences of (P value < 0.001) were found, surprisingly the level of less than 11 showed a higher compliance (60.6%) than those of Hb level more than 11 (38.2%). On the other hand no relation detected between marital age, parity, time of registration, complication in pregnancy and mode of delivery and breastfeeding in respect to compliance.

The reasons the respondents have given for not taking iron supplements have shown differences in respect to compliance that was statistically significant (P value < 0.001). Of the respondents who thought they were not anemic 100% of them did not comply with iron supplements, while a relatively higher compliance was found among the group who did not care to take it (22%). Among the group complained of side effects (12.5%) compliance

was found, the lowest rate (6.3%) was found among the group of respondents who thought they were eating well.

Concerning the specified side effects respondents complained of iron supplementation (P value < 0,001) in respect to compliance, the lowest compliance was among the ones complained of the tablets bad taste (18.8%). The respondents complained of constipation showed a relatively better compliance with the supplements (55.3%), the gastric irritation group had compliance of (27.9%).

Results proved statistically significant differences between the number of visits in PN period and receiving or not receiving iron supplementation. A higher compliance was found among respondents who paid two visits (64.6%) than those who paid only one visit for postnatal care (43.8%). In addition, a very high compliance was found among women who received iron supplementation during the postnatal period of (81.2%), while the others who did not receive iron supplements during their postnatal visits show a very low compliance.

The number of times the respondents receiving iron supplementation during their postnatal period and the Hb level reflected significant differences, an optimal compliance of (100%) was found among the clients who received it for three times, while (90.9%) compliance observed among group received iron supplements twice, and the least compliance was noticed among the group who received it once (79.5%).

Concerning the Hb level; results illustrate that the respondents of Hb level less than 11 more comply with the supplements (69.6%), while a very low compliance among the group of Hb more than 11 was observed (29.9%).

From among the counseling factors significant differences were identified in counseling about anemia and counseling about supplementation in respect to iron compliance. Much higher compliance observed among the respondents who have been counseled about

anemia (76.9%) than those who have not (30.0%). The clients who received counseling about iron supplementation show a high level of compliance (89.6%), a lower compliance was noticed among clients who received insufficient counseling (78.6%), while a very low compliance level was among the group who were not counseled about iron supplementation (10.1%).

In addition there were statistically significant differences between counseling about duration of iron supplementation in the postnatal period in respect to compliance with it. Results present that the group received counseling about duration of iron supplementation in the postnatal period shows a relatively better compliance (67.2%) than those who did not (42.8%).

Results show statistically significant differences between women view of the effect of counseling on the decision of taking the supplement with respect to compliance with the supplements (P value < 0.001). The women who thought that counseling do affect the decision of taking supplements were actually more compliant (97.8%) than those who did not think that counseling affects the decision to take supplements (54.8%).

All the practice variables showed statistically significant differences; Hb level & decision to take iron, receiving or not receiving iron supplements, the number of times receiving the supplements and the regularity of receiving it with (P value < 0.001) for all mentioned variables. It was also found that the respondents who thought that Hb level do affect the decision of taking iron supplements showed higher compliance of (97.9%) than those who did not see effect of Hb level on decision (73.7%). The clients who received supplements showed a very high compliance (94.9%) than those who did not (0.0%). Regarding to the number of times taken iron supplementation, results show that the women who received the supplement for two times have the highest compliance rate (96.4%) while surprisingly, the lowest compliance was among the group who received it three times (65.0%). Women

who were provided with the supplements regularly during antenatal visits show a higher compliance of (96.9%) than those who received it irregularly (85.9%).

From among the study variables, many have failed to prove statistically significant differences; women age, education level and work status of both women and husband did not show statistically significant differences. Moreover family income and the household number did not prove statistically significant differences.

Surprisingly the level of knowledge also did not reach statistically significant differences. These results indicate more supervision and training on counseling skills as well as increasing women awareness through health education.

In conclusion some of these factors may serve as avenues for interventions to increase compliance, and it is concluded that women adhere to prenatal/postpartum micronutrient supplementation when access to supplements is guaranteed and when they are provided with minimum, consistent and easily understandable information and counseling, indicating that these are key elements to ensure effective programmes for iron supplementation to combat anemia.

5.2 Recommendations

- Iron supplementation programs, for a variety of reasons, have not been effective in reducing anemia prevalence, new and innovative strategies are needed, particularly those that improve the overall health and nutrition status of adolescent girls before they enter their reproductive years.
- Appropriate programmes for wide-scale nutrition education should be especially targeted at young adolescents; these programmes should be carried out in schools, in the community and through the mass media. Nutrition education should focus on good eating habits.

- Policy and commitment from decision-makers with definite protocol and sufficient budget allocation for food fortification that improve the overall health and nutrition status of all Palestinian population.
- Pregnant and nursing women should be provided with minimum, consistent and easily understandable information and counseling; that is directed towards increasing women awareness and influence their perceptions about the benefits of iron supplements to their health and that of their newborns.
- Policy and commitment from decision-makers with definite protocol and sufficient budget allocation for iron supplementation programme especially iron tablet supply of high quality that may have the minimal side effects possible to enhance the women adherence with their supplements.
- Training of personnel at districts, on counseling skills, identification and utilization of effective communication tools (channel and messages) to create awareness among the recipient and appropriate means for motivation and improve health seeking behaviors among pregnant and nursing women.
- Close follow-ups and motivation by health personnel are critical to encourage continued supplementation providing advanced warning about the possibility of side effects; involving the patient in the therapeutic strategy; and providing reminders, such as posters and calendars, about taking supplements.
- Encourage woman for a 2-week postpartum visit for follow up and continue the iron supplementations for consecutive three months after delivery.
- Breast-feeding may be protective against the development of iron deficiency because it lengthens amenorrhea, thereby reducing bodily iron losses. Although our study failed to show differences in breast-feeding behaviors regarding compliance with iron supplementation, the researcher recommends enforcing breast-feeding that may be

protective against the development of iron deficiency because it lengthens amenorrhea or other healthy behaviors that are associated with breast-feeding.

- Strengthening the family planning programs which may indirectly improves the women health status and improve anemia. It is likely that prenatal iron supplementation must be combined with interventions that improve women's iron stores before pregnancy.

5.3 Recommendations for Future Research

- To have randomized trials to find effective, safe and affordable iron compounds that have reduced or no side-effects for use in public health antenatal and postnatal supplementation programs that have been proven safe.
- To carry out much larger multicenter studies to define effective and safe antenatal and postnatal supplementation strategies and modalities.
- To have randomized trials to find out the effectiveness of a weekly iron supplementation that may encourage better compliance.
- According to the limited time of the study, the researcher studied one dimension of the compliance, and the researcher recommend for other comprehensive studies of the women compliance with iron supplementation.

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Annexes

Annex 1

Map of Palestine

Source: MOH, 2000

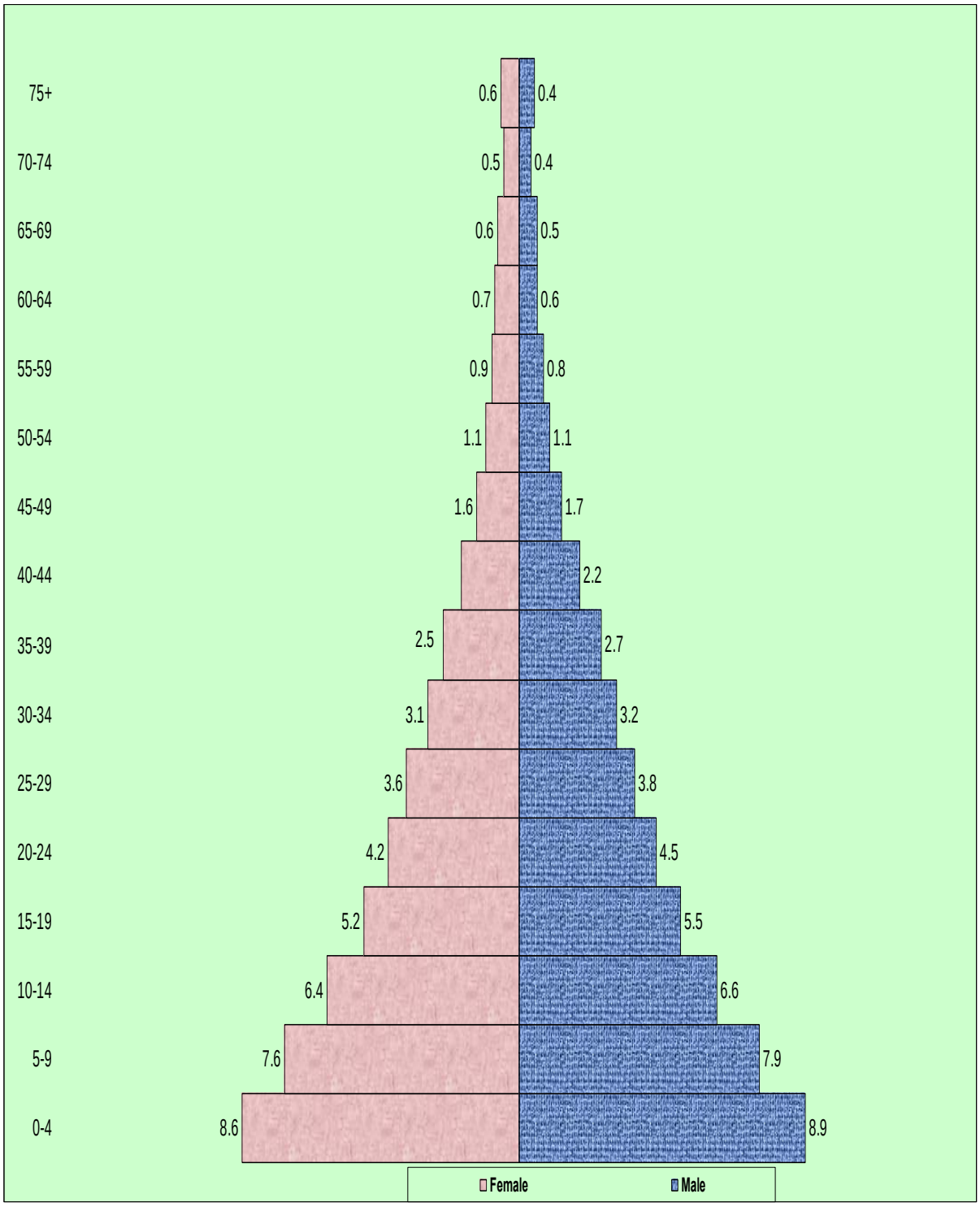
Annex 2

Map of Gaza Strip

Source: www. Islamonline.net

Annex 3

Age pyramid for Palestinian population, 2006



Source: www. Islamonline.net

Annex 4

Palestinian National Authority
Ministry of Health
Helsinki Committee

السلطة الوطنية الفلسطينية
وزارة الصحة
لجنة هلسنكي

Date: 15/8/2008

Name: Najwa Mossleh

I would like to inform you that the committee has discussed your application about:

Compliance with iron supplementation among women during post natal period at UNRWA clinics in the Gaza Governorates.

In its meeting on August 2008
and decided the Following:-
To approve the above mention research study.

التاريخ: ٢٠٠٨/٨/١٥

الاسم: نجوى مصلح

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:-

و ذلك في جلستها المنعقدة لشهر أغسطس ٢٠٠٨

و قد قررت ما يلي:-

الموافقة على البحث المذكور عاليه.

Signature
توقيع

Member
عضو

Member
عضو

Chairperson

Ministry of Health
Helsinki Committee

Conditions:-

- Valid for 2 years from the date of approval to start.
- It is necessary to notify the committee in any change in the admitted study protocol.
- The committee appreciate receiving one copy of your final research when it is completed.

Gaza Etwam – Telefax 972-7-2878166

Annex 5

Al-Quds University
Jerusalem
School of Public Health

جامعة القدس
القدس
كلية الصحة العامة

2008/7/5

الأخت/د. آمنة الشرباصي المحترمة
دائرة الصحة –وكالة الغوث
تحية طيبة وبعد،،،

الموضوع: مساعدة الطالبة نجوى مصلح

تقوم الطالبة المذكورة أعلاه بإجراء بحث بعنوان:

"Compliance with Iron Supplementation among Women During Post Natal Period at UNRWA Clinics in the Gaza Governorates"

كمتطلب للحصول على درجة الماجستير في الصحة العامة–مسار إدارة صحية و عليه نرجو التكرم للإيعاز لمن ترونه مناسب لتسهيل مهمة الطالبة في جمع البيانات اللازمة علماً بأن المعلومات ستكون متوفرة لدى الباحثة و الجامعة فقط.

و اقبلوا فائق التحية و الاحترام،،،

د. بسام أبو حمد
منسق عام برامج الصحة العامة

Approved
A
4/8/08

نسخة:
- الملف

Jerusalem Branch/Telefax 02-24799234
Gaza Branch/telefax 08-2884422-2884411
Sphealth@admin.alquds.edu
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ص.ب/51000–القدس

Annex 6

Consent Form

Number: ----------

Date: 1 / 10 / 2008

Compliance with Iron Supplementation among women during Post Natal Period at UNRWA Clinics in Gaza Governorates.

Dear Owner/Director/worker,

Kindly I would like to inform you that you have been selected to be part of my research study " Compliance with Iron Supplementation among women during Post Natal Period at UNRWA Clinics in Gaza Governorates".

as part of the requirement for Master degree Program organized by Al-Quds University-Public health Program. Your facility has been thoroughly selected as a source of data by filling a well and comprehensive a questionnaire for that purpose.

All the information given from your side is top confidential and will be used to asses. Your, ´Compliance with Iron Supplementation among women during Post Natal Period at UNRWA Clinics in Gaza Governorates"**.**

Participation is greatly appreciated and no information given would be used against you whatsoever.

Thanking you in advance for your cooperation.

Best Regards.

The researcher

Najwa Mosleh

Date: / / 2008

I, the undersigned, …….. in my capacity as woman received UNRWA health services in Gaza Strip, completely understands the objectives of this research and has the full desire to fill in the following questionnaire.

As well as, I do realize that all information given will be top confidential and will be used for research purposes and health and economic planning.

signature

أخي / أختي المحكم/ة:.....

نشكر مشاركتك بوقتك الثمين في إبداء الرأي وتحكيم هذه الاستبانة، فهذه المشاركة ستساهم في إتمام دراستي لقياس مدي التزام السيدات بتناول اقراص الحديد في فترة النفاس في عيادات رعاية الامومة التابعة لوكالة الغوث الدولية، والتي ستقدم كأطروحة لنيل درجة الماجستير في الصحة العامة-إدارة صحية التابع لجامعة القدس.-أبوديس

الغرض من الدراسة:

يهدف البحث لقياس مدي التزام السيدات بتناول اقراص الحديد في فترة النفاس في عيادات رعاية الامومة التابعة لوكالة الغوث الدولية ، ليستخدم كأداة لتحسين وتطوير البرنامج خاصة عند صناع القرار فيما يعود بالنفع علي السيدات وخفض نسبة فقر الدم لدى هده الفئة من السيدات.

"Compliance with Iron Supplementation among women during Post Natal Period at UNRWA Clinics in Gaza Governorate"

أهداف الدراسة:

1. To assess compliance status with iron supplementation during postnatal period of women attending UNRWA heath centers in Gaza.
2. To estimate the prevalence rate of iron supplementation compliance among women during post natal period.
3. To determine factors influencing iron supplementation compliance among mothers during postnatal period.
4. To examine the trend of iron supplementation compliance rate during antenatal care and postnatal care
5. To conclude recommendations that could help improving compliance with iron supplementation during pregnancy and post-natal period.

الإجراءات:

الاستبانة فستستخدم لمعرفة وجهة نظر السيدات اللواتي يتلقين الخدمة في عيادات رعاية الأمومة التابعة لوكالة الغوث الدولية.

ولكم جزيل الشكر

نجوى مصلح