

Primary Health Care Initiatives (PHCI)

The Effect of a Health Education Program On Prevalence Anemia among Pregnant Women in Tafila Governorate

December 2001

Prepared by:

Dr. Hamad Irbaihat

Dr. Jamil Qatatsheh

Dr. Iman Dawoodeyah



Abt Associates Inc. ■ 4800 Montgomery Lane, Suite 600,
Bethesda, Maryland ■ 20814 Tel: 301/913-0500
■ Fax: 301/652-3916

In collaboration with:

University of Colorado ■ Initiatives, Inc. ■ Trans Century
Associates



Funded by:

United States Agency for International Development

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Dedication

To the Ministry of Health represented by their Excellencies the Minister and the
Secretary General

Acknowledgements

Our thanks are to God Almighty first and to those who taught and helped us bring about this study into light. We particularly thank:

Dr. Richard Yoder PHCI

Dr. Ali Arbaji PHCI

Dr. Salah Mawajdeh/JUST University

All Employees of the Research Component at the PHCI

Health Director for Tafileh Governorate and all the Directorate staff

Summary

Introduction and Objectives:

Anemia during pregnancy is considered a serious and unique health problem, especially in developing countries where the intake of iron rich foods is minimal. The Governorate of Tafileh is believed to be a low socioeconomic community where inappropriate nutritional practices and behaviors that lead to anemia are thought to be common. This study aims at identifying the prevalence rate of anemia during pregnancy and at identifying the relationship between anemia and various behavioral and demographic factors. The study also aims at decreasing anemia prevalence among pregnant women who visit the MCH centers in Tafileh by launching a structured health education program about anemia and its effects.

Methodology:

A cross-sectional study was done in order to: a) study the prevalence of anemia among pregnant women in Tafileh Governorate during the first trimester of pregnancy, and b) define the relationship between anemia and some selected demographic variables and variables related to knowledge, attitudes, and practices. In addition, placing selected pregnant women into two groups, experimental and control encompassed a quasi-experimental study. The experimental group received the intervention consisting of a complete health education program provided through lecturing, distribution of a health education leaflet that focused on anemia and its prevention during pregnancy, and counseling. No interventions were undertaken for the control group. To define the two groups of the study all Tafileh Maternal and Child Health Centers (MCHCs) were divided into two equal groups according to the annual number of visits. In order to measure the effectiveness of the health education program, the two groups were followed up and hemoglobin values were measured at the end of the third trimester (posttest) and compared with the values collected prior to the intervention (pretest).

A sample of at least 80 women from each intervention and control groups was calculated to represent pregnant women in Tafileh during the year 2000.

Collected data was tabulated and entered into the computer using the SPSS program. Analysis for determining the relationship of anemia with other variables was done using relevant statistical tests and a 95% confidence level.

Results:

The study population consisted of 191 women selected from MOH Maternal and Child Health Centers (MCHCs). There were 100 women in the control group and 91 in the intervention group.

The mean age for the study population was 26.4 years, the average years of schooling was 10.6 years. The average family income was 180.7 JD per month, the average monthly income for the individual was 30.7 JD. The average number of family members was 4.4 individuals. No significant variation was found in the demographic composition of the control and intervention group.

While the average pregnancy duration at the pretest stage was 12.3 weeks, the percentage of Primi-gravida was 28.8%. The average number of previous pregnancies was 3.75 pregnancies and the average number of abortions was 0.69 per woman. In addition, the average number of previous deliveries was 3.06 delivery per women. Results also indicated that 52.9% of women with multiple pregnancies had used family planning methods before.

Results also revealed that 72.3% of the study population were used to drinking tea with their meals or shortly after, and that only 46.6% took iron and vitamin supplement pills. Those who reported consuming iron rich foods comprised 63.8% of the population. Almost all of the women in the study (97.4%) reported a preference for a female physician at the MCHC.

More than half of the women (53%) in the study reported that iron and vitamin pills were not constantly available at the MCHCs. Analysis showed that 31% of the women reported being visited by a health care team member during their last pregnancy thus indicating some weakness in following up the women at their homes.

The overall average hemoglobin value among pregnant women during their first trimester (pretest stage) was 11.8g/dl. The prevalence of anemia at this stage was

19.4% (12.6% mild, 6.8% moderate, and 0% severe), with 20% anemia prevalence for the intervention group and 18.7% for the control group. Analysis of hemoglobin values during the last pregnancy trimester (posttest stage) showed an average hemoglobin value of 11.2g/dl. Anemia prevalence rate during this stage was 33.3% (22.5 mild, 10.5% moderate, and 0% severe), with 19.2% prevalence for the intervention group and 48.9% for the control group.

A positive relationship was detected between anemia and each of: age of mother, family size, number of deliveries, and abortions. On the other hand, the relationship between anemia and average monthly family income, iron/vitamin pill intake as well as knowledge and consumption of iron rich foods was negative. Furthermore, no significant relationship was detected between anemia and each of the following: employment, level of education, and use of family planning.

Accordingly, it can be concluded that the major objective of the study (decreasing the prevalence of anemia among pregnant women) was not directly accomplished. Moreover, the major achievement of this study was the ability to maintain the level of anemia prevalence within the intervention group while concurrently attaining an increase of over 160% in the intervention group, at the end of pregnancy. While considering the similarity in variables that might affect anemia in the control and intervention group at the pretest stage, and refraining from carrying out the intervention, the outcome of the intervention group would have been similar to that of the control group.

Recommendations:

This study resulted in several recommendations, mainly:

- The adoption of a comprehensive national strategy for the prevention of anemia during pregnancy.
- The encouragement of research in the area of anemia prevalence.
- The incorporation of an anemia health education program in all MCHCs in the Kingdom of Jordan.

1. Introduction

1.1 Background

Tafileh Governorate has an area of 1,900Km² (2.1% of Jordan's area). It lies 186Km south of Amman (Appendix 1) and is populated by 75,000 individuals (about 1.6% of Jordan's population). With a prevailing rural structure, most of Tafileh residents come from the middle and low social class and are homogeneous in social beliefs and values.

1.2 Problem Description

The 1999 monthly reports of the Jordanian Ministry of Health indicated that the national prevalence rate of anemia among pregnant women was 23%. Furthermore, the WHO estimates the global prevalence rate for anemia among pregnant women at about 37%. Anemia in developing countries is considered to be a more serious problem than in developed countries¹. It is a major health problem that affects almost 2 billion individuals worldwide.

Children and pregnant women are considered the most vulnerable groups for getting anemia². Occurrence during pregnancy can result in heart failure, death, premature delivery, and can diminish fetal growth development. With iron deficiency as the most common type of anemia among pregnant women, causes of anemia vary to include: decrease in vitamin and folic acid intake, bleeding, presence of factors that diminish iron absorption, consumption of foods that are not rich in iron, and parasitic infections^{3,4}.

1.3 Study Rationale

The importance of the study stems from the following conceptions:

- Anemia during pregnancy endangers the health of the mother and her baby.
- The literature on anemia during pregnancy in Jordan is minimal.
- This study is the first of its kind in Tafileh Governorate.

1.4 Objectives

1.4.1 General Objective

Decrease the prevalence of anemia among pregnant women visiting the MCHCs in the Governorate of Tafileh through health education, between 1/9/2000 and 30/4/2000.

1.4.2 Specific Objectives

- Determine anemia prevalence rate among pregnant women who visit MCHCs in Tafileh Governorate.
- Determine the relationship between anemia and selected demographic and behavioral factors.
- Decrease the prevalence of anemia among pregnant women by 20%.

1.5 Hypothesis

Carrying out a comprehensive health education program that focuses on causes, indicators, complications of anemia as well as preventive measures, can reduce the prevalence of anemia among pregnant women who visit the MCHCs in Tafileh Governorate.

2. Literature Review

Anemia during pregnancy is a major global health problem that can arise in many complications. Prevalence rates for anemia vary between countries depending on the nutritional status of the community. Comprising 95% of all anemia forms, iron deficiency anemia during pregnancy remains the most common form.

In 1995, the Jordanian Ministry of Health and UNICEF carried out a national study on women during their reproductive age²⁹. Results of this study showed that 28.6% of the sample had anemia and that the major contributing factor was iron deficiency. Other neighboring Arab countries also consider anemia during pregnancy as one of the most significant health problems. For example, the prevalence rate of anemia during pregnancy in Asir region in Saudi Arabia was reported to be 31.9%²⁴. Ranging between 38% and 70%^{12,13,14,15,17,18,22} in African countries, anemia prevalence rates reach lower rates in other countries like 15.3% in Singapore¹⁵ and 19% in Israel²⁰.

With a 50% prevalence rate, poor pregnant women remain the most susceptible group for developing anemia^{6,25}. Women of younger and older ages, as well as multiparous are at a higher risk of developing anemia^{6,8,18,22}. In addition, women who are nonusers of family planning methods^{19,24} and those of low educational levels^{14,19,24} are at an increased risk. Early detection and treatment of anemia during pregnancy is important in preventing many serious consequences and unpleasant pregnancy effects⁴.

The intake of iron pills and consuming a well balanced diet can assist in preventing anemia and its complications especially during pregnancy^{5,10,11}. Many studies recommend giving iron supplements as a routine action during the second and third trimester of pregnancy because of the increased prevalence of anemia during that period. Iron supplements are not recommended during the first trimester of pregnancy unless lab results are indicative^{7,8,10,11}.

Studies also recommend the implementation of health education programs targeted at pregnant women and focusing on anemia complications and prevention measures^{7,9,13,16,24}. The need for such programs arises from the decreased awareness of the problem of anemia among women which indirectly increases its prevalence.

3. Methodology

3.1 Study Design

A **Cross Sectional design** was used to collect general demographic information and data relevant to the knowledge and practices affecting anemia.

A **Quasi-Experimental** design was done by measuring the hemoglobin value for both the intervention and control groups, during the first trimester of pregnancy (pretest) and again during the last month of pregnancy (posttest). Implementing a health education program was implemented for the intervention group after the pretest phase, as per the following chart:

Group	Sample	Pretest	Intervention	Posttest
Control	C	Hb₁	0	Hb₂
Intervention	C	Hb₁	I	Hb₂

Hb₁ = First Hemoglobin Test

Hb₂ = Second Hemoglobin Test

C = Sample (all women visiting the MCHCs during the month of September, 2000)

I = Intervention (health education program)

0 = No intervention

The study started on 01/09/2000 and ended on 30/04/2001

3.2 Sampling

3.2.1 Study Universe and Sample Selection

The study universe included all pregnant women visiting the Maternal and Child Health Centers (MCHCs) in Tafileh Governorate during the year 2000 (Table 1). Since women visiting the MCHCs in Tafileh Governorate are believed to be homogeneous in their socioeconomic backgrounds and in their beliefs and practices, 4 MCHCs that serve half the population were selected as the intervention group. The rest of the centers comprised the control group.

Table (1): Maternal and Child Health Centers (MCHCs) Included in the Study

Intervention Group (MCHCs)	Control Group (MCHCs)
Tafileh Comprehensive Health Center	Mansoura Health Center
Tafileh Primary Health Center	Eimeh Health Center
Al-Hasa Primary Health Center	Abel Health Center
Baseera MCH	Arweem Health Center
	Sanfaha Health Center
	Wadi Zeid Health Center
	Ein Beida Health Center
	Qadisiyeh Health Center
	Abu Bana Health Center
	Al-Eis Health Center
	Ghrandal Health Center

3.2.2 Sample Size

All pregnant women attending the Maternal and Child Health Centers (MCHCs) within Tafileh Governorate between 01/09/2000 and 31/10/2000 were selected and included in the study. Since pregnancy occurrence has no seasonal variability, the selected sample of women were considered representative of all pregnant women during the year. The sample size was calculated according to the following:

$$n=(z)^2pq/(d)^2 \quad n=(1.96)^2(0.3)(0.7)/(0.1)^2\approx 81$$

where:

n = sample size

z = confidence limit

p = anemia prevalence rate in Jordan, about 30%

q = 1-p = 70%

d = precision level

Accordingly, acquiring a total of 81 women for each of the intervention and the control group was ascertained. Reviewing the records indicated that the required sample size could be attained over a period of two months. This prompted the inclusion of all pregnant women who visit the MCHCs between 01/09/2000 and 31/10/2000 while allowing for a minimum of 81 women for each group.

In order to generalize the findings to all pregnant women in Tafileh Governorate during year 2000, the sample was weighted by using the inverse selection probability. Therefore with an approximate 2:12 selection probability for each women (2months out of 12 months /year), the inverse selection probability was determined as 6.

3.3 Variables

3.3.1 Independent Variables

Age measured in years.

Occupation: women were asked if they worked or not.

Educational Level: years of Schooling.

Family Size: number of family members living in the same household.

Income: Average family income in Jordanian Dinars.

Pregnancies: number of previous pregnancies.

Abortions: number of previous abortions.

Deliveries: number of previous deliveries.

Duration of current pregnancy measured in weeks.

Interval between present pregnancy and last delivery measured in months.

Family planning: use of any method to space deliveries.

Practices related to nutrition during pregnancy: (drinking tea with meals, iron and vitamin supplement intake, eating iron rich foods).

Knowledge: level of knowledge among pregnant women regarding anemia and other relevant factors.

Follow up: follow up of the pregnant women at home by a health worker, visit of the pregnant women to the health center.

3.3.2 Dependent Variable

Hemoglobin was defined as the red coloring that includes the red blood cells²⁶.

Anemia was defined in accordance with the WHO definition:

- A pregnant woman was considered anemic if her hemoglobin measurement was found 11.0 gm/dl or less. Three levels of anemia were defined:
 - Mild: (10.0 - >11.0)
 - Moderate: (7.0->10.0)
 - Severe: >7.0

Pretest Hb value was measured prior to 20 weeks of pregnancy, while the posttest value was measured during the last month of pregnancy.

3.4 Data Collection Techniques

Data was collected using the following techniques:

3.4.1 Interviewing (Questionnaire)

A special questionnaire was designed and used in this study. Necessary changes to this questionnaire were made after pilot testing. A trained midwife used a separate questionnaire to interview each woman who visited the MCHCs and was less than 20 weeks pregnant. The questionnaire included data on the following:

- General information: age, occupation, place of residence, years of schooling for the woman and her husband, number of family members and the average family income.
- Data on use of family planning, number of previous pregnancies, abortions, deliveries and interval between current pregnancy and previous delivery.
- Data on knowledge and practices, such as: drinking tea with meals or shortly after, eating iron rich foods, intake of iron and vitamin supplements, complications of anemia and availability of maternal and child health care services.
- Data on visits of the women to the health center and that of the health worker to the women in her place of residence. Information on women's preference of the doctor's gender was also collected.
- First and second measurement of hemoglobin blood test.

3.4.2 Observation (Hemoglobin Blood Test)

In order to limit distant transportation and unnecessary handling of blood specimens, tests of Hemoglobin were performed in three health centers, namely: Tafileh comprehensive health center, Al-Hasa primary health center and Baseera

comprehensive health center. The following procedure for taking a capillary blood sample for a hemoglobin blood test was used to train Lab technicians:

- Clean the puncture site with alcohol and allow it to dry.
- Prick the fingertip with a lancet.
- Fill two thirds of the capillary blood tube with blood.
- Close the blood tube using specific clay.
- In order to separate the plasma from the blood cells, place the tube in the centrifuge and circulate at 3000 rpm for five minutes.
- Use a special measuring ruler to measure the PCV.
- Use the following formula to get the Hb value: $(PCV-1)/3$.

3.5 Data Collection Plan

- Several meetings were held with physicians, midwives and lab technicians participating in the study. The objective of the study and essential training was provided during these meetings.
- Training midwives to obtain consent and conduct interviews was done.
- Training of midwives in carrying out the intervention at the assigned Maternal Child Health Centers, with special focus on using the specially prepared leaflet on anemia during pregnancy was also undertaken.
- Physicians were informed of the various stages of the study in order to facilitate the work of the midwives as well as supervise their performance.
- Lab technicians were briefed on the study objectives. The importance of performing the lab test was emphasized.
- The study investigators and the physicians at the MCH intervention centers carried out the intervention which consisted of three lectures targeting pregnant women and focusing on the causes, complications and prevention of anemia.
- Approval for conducting the study was obtained from the Jordanian Ministry of Health. A verbal consent was obtained from each pregnant

women participating in the study. Anonymity of the collected data was emphasized and kept.

3.6 Data Analysis

Collected data was entered into the computer and analyzed using the SPSS program.

The following statistical procedures were used:

- Description of frequency distributions.
- Comparison of means for continuous variables using independent and paired t tests.
- Non-parametric analysis – Comparing proportions using chi-square and two related samples using Mc Nemar test.

3.7 Intervention

3.7.1 Leaflet and Counseling

A specially prepared leaflet (Annex 3) was read and explained to each pregnant woman selected for inclusion in the intervention group during her initial visit to the MCH center. The midwife ascertained the mother's comprehension of the information prior to handing out the leaflet, which contained:

- Definition of anemia
- Signs and symptoms of anemia
- Causes of anemia and factors affecting it
- Complications of anemia affecting the pregnant woman and her infant
- Treatment and prevention of anemia

3.7.2 Lectures

Three lectures were given to pregnant women at each intervention MCH center (see Annex 4). Lectures focused on the signs and symptoms, causes, complications, and prevention of anemia. Nutrition during pregnancy and the importance of taking iron and vitamin supplements was emphasized.

4. Results

4.1 Cross Sectional Study

4.1.1 Demographic Variables

A total of 191 women (100 intervention and 91 control) were included in the study. Table 2 describes the demographic characteristics of the sample. Ranging between 17 and 43 years and averaging 26.4 years, two thirds of the sampled women were between 20 and 29 years. The average number of household members was 4.4 individuals, and 18.3% of the sample was employed.

With an average of 10.6 years of schooling for the sampled women and 10.5 years for their husbands, 50.8% of the women had 12 years or more of schooling. The average monthly family income was 180.7 JD. The majority of the families had a modest income that ranged between 100 and 200 JDs. Monthly income per capita ranged between 10 and 200 JDs with an average of 53.7 JD per month.

Table (2): Demographic Characteristics of the Sample

Demographic Variable	Number	Percent %
Total Number of Sample	191	100
Age (in years)		
< 20	19	9.9
20-29	120	62.8
≥ 30	52	27.3
Employment		
Employed	35	18.3
Unemployed	156	81.7
Educational Level		
< 7 Years	28	14.7
7 – 11	66	34.6
12 – 16	97	50.8
Average Monthly Per Capita Income (JD)		
Less than 30	45	23.6
30 – 49	55	28.8
50 – 69	56	29.3
70 and more	35	18.3
Household Members		
2 – 4	115	60.2
5 – 7	51	26.7
> 7	25	13.1

4.1.2 Variables Related to Pregnancy and Delivery

Table 3 describes the sample distribution for variables relevant to pregnancy and delivery. The average number of previous pregnancies (excluding primi-gravida) was 3.75 pregnancies. In addition, 40.3% of women were previously one to three times pregnant. The average number of abortions was found to be 0.69 abortions per woman, while 31.6% and 15.4% of the women reported having one, and two or more abortions respectively,.

The duration of present pregnancies at the initial time of registration averaged 12.3 weeks and ranged between 4 and 20 weeks. The interval between the current pregnancy and previous delivery averaged 22.7 months. Women pregnant for the first time (primi gravida) constituted 28.8% of the sample and were nonusers of family planning methods. More than half (52.9%) of the multi gravida women used family planning methods. Followed by the pills (19.9%), the IUD (24.3%) was the most commonly pursued family planning method.

Table (3): Distribution of Variables Related to Pregnancy and Delivery		
Pregnancy/Delivery Variables	Number	Percent %
Previous Pregnancies		
Primi Gravida	55	28.8
1 – 3	77	40.3
4 – 7	44	23
> 7	15	7.9
Total	191	100
Abortions		
None	72	52.9
One Abortion	43	31.6
Two Abortions	14	10.3
Three or more	7	5.1
Total	136	100
Previous Deliveries		
Less than 3	66	48.5
3 – 4	41	30.1
5 and more	29	21.4
Total	136	100
Pregnancy/Delivery Interval		
1 – 12 months	38	27.9
13 – 24 months	48	35.3
> 25 months	50	36.8
Total	136	100
Use of Family Planning		
Not Used	64	47.1
IUD	33	24.3
Pills	27	19.9
Male Condoms	4	2.9
Natural Family Planning	2	1.5
Other	6	4.4

4.1.3 Variables Related to Practice and Knowledge

Results indicated that 74.3% of the women had some knowledge regarding the effect of tea intake on iron absorption, and that less than half (42.4%) of them knew about the benefits of iron and vitamin supplement intake during pregnancy. Moreover, 47.6% of women had some knowledge about the complications affecting the mother and infant as a result of anemia during pregnancy.

Table 4 shows that 37.7% of the sample reported not or rarely drinking tea with their meals or shortly after, and that 27.7% of the sample were usual or regular tea drinkers. Moreover, while 37.7% of the women did not drink iron and vitamin pills during their pregnancy, most of the pregnant women (63.8%) reported consuming iron rich foods.

Table (4): Distribution of Sample by Consumption of Tea, Iron and Vitamin Pills, and Iron Rich Foods

Variable Response	Drinking Tea with meals		Intake of Iron and Vitamin Pills		Intake of Iron Rich Foods	
	Number	Percent	Number	Percent	Number	Percent
Never	32	16.8	72	37.7	9	4.7
Rarely	40	20.9	30	15.7	14	7.3
Sometimes	66	34.6	37	19.4	46	24.1
Most of the times	13	6.8	25	13.4	57	29.8
Always	40	20.9	27	14.1	65	34
Total	191	100	191	100	191	100

Most of the pregnant women (97.4%) reported preference for having a female physician as a health care provider. A large proportion (91%) of the women felt a need for receiving health care during their pregnancy. Slightly more than half of the sampled women (53%) said that iron and vitamin pills were not regularly available at the health center. The majority of the women (93%) had some knowledge about the free provision of maternal and child health services by the Ministry of Health.

Study results indicated that 93.4% of multi-Para women have visited the antenatal clinic during their previous pregnancy. On the other hand, only 31% of the previously pregnant women reported being visited at home during their last pregnancy.

4.1.4. Anemia Prevalence during First Trimester of Pregnancy

Results of the study indicated that the prevalence of anemia during the first trimester of pregnancy was 19.4% (12.6% mild, 6.8% moderate), and that the average hemoglobin value was 11.8 g/dl.

4.1.5 Relationship of Anemia with Demographic Variables

4.1.5.1 Anemia and Age

Table 5 shows a positive relationship between the age group of the respondents and the prevalence of anemia, whereby the prevalence of anemia among pregnant women who were younger than 20 years and 30 years or older was 15.8% and 25% respectively ($p = 0.012$, $\chi^2 = 8.9$).

Table (5): Distribution of Anemia Prevalence by Age Group

Anemia Age Group	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
Less than 20 years	3	15.8	16	84.2	19	100
20 – 29 years	21	17.5	99	82.5	120	100
30 years and above	13	25	39	75.0	52	100
Total	37	19.4	154	80.6	191	100

4.1.5.2 Anemia Prevalence and Employment

The difference in anemia prevalence between working and not working pregnant women shown in Table 6 was found statistically insignificant ($p = 0.16$, $\chi^2 = 2$).

Table (6): Distribution of Anemia Prevalence by Employment

Anemia Employment	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
Employed	8	22.9	27	77.1	35	100
Not Employed	29	18.6	127	81.4	156	100
Total	37	19.4	154	80.6	191	100

4.1.5.3 Anemia and Educational Level

Table 7 shows that the lowest anemia prevalence rate (16.7%) was demonstrated in the middle level educated women (7–11 years of schooling). Conversely, the highest prevalence rate of anemia in relation to the educational level was found among women with 7 years of education or less (21.4%). These differences were not found statistically significant ($p = 0.24$, $\chi^2 = 2.9$). The average years of schooling for those women who were anemic and not anemic was 10.5 and 10.6 years respectively ($t = 0.5$, $p = 0.6$).

Table (7): Distribution of Anemia Prevalence by Educational Level

Anemia Education	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
Less than 7 years	6	21.4	22	78.6	28	100
7 - 11 years	11	16.7	55	83.3	66	100
12 – 16 years	20	20.6	77	79.4	97	100
Total	37	19.4	154	80.6	191	100

4.1.5.4 Anemia and Family Income

The average family income was 47.6 JD for anemic women and 55.2 JD for those who were non anemic. A significant relationship was found between anemia and monthly income per family member ($t = -3.1$, $p = 0.002$). Table 8 illustrates anemia prevalence by monthly income per family member.

Table (8): Distribution of Anemia Prevalence by Income per Family Member

Anemia Monthly Income	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
Less than 30 JD	12	26.7	33	73.3	45	100
30 – 49 JD	11	20	44	80	55	100
50 – 69 JD	7	12.5	49	87.5	55	100
70 JD and more	7	20	28	80	35	100
Total	37	19.4	154	80.6	191	100

4.1.5.5 Anemia and Family Size

Table 9 shows that anemia prevalence among women who came from families consisting of four members or more (26.3%) was higher than that of women with four or less family members (15%). The average number of family members among anemic women was 5.38 persons as opposed to 4.11 for non-anemic women. This variation in anemia prevalence was found statistically significant ($t = 2.76$, $p = 0.007$).

Table (9): Distribution of Anemia Prevalence by Number of Family Members

Anemia Number Of Family Members	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
2 – 4 members	17	14.8	98	85.2	115	100
5 – 7 members	14	27.5	37	72.5	51	100
More than 7 members	6	24	19	76	25	100
Total	37	19.4	154	80.6	191	100

4.1.6 Relationship of Anemia with Pregnancy and Delivery Variables**4.1.6.1 Anemia and Number of Previous Deliveries**

There was a positive relationship between anemia prevalence and the number of previous deliveries. Table 10 shows that anemia prevalence for women with less than 3 deliveries and for those with 5 or more deliveries was 15.7% and 31% respectively ($p < 0.0001$, using a t-test).

Table (10): Distribution of Anemia Prevalence by Number of Deliveries

Anemia Number Of Deliveries	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
Less than 3	19	15.7	102	84.3	121	100
3 - 4	9	22	32	78	41	100
5 and more	9	31	20	69	29	100
Total	37	19.4	154	80.6	191	100

4.1.6.2 Anemia and Number of Abortions

Table 11 shows that there was a positive relationship between the prevalence of anemia and the number of abortions. Accordingly, anemia prevalence increased from 14% for those women who had no abortions to 43% for those with 3 abortions or more ($p < 0.0001$, $\chi^2 = 22.5$). The average number of abortions for anemic women and non-anemic was 0.81 and 0.42 abortion respectively ($t = 6.5$, $p < 0.0001$). These differences remained evident even with the exclusion of the Primi-Gravida women where the average number of abortions among anemic women was 0.94 and 0.62 for the non-anemic 0.62.

Table (11): Distribution of Anemia Prevalence by Number of Abortions

Anemia Number Of Abortions	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
No Abortions	18	14.2	109	85.8	127	100
One Abortion	12	27.9	31	72.1	43	100
Two Abortions	4	28.6	10	71.4	14	100
More than Two	3	42.9	4	57.1	7	100
Total	37	19.4	154	80.6	191	100

4.1.6.3 Anemia and Interval between Pregnancies

Table 12 shows the distribution of anemia prevalence by the time interval between the current pregnancy and previous delivery measured in months. No significant association was found between these two variables ($p = 0.2$, $\chi^2 = 3.2$).

Table (12): Distribution of Anemia Prevalence by Interval between Pregnancies

Interval \ Anemia	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
1 – 12 months	8	21.1	30	78.9	38	100
13 – 24 months	13	27.1	35	72.9	48	100
More than 24 months	11	22	39	78	50	100
Total	32	23.5	104	76.5	136	100

4.1.6.4 Anemia and Use of Family Planning

The prevalence of anemia (shown in Table 13) was not associated with the use of family planning methods during the last pregnancy. The higher prevalence of anemia (25%) among users of family planning methods was not found to be significantly different from that (21.4%) of the non-users ($p = 0.3$, $\chi^2 = 1.1$).

Table (13): Distribution of Anemia Prevalence by Use of Family Planning

Use of Family Planning \ Anemia	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
Users	18	25.0	54	75.0	72	100
Non-Users	15	21.4	55	78.6	70	100
Total	33	23.2	109	76.8	142	100

4.1.7 Relationship of Anemia with Variables related to Knowledge and Practice

4.1.7.1 Anemia and Tea Consumption

Table 14 shows that 25% of women who regularly drank tea with their meals or shortly thereafter were anemic. On the other hand, 18.8% of the women who never drank tea were found anemic. Overall, the association between tea drinking and anemia was not found to be statistically significant ($p = 0.12$ using Mann Whitney test).

Table (14): Distribution of Anemia Prevalence by Tea Drinking

Tea Drinking \ Anemia	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
Never	6	18.8	26	81.3	32	100
Rarely	7	17.5	33	82.5	40	100
Sometimes	12	18.2	54	81.8	66	100
Most of the times	2	15.4	11	84.6	13	100
Always	10	25	30	75	40	100
Total	37	19.4	154	80.6	191	100

4.1.7.2 Anemia Relationship with Iron and Vitamin Supplement Intake

Table 15 shows that anemia was more prevalent among women who were not used to taking iron and vitamin pills during their last pregnancy than others. In view of that, anemia prevalence among women who used to always take iron and vitamin pills during their last pregnancy was 12.5% as opposed to 40% for women who rarely took these pills. These differences shown in table 15 were found to be statistically significant ($p < 0.001$, Mann Whitney test).

Table (15): Distribution of Anemia Prevalence by Iron and Vitamin Intake

Anemia Intake of Iron and Vitamin	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
Never	10	25.6	29	74.4	39	100
Rarely	10	40.0	15	60.0	25	100
Sometimes	5	17.9	23	82.1	28	100
Most of the times	4	20.0	16	80.0	20	100
Always	3	12.5	21	87.5	24	100
Total	32	23.5	104	76.5	136	100

4.1.7.3 Anemia and Consumption of Iron Rich Foods

Table 16 shows that anemia prevalence among women who never ate iron rich foods was 77.8% as opposed to 10.8% among those who reported always eating iron rich foods. This result highlights the importance of eating a complete diet, which is enriched with iron, in decreasing the incidence of anemia. The association of anemia and iron rich food intake in this study was found to be highly significant ($p < 0.0001$ using Mann Whitney test).

Table (16): Distribution of Anemia Prevalence by Iron Rich Food Intake

Anemia Intake of Iron Rich Food	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
Never	7	77.8	2	22.2	9	100
Rarely	9	64.3	5	35.7	14	100
Sometimes	7	15.2	39	84.8	46	100
Most of the times	7	12.3	50	87.7	57	100
Always	7	10.8	58	89.2	65	100
Total	37	19.4	154	80.6	191	100

4.1.7.4 Anemia and Knowledge related to Iron and Vitamin Supplement Intake

Table 17 shows that contrary to 16% of those who knew the importance of receiving iron and vitamin pills during the period of pregnancy, 21.8% of the women who were unaware of this importance were anemic. The association between anemia and the knowledge regarding the importance of taking iron and vitamin pills was statistically significant ($p = 0.015$, $\chi^2 = 6$).

Table (17): Distribution of Anemia Prevalence by Knowledge related to the Importance of taking Iron and Vitamin Pills

Anemia \ Knowledge	Anemic		Non Anemic		Total	
	N	%	N	%	N	%
Know	13	16.0	68	84.0	81	100
Don't Know	24	21.8	86	78.2	110	100
Total	37	19.4	154	80.6	191	100

4.2 Quasi Experimental Study

As previously indicated, the prevalence of anemia among pregnant women at the initial stage of the study (pretest) was 19.4% and the average of hemoglobin value was 11.8g/dl. Moreover, with an average hemoglobin value of 11.2g/dl, the prevalence of anemia among pregnant women during their last month of pregnancy (posttest) was 33.3%.

4.2.1 Anemia Prevalence in the Intervention Group - Pretest and Posttest Comparison

As shown in table 18, the prevalence of anemia at the pretest stage for the intervention group was 20% and the average hemoglobin value was 11.9g/dl. Conversely, the prevalence rate of anemia at the posttest stage (during the last trimester of pregnancy) was 19.2% and the average hemoglobin value at that time was 11.7g/dl. Even though anemia prevalence increases with the increase in the duration of pregnancy, it decreased in the intervention group by an average of 4%. The difference between pretest and posttest anemia prevalence rates for the intervention group was not found to be statistically significant ($p=0.61$, using Mann Whitney). However, the difference between the pretest (11.9g/dl) and posttest (11.7g/dl) hemoglobin values, at a value of 1.7% decrease, was found to be significant ($t = 5$, $p<0.0001$).

Table (18): Pretest and Posttest Anemia Prevalence for the Intervention Group

Anemia	Pretest		Posttest	
	Number	Percent	Number	Percent
Present	20	20	19	19.2
Not Present	80	80	80	80.8
Total	100	100	99	100
Average Hemoglobin	11.9g/dl		11.7g/dl	

4.2.1 Anemia Prevalence in the Control Group - Pretest and Posttest Comparison

Table 19 shows that the prevalence of anemia at the pretest stage for the control group was 18.7% and the average hemoglobin value was 11.8g/dl. On the other hand, with an average hemoglobin value of 10.8g/dl, the prevalence of anemia for the same group at the posttest stage was 48.9%. It can be deduced that the prevalence of anemia increased in the posttest stage by 162%. The difference between the pretest and posttest anemia prevalence rates was found to be significant ($p < 0.0001$ using McNemar-test). Results remained significant when testing the difference between pretest and posttest average hemoglobin value ($t = 20.4$, $p < 0.0001$).

Table (19): Pretest and Posttest Anemia Prevalence for the Control Group

Anemia	Pretest		Posttest	
	Number	Percent	Number	Percent
Present	17	18.7	44	48.9
Not Present	74	81.3	46	51.1
Total	91	100	90	100
Average Hemoglobin	11.8g/dl		10.8g/dl	

4.2.3 Pretest Comparison for Control and Intervention Groups

Table 20 illustrates the differences in selected characteristics between the control and intervention group. No profound differences were noted between the characteristics of these two groups.

Table (20): Differences between the Control and Intervention Groups in Selected Variables

Variable	Control Group	Intervention Group
Age in Years	26.9	25.8
Years of Schooling	10.72	10.45
Average Number of Family Members	4.29	4.43
Monthly Income per Capita	55.9	51.3
Number of Previous Pregnancies	2.69	2.65
Number of Previous Abortions	0.52	0.46
Number of Previous Deliveries	2.17	2.19
Duration of Current Pregnancy in Weeks	11.78	12.95
Interval between Present Pregnancy and Previous Delivery in Months	21.86	23.75

5. Discussion

This study focused on the problem of anemia during pregnancy. A total of 191 pregnant women were selected and followed up for measuring changes in their hemoglobin values. Hemoglobin was measured at the initial registration of the pregnant woman (during the first trimester of pregnancy) and again during her last month of pregnancy.

Results indicated that the intervention group managed to maintain a steady anemia prevalence rate throughout the period of pregnancy. Consequently, anemia prevalence rate in this group decreased 4%, from 20% at the beginning of pregnancy to 19.2% towards the end. On the other hand, anemia prevalence in the control group increased by 160% (from 18.7% to 48.9%). The differences in anemia prevalence between the control and the intervention group can be attributed to carrying out the intervention, especially since the variability between the two groups in terms of demographic variables and other variables associated with anemia was substantially minimal.

The increase in prevalence rate with the increase in the duration of pregnancy in the control group was expected especially since this group was not consuming enough iron in the form of pills or enriched foods. The literature includes several studies that indicate a difference in anemia prevalence between the beginning and end of pregnancy. A study done by O'Brien H et al (2001) shows that without intervening, anemia prevalence increased from 14.6% in the first trimester of pregnancy to 22.6% in the second and 39.8% in the third²⁷. Similar results were accomplished by a study performed by UNICEF and the Jordanian Ministry of Health (1995), where anemia during pregnancy was assessed at 10.5% during the first trimester, and increasing to 33.8% in the second trimester reaching 42.5% in the third trimester of pregnancy²⁹.

It can therefore be summarized that in the absence of an intervention in this study, the fate of the women in the intervention group would have been the same as that of the control group. Although it seems that the overall goal of decreasing the prevalence of anemia by 20% in this study was not directly accomplished, maintaining the rate of anemia prevalence within the intervention group at the same pretest stage level and

not attaining the substantial increase of the control during the posttest stage, is an accomplishment in itself. Therefore, such an accomplishment can be viewed as an indirect achievement of the study's objective.

Comparing the results of anemia prevalence for the study group during the first trimester of pregnancy (19.4%) and during the last trimester for the control group (48.9%) to those in other studies, seem difficult. Such a limitation comes in light of the researchers' inability to review a detailed version of relevant researches that include an in depth description of the sample that notes the stage of pregnancy. Therefore, a simple listing of other research findings is hereby presented to indicate anemia prevalence among pregnant women in other countries.

In other studies done in neighboring Arab countries, like Saudi Arabia, it was found that the prevalence rate for anemia during pregnancy was 31.9%²⁴. High prevalence rates for anemia were reported by studies done in many African countries, such as: 66% in Burkina Faso¹², 51.7% in Guinea¹³, 55.6% in Nepal¹⁶, 57% in Malawi¹⁷, 72% in Zaire¹⁸, and 70% in Mozambique²¹. A low prevalence rate for anemia during pregnancy was reported in each of the following: 15.3% in Singapore¹⁵, 19% in Israel²⁰, and 20.7% in Nigeria²³.

The literature reports a positive association between anemia prevalence and each of: age, family size, and the number of previous deliveries and abortions. A negative association can also be established in the literature between anemia prevalence and each of: family income, iron pill intake during previous pregnancies, consuming iron rich foods and knowledge about the importance of iron during pregnancy. All these associations seem to hold a rational explanation.

Women's preference in this study for having a female physician at the health center is a well-understood concern in the Jordanian culture. Use of family planning methods during the previous pregnancy reported in this study at the rate of 53% was similar to other national figures, such as that of the 1999 annual fertility study rate of 57%²⁸. However, the absence of relationship between anemia and use of family planning methods is related to the long periods of interruption in use and to the number of previous deliveries and abortions.

The lack of relationship between anemia prevalence and the educational level of the mothers in this study might be related to the overall homogeneous educational background of women. Although the average interval (less than 2 years) between the current pregnancy and the previous pregnancy was somewhat reasonable, the direct relationship of this interval with the number of previous pregnancies and abortion might have affected anemia prevalence.

6. Conclusion

Several conclusions made from this study can be generalized to all pregnant women in the Governorate of Tafileh. The most important of these conclusions are:

- Anemia during pregnancy is a serious problem in Tafileh Governorate.
- The simple health education program used in this study is effective in producing significant results and in preventing the increase in anemia prevalence during the third trimester of pregnancy.
- There is a positive relationship between anemia prevalence and each of family size, number of previous pregnancies and deliveries, which in turn emphasize the need to space pregnancies.
- There is a negative association between anemia prevalence and each of: iron pill intake during previous pregnancies, consuming iron rich foods and knowing the benefits of iron. The importance of consuming enough iron in the form of pills or food products was predominantly emphasized in the health education program of this study.
- There was a limitation in the home visitation program of the pregnant women by the health care team at the maternal health care center.

7. Recommendations

Given that there is an established association between anemia and several variables, and in light of an absent national strategy for combating anemia during pregnancy, the following recommendations are hereby introduced:

- Utilize the mass media to increase women's awareness level during their reproductive age regarding anemia during pregnancy.
- Emphasize the various demographic and behavioral factors that increase the prevalence of anemia.
- Work at activating mutual visits of the pregnant woman and the health care team members.
- Provide training for relevant health care team members in anemia during pregnancy. Provide health workers with tools and mechanisms for combating and preventing anemia during pregnancy.
- Perform periodic evaluation for the program of anemia prevention during pregnancy.
- Assure the presence of female physicians who are trained in maternal and child health at the health centers.
- Incorporate the health education program for the prevention of anemia during pregnancy at all maternal and child health centers in Tafileh Governorate, and consider generalizing this action nationally.
- Disseminate the results of this study and share the findings with decision makers at the Ministry of Health.
- Design and carry out a national study on the problem of anemia during pregnancy.

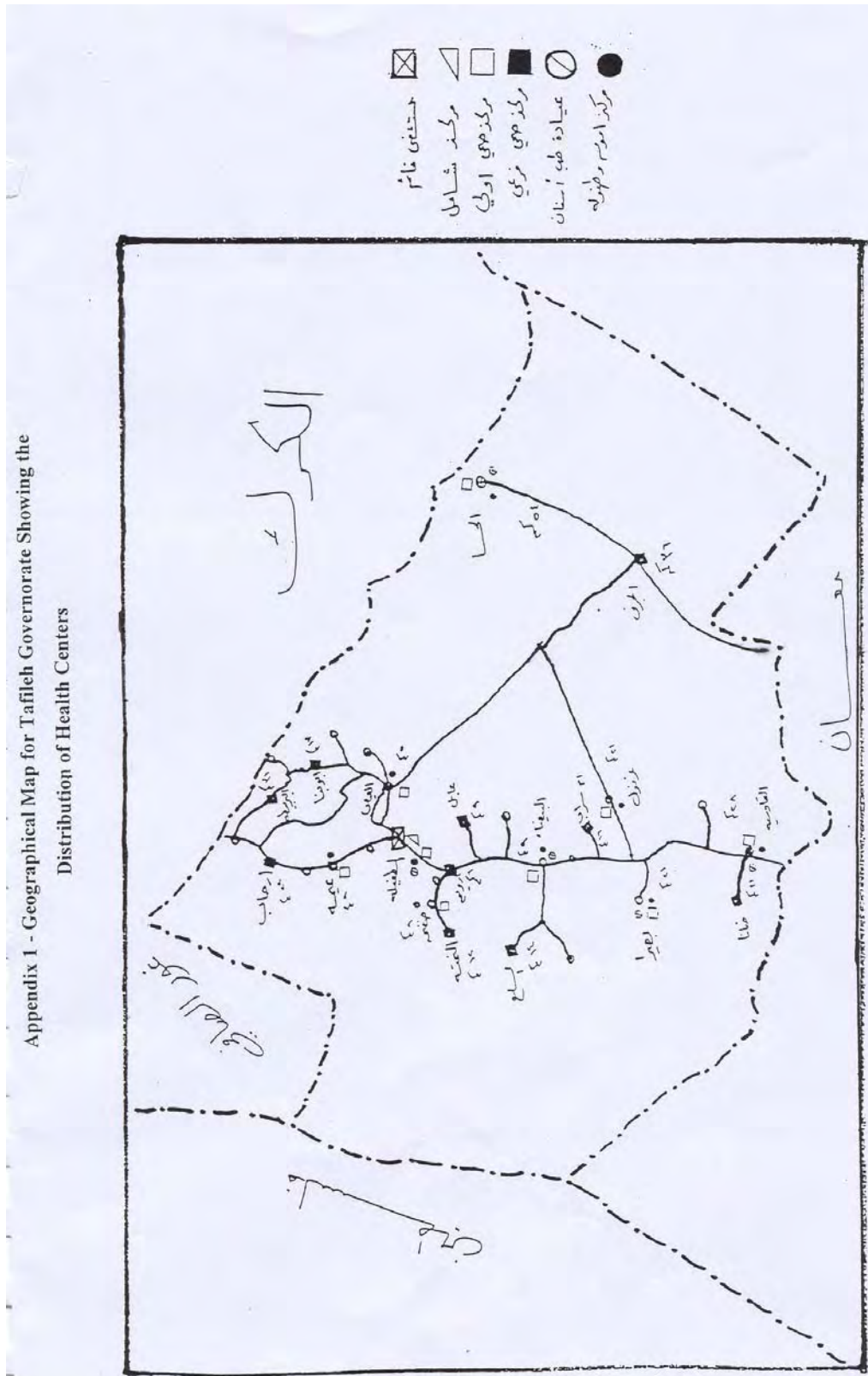
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9. Appendices

Appendix 1 - Geographical Map for Tafileh Governorate Showing the Distribution of Health Centers



Appendix 2 – Questionnaire

“In the Name of God Almighty”

Questionnaire for the Study on the Effect of a Health Education Program on Anemia Prevalence Among Pregnant Women Visiting Maternal Health Centers in Tafileh Governorate

- Record Number:

- 1. Age:
- 2. Years of Marriage:
- 3. Occupation: _____
- 4. Years of Schooling for Woman (number):
- 5. Years of Schooling for Husband (number):
- 6. Place of Residence: Urban Rural
- 7. Property of Dwelling: Ownership Rent
- 8. Number of Family Members Living in the same Household:
- 9. Average Monthly Family Income in JDs:
- 10. Number of Previous Pregnancies:
- 11. Number of Previous Abortions:
- 12. Number of Previous Deliveries: Normal: Cesarean:
- 13. Duration of Current Pregnancy in Weeks:
- 14. Interval between Current Pregnancy and Previous Delivery in Months:
- 15. Did you use any family planning method to space your pregnancies? Y/N
If the answer is Yes, please specify method _____
- 16. How often do you drink tea with meals or shortly after?
1 – Never 2 – Rarely 3 – Sometimes
4 – Most of the Times 5 – Always
- 17. Do you know that drinking tea with meals can reduce iron absorption?
1 – No 2 – Yes 3 – Not Sure
- 18. Are iron and vitamin pills available at the health center?
1 – Never 2 – Rarely 3 – Sometimes
4 – Most of the Times 5 – Always

19. Do you take iron and vitamin pills?
1 – Never 2 – Rarely 3 – Sometimes
4 – Most of the Times 5 – Always
20. Do you eat iron rich foods? (Such as: red meat, kidney, cabbage, spinach, molokhiyeh, lentils, eggs....etc)
1 – Never 2 – Rarely 3 – Sometimes
4 – Most of the Times 5 – Always
21. Do you know the advantages of iron and vitamin intake during pregnancy?
1 –No 2 – Yes
If the answer is Yes, please specify:

22. Do you have knowledge about anemia complications affecting the pregnant women and her infant?
1 –No 2 – Yes
If the answer is Yes, please specify:

23. Did you ever have any operations?
1 –No 2 – Yes
If the answer is Yes, please specify:

24. Are you taking any medications for chronic diseases?
1 –No 2 – Yes
If the answer is Yes, please specify:

25. Did you consult a doctor or a midwife during your last pregnancy?
 1 –No 2 – Yes
 If the answer is Yes, please specify the number of consultations:
26. What was the purpose of the visits?
 1 – Follow up for pregnancy 2 – Treatment 3 – (1+2)
27. Did any of the health care team members at the health center visit you at your home during your last pregnancy?
 1 –No 2 – Yes
 If the answer is Yes, please specify the number of consultations:
28. Do you know that the maternal and child health care services in Jordan are free of charge?
 1 –No 2 – Yes
29. Do you feel that you are in need of health care during your pregnancy?
 1 –No 2 – Yes 3 – Don't Know
30. Does having a female doctor at the health center encourage you to use the services there?
 1 –No 2 – Yes 3 – Has no effect

Examination

- General Condition _____
- Diseases identified during physical exam: _____

- Weight in kg
- Height in cm
- Hemoglobin 1 .
- Hemoglobin 2 .

“With our gratitude, and wishing you a safe pregnancy”

Appendix 3 - Health Education Leaflet

سيدات الحامل : بعيداً عن فقر الدم



المديرية العامة لصحة
محافظة الطفيلة



أعدت هذه النشرة من قبل أعضاء فريق البحث في مديرية صحة محافظة الطفيلة

Primary Health Care Initiatives is implemented
by AHC Associates, Inc. under contract No. 275 CD/29-0159/0
with the U.S. Agency for International Development (USAID)



بعيداً : ما أمكن - عن تناول الشاي والقهوة والمشروبات
مع الوجبات أو بعدها مباشرة.

تتجاوز هذه المواد بعد ٣ ساعات من الوجبة)



تتبع عن اتباع إنقاص الوزن (الرجيم) أثناء فترة
تباعد بين الاحمال ويصبح بأن تكون الفترة بين الحمل
بر ثلاث سنوات على الأقل.

من الغذاء المتوازن واتباع الممارسات الغذائية
السليمة كافية بأن تبقى السيدة الحامل من
فقر الدم ومضاعفاته.

ولكن في معظم الأحيان تحتاج السيدة
حامل الى تناول قرص الحديد التي قد ينتج
نهما الأم في البطن وتكون البراز بلون اسود
اكن لذا يفضل يتناولها بعد الاكل وعدم
وقف استعمالها قبل استشارة الطبيب.

سيدات الحامل :

وردي مراكز الامومة
والطفولة من أجل...
حصل سليم

الوقاية من فقر الدم :

- تناول الأغذية الغنية بالحديد منها :
- اللحوم الحمراء ، الأسماك ، الدجاج
- البقوليات : الفول والحمص والعدس والفاصوليا .



- الخضروات الورقية : السبانخ ، الملفوخي ، الملفوف .



- الفواكة المختلفة والتمر والزبيب .



- تناول الأغذية الغنية بالفيتامينات الضرورية لإمتصاص الحديد (أ ، ب ، ج ، ح) أهمها :
- الحمضيات ، التفاح الأخضر ، الملفوف ، الجزر .
- الوفاة من الإصابة بالديتان المعوية وذلك بالامتصاص بالنسبة المنخفضة ، وفشل الخضروات والفاكهة تؤكل طازجة .

- عدم التوازن في الغذاء مما يؤدي الى غياب بعض

الفيتامينات التي تساعد على إمتصاص الحديد (أ ، ب ، ج)

- عدم التباعد بين الاحمال (الاحمال المتتالية) .

كيف تتأكدين من إصابتك بفقر الدم ؟

- تتوفر خدمة إجراء الفحوصات المخبرية في جميع مراكز الامومة والطفولة التابعة لوزارة الصحة علماً بأن هذه الخدمات مجانية .

ما هي مضاعفات فقر الدم ؟

على الحامل :

- إرتفاع معدل الامراض والوفيات بين الحوامل .
- العد من نشاط الحامل على القيام بالواجبات اليومية .
- نقص المناعة ضد الامراض المختلفة .
- الإصابة باضطرابات عصبية وعملية .

على الجنين :

- إرتفاع معدل الامراض والوفيات بين الاجنة ، بالإضافة إلى معدل الاجهاضات .
- تأخر النمو التطوري عند الجنين .
- وفي وقت لاحق زيادة نسبة الوفيات بين الاطفال وضعف القدرات الفكرية (صعوبة التركيز في الدراسة أو عند اللعب) .

هو فقر الدم ؟

هو عبارة عن تنني نسبة خضاب الدم (المادة الحمراء) في الدم المتعارف عليه مما يؤدي الى عجز الكريات الحمراء عن القيام بوظيفتها على الوجه الاكمل .

وهناك أسباب متعددة له ولكن الاكثر شيوعاً هو فقر الدم الناتج عن نقص الحديد .

وتعتبر النساء الحوامل والاطفال من أكثر الفئات المعرضة للإصابة به .

هل أعراض فقر الدم ؟

أفعم الاعراض التي قد تشعير بها السيدة الحامل ، حوب لون الوجه ، الدوخة ، فقدان الشهية ، الشعور بالتعب ، ضعف العام ، وطفقان القلب .

هل العوامل المؤدية لفقر الدم ؟

نقص كمية الحديد في الغذاء المتناول خاصة وان احتياجات الحامل من الحديد تزداد مع تقدم الحمل ، ونمو الجنين .

إحتواء بعض الاغذية على مواد تعيق إمتصاص الحديد (الطماطي ، المشروبات الغازية ، ومضادات الحموضة ...) .

الإصابة بالملقنيات والديتان المعوية .

فقدان كمية كبيرة من الدم نتيجة للتدري المتكرر (الدورة الشهرية ، التدري خلال فترة الحمل) .

Appendix 4 - Material Used during Lectures

Importance of Iron in Treating Anemia

The following items represent the major subjects for the given lectures. These lectures were simplified and discussed in colloquial Arabic.

1. What is iron?

Iron is a nutritional element that is essential for the human body. The individual needs iron in very small quantities that are usually measured in milligrams.

2. What is the amount of iron that is usually present in the human body?

There is about 0.5g of iron in the children's body and 4-5g in adults.

3. Why does the human body need iron?

Iron is needed for carrying out important life maintenance activities, such as:

- a. Developing hemoglobin that consists of 75% of the iron in the body. Hemoglobin is essential for transporting oxygen from the lungs to body cells and for eliminating the accumulated cellular carbon dioxide through breathing.
- b. Iron is essential in the composition of myoglobin, which is found in the muscles and is important for storing oxygen in the muscles for use when needed (like during exercise).
- c. Iron is essential for the composition of many body enzymes needed for oxidization. It is also an essential constituent for the enzyme that is responsible for transforming carotenes to vitamin A.

4. Does the human body need iron on daily basis?

Yes our bodies need iron daily and in very small amounts.

5. How much is needed?

The body's need for iron varies with age, sex and the physiological status. For example: Children need iron in greater amounts than adults; females

need more iron than males; pregnant and nursing women are the two most susceptible groups that need iron.

The following table identifies the recommended daily iron requirement

Age Category	Required Iron
Children (1 – 10 years)	10 mg (10/1000 g)
Males (11 – 18 years)	12 mg
Adult Males	10 mg
Adult Females (11 – 18 years)	15 – 18 mg
Pregnant and Nursing Women	+30 – 60 mg (In the form of supplements)

6. Are there any dangers from not having enough iron intake daily?

Yes there are dangers and serious health problems that can result from insufficient iron intake, and anemia is the most important problem.

7. What is anemia and what are its signs and symptoms?

Anemia is a disease that results from nutritional deficits, the most important of which is the iron. Some of the signs of anemia include: paleness, dizziness, fatigue, dyspnea, anxiety and anorexia.

8. The following population groups are the most susceptible for getting anemia:

- Children during development
- Pregnant women
- Nursing women

9. What are the results and unwanted effects of iron deficiency anemia in children.

- Delay in growth and development
- Delay in speech and learning developmental
- Some behavioral and psychological unwanted changes, such as: lack of concentration, carelessness, fatigue, quick exertion, phobia,etc.
- Lack of activity and lethargy

10. What are the consequences of anemia during pregnancy?

- Increase in maternal morbidity and mortality

- Increase in infant morbidity and mortality
- Increase in low birth weight babies (less than 2.5kg)

11. Are there any dangers from anemia on the health of adults?

Yes, adults who have anemia suffer from:

- Fatigue and lethargy
- Quick exertion and feeling of tiredness
- Lack of productivity

12. Is the community affected by the individuals' affect with anemia?

Yes, and the effect is mostly in the form of:

- Allocating a specific budget for treating the affected individuals
- Retarded growth for children and the spread of other forms of anemia
- Decrease in the socio economic and development indicators within the society
- Poor economical development
- Delay in community development

13. What is the extent of anemia prevalence in Jordan? or Is there a problem in the prevalence of anemia in Jordan?

Yes there is a problem. 25% of the pregnant women have anemia and 50% of them suffer from depleted iron stores in their bodies. Anemia is present in 9.6% of children under five years of age. One of the studies showed that by 6 months, 32% of children develop anemia. About 15% of school aged children aged 6-12 years suffer from anemia.

14. How do you know that a person has anemia?

There are simple laboratory tests that can be done in the MCH center or hospital to identify if the person is affected with anemia or not. Examples of these tests include: measurement of hemoglobin level (Hb) or hematocrit (HCT). If the hemoglobin is less than 11g/dl or the HCT is less than 33, then the person is said to have anemia and intervention is necessary.

15. Can you protect yourself and your children from getting anemia?

Yes and there are several ways to do that. Most of the prevention measures depend on establishing appropriate dietary habits within the community. These habits can be summarized as:

- Exclusive breast feeding for the first 6 months of age
- Following a healthy dietary practice, such as:
 - Eating iron rich foods
 - Eating foods rich in vitamin C
 - Avoiding drinking tea and coffee with meals
 - Eating diets rich in vitamin A
 - Eating foods rich in protein
- Providing foods and bread that are iron fortified
- Giving children iron supplements at the age of six months
- Encouraging pregnant and nursing women to take iron and folic acid supplements
- Fighting intestinal parasite

16. How does breast-feeding help in preventing anemia occurrence?

Breast-feeding is the ideal method for infant feeding. It is one of the methods that can prevent anemia. Although breast milk has very small amounts of iron, the iron that it has is highly absorbable (can reach 50-80%) compared with the iron absorption from other sources, that doesn't exceed 30%. Therefore, infants who are exclusively breast fed until 6 months of age are less likely to get anemia because they get enough amounts of iron that assist in the protection from anemia.

Introducing food supplements to children prior to six months of age can decrease the iron absorption provided by breast-feeding. The diminished absorption is brought about by the presence of dietary fibers that hinder iron absorption and thus increase the susceptibility for anemia.

17. What foods are rich in iron?

Foods from animal origin and those from plant origin are the two main sources for iron intake.

- Foods from animal origin, like:
 - Liver, kidneys, and spleen
 - Red meat: Frozen or fresh beef and lamb
 - White meat like chicken and rabbit
 - Fish, sardines and tuna

Note: Iron absorption from animal origin is higher and much simpler than plant origin. Iron from animal origin facilitates and assists in the absorption of iron from plant origin.

- Foods from plant origin, like:
 - Dry legumes, lentils, chickpeas, beans, black eyed beans, sesame seeds.
 - Green leafy vegetables, like spinach, molokhiyeh, khubbeizeh, grape leaves, parsley, mint, rocket, and others.
 - Dry Fruits like dates, raisins and dried figs and prunes

18. Are there any foods that help in iron absorption?

Yes, Ascorbic acid helps in the absorption of iron from milk and from plant origin.

19. Which foods are rich in ascorbic acid?

Citric fruits and their juices, such as: lemons, oranges and nectarines, as well as tomatoes and tomato juice (fresh).

Note: It is preferred to take these foods together with iron rich foods or shortly thereafter.

20. Are there any foods that inhibit the iron absorption?

Yes, and most importantly tea, coffee.

Note 1: The above-mentioned foods can be taken two hours before or after meals.

Note2: Eating foods rich in ascorbic acid decreases the effect of tea and other iron inhibitors.

21. What foods are rich in vitamin A?

In addition to egg yolk, liver, milk and cheese, vitamin A can be mostly found in: carrots, spinach, molokhiyeh and other green leafy vegetables.

22. How do vitamin A rich foods help in anemia prevention?

Vitamin A rich foods facilitate the mobility of iron in the body in order to utilize it in hemopoiesis. In addition, these foods have a role in making erythrocytes.

23. Is diet alone sufficient for anemia prevention?

Diet is sufficient only if all the previously mentioned considerations were followed. Nutritional intake during childhood should be balanced in order to provide the body with the needed nutritional elements such as iron. Therefore, following healthy dietary practices has a major role in anemia prevention.

24. In addition to nutrition, a person might need iron supplements. What are these?

Iron supplements are iron products given in the form of syrup or drops to children and pills to adults. The intake of iron supplements is an effective method for anemia prevention, especially where dietary regimes are ineffective or when the family is unable to provide for iron rich foods.

25. When is it recommended to give iron supplements to children?

Some doctors recommend giving iron supplements to children at the age of 4 months. Others advise to give it at 6 months. It is recommended to give the iron supplement before feeding (i.e. on an empty stomach).

26. Are there any side effects from giving iron supplements to children?

Yes, such as change in the color of stool to black and darkening of the teeth, both of which are normal temporary changes that are harmless and concern free because they disappear with the end of treatment.

Note: Intake of iron in large quantities can cause toxicity in the form of diarrhea, vomiting and gastrointestinal bleeding.

Nutrition During Pregnancy

Proper nutrition during pregnancy has a major affect on the mother's health and her baby. Nutrition of the mother is important for her health because the baby receives it's nutrients from her body, and it is important for her to include good amounts of all nutritional elements in her diet, such as: protein, vitamins, minerals, carbohydrates and some fat from meat, milk and its products, green and yellow vegetables, and fruits. A decrease in the quality of the pregnant woman's diet can affect her health. Severe dietary deficits can have serious effects on the mother and her baby, and can lead to newborn malformations, disease or low birth weight. Knowing that the weight increase during pregnancy should not exceed 10-12 kg, a pregnant women is in need of the following nutrients daily:

1. Milk and its products:

An average of 3-4 cups of milk or equivalent dairy products, such as: yogurt, labaneh or cheese. These dairy products supply the body with minerals, calcium, phosphorus, vitamin B2, proteins and fats that are easily digested.

2. Fruits and vegetables:

A pregnant woman needs two or more servings of green and yellow leafy vegetables, and it is preferred to have at least one fresh product, such as lettuce, spinach, green pepper, or tomatoes. It is recommended to eat potatoes in moderate amounts, and to eat at least two servings of fruits and vegetables a day, such as: oranges, cantaloupe, pears, and apples. These products provide the body with essential vitamins, minerals and fiber necessary for normal gastric functioning. The serving size is one medium sized fruit or half a cup of the fruit or it's juice, and a cup of cooked vegetables.

3. Meat, Legumes and eggs:

In order to provide the body with protein, pregnant and nursing women should eat one serving of meat or fish. Protein rich foods that are at low cost such as: legumes, beans, chickpeas and fava beans can be eaten. These foods are partial substitutes for meat. Eggs serve as a good source of iron that is necessary for both the mother and her baby. It is therefore recommended to have 3 eggs a week and to eat kidneys once a week.

4. Bread and grains:

Pregnant and nursing mothers are advised to eat at least four servings of bread and grains. A serving is equal to half a cup of cooked rice/spaghetti or half a loaf of local made bread preferably whole grain. Breads and grains provide the body with energy and with a considerable amount of protein as well as some vitamin B and minerals like iron.

5. Fats:

Fats, oils and butter form this group. It is recommended to eat moderate amounts of butter or vegetable shortening, and not to exceed one tablespoon daily. Fats are a good source for vitamin A and E which can be found in the daily meals and other foods, especially if the woman watches her weight.

6. Fluids:

In order to maintain good renal functioning, pregnant women are advised to drink large amounts of water (not at mealtimes) in the morning and before bedtime. Soup, milk and fruit juices are good sources for fluids, and nursing mothers should drink a lot of fluids (even if it is just water). It is also recommended to drink fluids half an hour prior to breast-feeding.

General recommendations to improve the practices of pregnant and nursing mothers:

1. It is generally recommended that pregnant and nursing mothers refrain from eating large quantities of sweets, pastries and sodas especially if they are overweight. Eating canned foods and sauces is also not advised because these foods can cause gastric disturbances and bloating for the pregnant woman. Eating a low salt diet is preferred during pregnancy because salt can cause water retention and disturbance for the pregnant woman, especially during the last two months of pregnancy. It is therefore recommended not to take salt in large amounts.
2. Minimizing the intake of caffeine in the form of coffee and tea is recommended.
3. Pregnant women are advised to eat frequent small meals (3-4 per day), especially during the last trimester. Large meals can affect the stomach's size and digestion, which can cause nausea and vomiting during the first trimester of pregnancy. In order to minimize morning sickness, pregnant women are advised to eat a piece of bread or cream crackers 10 – 15 minutes before getting up from bed in the morning.
4. Refraining from smoking because smoking can decrease the amount of blood reaching the infant, which in turn reduces the amount of nutrients. Smoking can also delay fetal development and can lead to complications during delivery.
5. Refraining from dieting (or not eating for long hours) during pregnancy is important because it inhibits glucose from reaching the brain. In addition, the decrease in protein can result in small head size and short stature.
6. Pregnant and nursing mothers should refrain from using any medicines without consulting the physician.