Effect of Nutritional Interventions on Anemic Pregnant Women's Health Using Health Promotion Model

Mariam Amer Al-Tell: Assistant *Lecturer in Faculty of Nursing /An-Najah University*

Prof.Dr. Nawal Mahmoud Soliman: *Prof. of Community Health Nursing, Faculty of Nursing, Ain Shams University*

Prof. Dr. Faten Khayrat El-Guindi; *Prof &Head of Community Health Nursing Department, Faculty of Nursing,Ain Shams University*

Dr. Hisham El-Nana,MD of Obstetric And Gynecologist

Abstract

Iron deficiency anemia is one of the main health problems in Palestine, it affects about a quarter of pregnant women who attended the Ministry of Health facilities in the West Bank. It is preventable awhile its consequences can't be prevented or treated easily. Health Believe Model (HBM) is widely used in intervention programs that aiming to changing behaviors. **The aim of study** *was to evaluate the effect of nutritional interventions using health promotion model through changing in their perception regard the risk of anima.* **Research design***: Quasi-experimental design, using control group.* **Sample***: it was a convenient sample included 102 pregnant from antenatal care (ANC) of MOH in Nablus city/Palestine.* **Research tool:** *two tools were used for data collection; the interviewing questionnaire that consist of 3 parts; the socio-demographic and maternal profile of pregnant women, their perception about risk and susceptibility to iron anemia and their dietary habits/ practice. The second tool was the investigation /laboratory tool that assessed the hemoglobin level of pregnant women. All pregnant women interviewed, and results of blood samples for hemoglobin level obtained from the MOH laboratories. Data were analyzed using SPSS soft ware. The study result showed overall significant relationship between perceiving risk of anemia and eating practices, and between changing eating practices and improvement in hemoglobin level of pregnant women. Actions at mother child health centers regarding management of anemia among pregnant women using principles of Health Promotion Model/Health Belief Model in different intervention programs should be request for.*

Introduction

Anemia, as defined by **Skikne, (2007**) is **"**a deficiency in red blood cells (RBCs) or a decrease in hemoglobin and it is a symptom that can result from many underlying pathologies.

In spite of the fact that most Ministries of Health in developing countries have policies to tackle this main health problem, exp; provide pregnant women with iron in supplement, maternal anemia prevalence has not declined, and as estimated by WHO, the prevalence rate of iron deficiency anemia among pregnant women world wild is (55.8%) (**Yekta, etal, 2008),** (58%) of pregnant women in developing countries are anemic. Anemia affects about (18%) women during pregnancy in developed countries (**Galloway, 2002), (Moradi, etal, 2007),** most of them were already anemic at the time of conception.

Iron deficiency anemia is the one of most common hematologic complication during pregnancy, severe anemia increases the risk of maternal and fetal morbidity and mortality, and the risk of premature delivery and low birth weight for the infant , and it is associated with lower infant Apgar scores, (**Hilary et al, 2000**), (**Allen, 2000) (Burger, 2002**) & (**Bakhtiar, etal, 2007**). In addition, Infants, whose mothers were iron deficiency anemic, are at increased risk of developing iron deficiency anemia earlier, because their iron stores may be low at birth (**Burger, 2002).**

Health Believe Model is widely used in intervention programs that aiming to changing behaviors, especially those related to infectious disease, dietary practices, and contraceptive use, high blood pressure screening, smoking cessation, exercise, nutrition, breast self-examination, sexual risk behaviors, (**Denison, 2002**).

Changes in behavior according to this model based on five components: perceived *susceptibility:* the belief that one is susceptible to the problem, perceived *severity:* the belief that a health problem is serious, *perceived benefits:* the belief that changing one's behavior will reduce the threat*,* and perceived *barriers:* a perception of the obstacles to changing one's behavior. These components explain the individual's "readiness to act."

cues to action: which stimulate behavior, and self-*efficacy,* which is one's confidence in the ability to successfully perform an action and change behavior **(Glanz, etal, 1997) & (Denison, 2002) &(Menon & Szalacha, 2008) & (Campbell, 2008)**. So the positive thoughts, rather than negative once help person to make the change. As cognitive is affected by attitude and feeling, therefore attitudes influence people's decision and action **(Holli, etal, 2003)**. People do eat for different reasons, in addition to physiological factors; anxiety, loneliness, depression, happiness, celebration. So knowledge of what to eat is essential to influence healthful food choice, although the relationship between, food and nutrient and what they eat is very week as reported by **Holli, etal (2003)** unless people are "willing and motivated to change". The model assumes that a person's beliefs about health are determinants of the possibility of an individual to make changes in the lifestyle behaviors (**Holli, etal, 2003) (Menon & Szalacha, 2008) & (Denison, 2002) & (Campbell, 2008)**. Health education is a very crucial factor in preventing illness, high proportion of women lack information regarding their health and risk factors. Provision of information will help them in taking care of themselves and their family **(NY, 2006)**.

Magnitude

In Palestine**,** anemia is still considered a public health problem, as it affects about a quarter of pregnant women who attended the Ministry of Health facilities in the West Bank. According to **(PHIC, 2004)** the rate of anemic pregnant women who attended the MOH facilities, reached to (25.8%) ;{(14.8%) were primi-gravida and (19.4%) were multi-parous women}. In UNRWA, the prevalence rate of anemia among pregnant women was (38.3%) and (15.3%) among nursing mothers visited UNRWA-Primary Health Care centers, while it was (35.8%) among pregnant women who visited the Governmental MCH **(WHO, UNICEF, 2009)**.

Community health nurse play a vital role in promoting health during pregnancy. The nurse role within the aspect of health promotion has shifted from a disease model to a health model **(Piper, 2009**). The most important role is figured in teaching and providing pregnant women with information needed based on social and psychological behavioral changes to maintain health during pregnancy mainly those related to

nutritional aspects. Community health nurse emphasize on behavioral changes to assist mothers to change their eating habits and practices that contribute to nutritional deficit. Antenatal care is an important indicator for maternal mortality and morbidity and it is one of the basic components of maternal care that the life of mothers and babies rely on **(Nisar, White, 2003).**

Aim of the study

The study aims to evaluate the effect of complementary nutritional interventions for anemic pregnant women by using health promotion model" through:

- Assessment of pregnant women's perceptions, practices and general health to determine their needs
- Design and implement nutritional interventions using health believe model according to pregnant women's needs
- Evaluate the effect of nutritional interventions through improving pregnant women's health status.

Hypothesis

- Nutritional intervention has its effect on women's perceiving risk regarding iron deficiency anemia
- Health promotion model will promote women to adopt better nutritional eating practices. (Perception changes will affect pregnant women eating practices)
- Nutritional interventions will improve general health status of pregnant women.

Subjects and Method:

Research design: quasi-experimental design, using control group was used to implement this study.

Setting: The study was conducted at 4 Mother Child Health Care (MCH) clinics. The four clinics are Palestinian Governmental Primary Health Care (PHC) centers; Balata, Ras-Elein, Habs-Aldam and Alwasta clinic.

Subjects: The number of pregnant women attended each MCH center during the year 0f 2007-2008, ranged (15-20) women per each month. With total number who attended the 4 MCH centers in 1 year (2007-2008) was about (720-960) women**.**

Sample: Convenient, purposeful sample was used in this study. The total number collected reached up to 110 women, (6 women aborted by first trimester, and 2 women withdraw and refused to continue with the study), so the sample size consisted of 102 pregnant women, according to certain inclusive criteria: hemoglobin level less than 10.5 gm/dl at booking/first visit, gestational age of 3-4 months, and with age 20-35 years old.

Simple random method was used to grouping women into study group; included 51 pregnant women, received the complementary nutritional intervention program, and control group, included 51 pregnant women, and did not received the program, appointing that odd numbers were on study group and the even numbers were in the control group in each clinic.

Tools of data collection:

Four tools were used for data collection

The first tool:

Interviewing questionnaire: The questionnaire was developed by researcher in Arabic language, based on the related literature review and supervisors opinions, it comprised of the following six parts;

Part one**:** Socio-demographic data and maternal history **(**pre- assessment tool) of pregnant women's age, occupation, educational level, income level, number of parity, number of abortion, family planning methods used, history of present pregnancy, and the use of iron supplement, in addition to medical obstetric history present and past

Part two: pregnant women's perception (pre-post tool). It consisted of 2 items; perceived risk of iron deficiency anemia and perceived susceptibility to iron deficiency anemia. The two parts composed of statement of likert scale **(Likert, 1932),** that used for assessment of respondent attitudes and beliefs. The scale had five response alternatives (ranged from strongly agree to strongly disagree), and it based on health belief model components, adopted the design of (**Hazavehei, etal, 2007**).

Part three**:** pregnant women's practices **(**pre-post tool); it composed of two elements; the first one consisted of (10) questions that assessed the women's eating practices. The second one included (8) questions that assessed the women cocking habits. The 18th statements had 3 response alternatives, ranged from never to always, and it was scored as following: The 3 response alternatives were given the value of 3, 2 and 1point

respectively. The sum of ratings for all of the items was calculated, then level of practice was classified, as good practices if grade is (>85%), and poor practices if grade was (≤85%).

The Second Tool: investigation tool: (pre-post tool) ,that assessed pregnant women's hemoglobin level 3 times during the study period, at first visit/first trimester, second and third trimester.

The overall study work carried out through June /2008 to March /2010. Developing and reviewing the data collection tool, piloting and designing of educational booklet were managed between Junes to the middle of August/2008. Collection of the proposed sample size accomplished within 3-4 months, from middle of August to middle of December/2008. Implementation of program and the re-evaluation phase attained through August/2008 to June /2009, writing and analyzing were accomplished June 2009-to March/2010.

Administrative part

Official approvals from the authority of Ain Shams University Palestinian Ministry of Health were attained to facilitate the carrying out of the study.

The purpose of the study was explained to each pregnant women and informed consent was also obtained.

Operational part

Pilot: piloting of (10%) ten pregnant women, who were inclusive in the study, was carried out to ensure understanding of questionnaire and time needed completion, modifications was made accordingly.

Field work: The researcher interviewed pregnant women to fill the questionnaire. The results of blood test /hemoglobin level/HB were obtained from pregnant women file as at first visit / booking visit. And it was repeated at second (24-26 wk) and third trimester (34-38 wk), at MOH laboratory, if it was not repeated, researcher recommended to be repeated.

Program construction

First Phase; assessment and planning phase

Using the previous mentioned tool   all pregnant women included in the study were assessed regard their socio-demographic statues, their perception regard risk and susceptibility to iron deficiency anemia study, their dietary practices/habits and their hemoglobin level at the three pregnancy trimesters.

Designing and development of nutritional intervention program

The complementary nutritional intervention (CNI) program was developed based on the literature review and educational principles using the principles of health belief model that aimed to behavior change. The health educational / promotional program aimed at improving the nutritional status of pregnant women and raising their hemoglobin blood level through changing their perception regards the risk of iron deficiency anemia and through changing their eating habits/ practices.

The program composed   of two parts that were presented within (16 hours) and through 8 grouped sessions, in addition to another 2 individualized/follow up session for each woman. The content of the theoretical part consisted of (60%) of program hours, and the practical part consisted of (40%) of program hours. In addition an educational booklet was designed based on educational material development principles, and related information gained from piloting. It included information regard iron deficiency anemia in term of causes, complication, treatment inhibitors and promoters of iron absorption and examples of prepared meals rich of iron. It was distributed to pregnant women as a self learning material aimed at acquiring pregnant women information about anemia.

Second Phase; implementation phase

Pregnant women in study group were organized into five educational groups according to their expected date of delivery (EDD). Each group was encountered to 10 sessions.

Third phase: Evaluation phase

The study tool that used in the assessment phase was used to evaluate   the effect of the health promotion program on health status of pregnant women, and their perception, eating practices. The evaluations were attained through comparing the study group pre and post the implementation of nutritional intervention program and through comparing the study and the control group. And it was conducted tow times during the study and according to the Expected Date of Delivery (EDD) of pregnant

women: The first one was performed at the second trimester of pregnancy (22-25week) and hemoglobin level of pregnant women for both study and control groups were reassessed. The second evaluation was performed at third pregnancy trimester (32-24wk), and pregnant women's dietary practices, perceiving risk of anemia, in addition to their blood test/Hb level.

Data analysis

All collected data and laboratory tests were entered and computed using SPSS software and applying Chi-squire test, t-test and Spearman correlation test with significance at p value ≤ 0.05.

Results

1. Socio-demographic and maternal profile

Results showed that (92.2%) of study group and (78.4%) of control group are between 20-30 years old. And (45.1% &43.1%) of study and control group, respectively, had secondary level of education. (76.5%) of the study group and (84.3%) of control group are household. (47.1%) and (60.8%) of study and control group had income of less than 1500NIS/month. Regarding parity (25.5%) and (33.3%) of study and control group respectively are prami-gravida, (54.9%) of study and (49%) of control group have been pregnant for 1-3 times. The results relieved that there was no significant differences (*p.value <.05)* between study and control group in the socioeconomic status which proved the homogeneity of the sample.

2. Iron supplementary use

Table (2) showed that (58.8%) of study group and (54.9%) of control group reported the (irregularly use of iron), and (13.7%) of study and (19.6%) of control group don't use it. According to the time of iron supplement use, (29.4%) of both groups take iron supplement when they remember, and (25.5%) of study group and (19.6%) of control group take it immediately after meal. (39.2%) of both study and control group related the cause of incompliant to use of iron to "forgetting". And (7.8%) of both groups related it to "fear of having infant with abnormalities".

3. Results of hemoglobin level

Table (3) showed that, (94.1%) of study group and (98%) of control group has moderate level of anemia (9.1-10gm/dl) at first trimester. (80%) & (74%) of study

group became non anemic, respectively at 2nd and 3rd trimesters, with high significant difference. And (80.9%), (74.5%) of control group had moderate level of anemia at 2nd, and 3rd trimester, respectively. the findings indicate high significance difference between study and control group in the level of hemoglobin at second and third trimester.

4. Pregnant women's Perceptions about risk and susceptibility to iron deficiency anemia

Table (4) illustrated that (62.7%) & (68.5%) of study and control group respectively have law perceiving risk of anemia that indicated no deference between the groups pre- CNI (*p. value. .709*). While post-complementary nutritional intervention (54%) of study group highly estimated the risk of iron deficiency anemia and was no change among control group. According to perceiving susceptibility to anemia during pregnancy, (43.1%) of study group and (35.3%) of control group has law estimation level. which indicated no differences between the two groups pre-CNI, and post-CNI (60%) of study group highly perceived their susceptibility to IDA.

5. Pregnant women' eating practices

The results (table 5) indicated that (92.2 %) of study group and (83.7%) of control group have poor level of eating habits/practices, while post-CNI, it changed and (83.7%) of study group developed good level of eating habits/practices with statistical significant change (p.value<0.05), while was no change in control group (p.value 0.182).

6. Relationship between pregnant women's perceptions about risk of anemia and their eating practices

According to the research question regard the relationship between pregnant women's perceiving risk and susceptibility to anemia and their eating practices, table (6): illustrated that, post-CNI, one third of study group have high level of perceiving risk/danger to anemia and good eating practices level, that indicated a relationship in pregnant women level of eating practice and their perception regard risk (*p.value.013*) and susceptibility to anemia *(p.value .05)*.

7. Relationship between pregnant women eating practices and their hemoglobin level

According to relationship between pregnant women level practices and hemoglobin level, table(7) illustrated that , post complementary nutritional intervention , there was a relationship among the study group (*p.value .0.001*), while was no relationship among control group (*p.value .772).*

Discussion

Finding of study (table 1) revealed that mean age of pregnant women 22±.624 with different education level, more than one third of study group and about one quarter of control group had their university education which compatible with the results of **(PCBS, 2004)** that indicates literacy rate, of female of age group 15-24 and 25-34 in the West Bank, reached up to (99.2) and (98.6) respectively, noting that it is higher in urban than rural in addition illiteracy rises with age.

More than tow third of pregnant women in both groups are household, and these results is consistent with **(PCBS, 2004)** that revealed "Palestinian women constitute only (14.7%) of labor force in the West Bank, and that the unemployment rate among women aged 15 and older is (19.1%)".

According to maternal history, the study findings (table2) revealed that mean of parity   was 2±.751, noting that it was one of the study conditions to include women with 0-3 pregnancies. One quarter of study group and one third of control group are prima-gravida, and about half and less of study group and of control group respectively got pregnant for 1-3 times, these results are in reliable with the finding of PCBS that indicated the fertility rate for 2003 in Palestine reach up to (5.2). In the main time **WHO (2001)** indicated that high proportion of women enters pregnancy with anemia.

Regarding the "time of taking iron supplement", results revealed that more than one quarter of both groups, take the supplement "when remember". "Forgetting" was the main to reason for non-adherence to use of iron supplement, as more than one third of both groups relate their non use of iron supplement to forgetting, and less than one tenth of both groups related it to "fear of having infant with abnormalities". These findings are supported by **(Winichagoon, 2002)** in a study about developing strategy to combat anemia in **Thailand**, who reported that who reported that "fear of having a large

fetus, forgetfulness and side effects were important reasons for low compliance with iron supplementation in Thailand". In the mean time, **(Galloway, etal, 2002)** summarized that, the reasons for non adherence to iron supplement in 8 developing countries, {"only about one-tenth of the women stopped taking the tablets due to side effects, poor utilization of prenatal health care services, beliefs against consuming medications during pregnancy, and in most countries, fears that taking too much iron may cause too much blood or a big baby, making delivery more difficult"}. In contrast, **(Yeketa, 2008**) illustrated that "high compliance with supplementation use, reached (87%) and highlighted that "experiencing side effect did not influence duration of iron intake". More than two third of both groups "drink water with iron tablet", and one quarter of study group, and one fifth of control group, "take it immediately after meal", and this could explain the non benefiting of iron supplement, **(Hillary, 2000)** in a study conducted in **Peru** regard improving dietary intake to prevent anemia in girls, indicated that total iron absorption from meal is constant. In addition it is preferable to use juice and sources of vitamin C with iron supplement and food, as indicated by **(Schumann, 2007), (Waweru, 2009),** the absorption rates of iron could rise significantly from less than (5%) to more than (15%). In the other hand calcium inhibits and decrease absorption of iron and it is recommended to avoid taking iron tablet or iron rich food with milk **(Thompson, 2007**).

The finding of the study regards "iron supplementary usage, in term of "time of use, fluids used with iron supplement, and the adherence of pregnant women to the use of iron supplement", reflect the poor practices of pregnant women regarding iron supplement use, that affect on the amount iron bioavailability and the benefit of using it, it also reflect their knowledge about the iron absorption promoters and inhibitors.

According to the perception of pregnant women regards the risk of IDA, finding of study (table 4) illustrated that, pre-CNI, about two third of pregnant women in both study and control group has law level of perception regards danger and risk of IDA, with no significant difference between both groups (p=.709). While post-NI, results indicated that there was improvement in their level of perceptions with significant difference among study group, and between study and control group, (*p. value <.05*). These findings were in line with study by **(Campbell, 2008)** that studied

the effect of perception of diabetic patient on their preventive behaviors and reported that "poor complication preventive behavior among the subjects was associated with lack of perceived seriousness of diabetes and lack of perceived susceptibility to diabetes complications".

According to the research hypothesis concerning the relationship between pregnant women perception level about anemia and their eating practices, The findings of this study (table 6) indicated that, less than half of study group who highly perceived risk and susceptibility to anemia, have good eating practices, which indicated significant relationship between level of perceiving risk and susceptibility to anemia and the level of eating practices, (r=.013) and (r=.05) respectively in study group, while was no relationship in the control group (r=.347) and (r=.960).

Also, according to steps of HBM, changing in how (perceiving the risk and susceptibility) of disease /problem, has its effect on changing behaviors and developing better practices (*cues to action*) to prevent and minimize the rate of prevalence. These findings supported by (**Mora & Nestel, 2000**) who illustrated that, behavioral change programs included expanded promotion of positive health and nutritional practices for females, would be expected to lead to significant and sustainable improvements in women's nutrition. In addition, (**Block, 2004**), in nutritional intervene program have increased awareness in many Americans, with small changes in actual dietary habits.

It could be concluded that, the low level of perceiving risk and seriousness of IDA and the low estimation of perceived susceptibility to IDA and its complications is associated with poor dietary practices as a preventive behavior.

Regarding hemoglobin level, the results (table 7), illustrated that, pre-CNI, mean of hemoglobin level was 9.8686±.42402 among the study group and 9.9157±.29008 in the control group, with no significant difference between the study and control groups (p=.312), which was supported by (**WHO, 2001**) who indicated that "many pregnant women enter pregnancy with low iron store. While post-CNI, the study showed improvement in hemoglobin level, as more than one two third of study group, had mean hemoglobin level of {10.9412±.5390} at second trimester (24-26 wk) and of {11.388±.86346} at third trimester (>36wk) with significance difference, in comparing to the level of hemoglobin in first and second trimester (p=.001), (p=.019) respectively.

While among control group the results showed decrease in Hb level, as about two third of them have mean of hemoglobin of {9.61989±.613960}, {9.5277±.72192} at second and third trimester of pregnancy respectively, with significant difference in comparing to HB level at third trimester with the first and second trimester of pregnancy, with (p= .032) and (p=.031), and with no difference between HB level comparing second and third trimester (p= .533). Several studies indicated the worsening of anemia throughout duration of pregnancy, without any interventions. Similar results are accomplished by **(WHO, 1996),** where prevalence rate of anemia among Palestinian women was (29%) at the time of registration and increased to (38%) by the 32 week of gestation. And after intervention more than 2/3 of who were anemic at first stage of pregnancy showed an improvement in their hemoglobin level. These results also were in line with study done by **Irbihat, etal,(2001)** that showed decrease in the prevalence rate of anemia with advancement duration of pregnancy among the intervention group from (20%) to (19.2%), with hemoglobin level (11.9-11.7g/dl) and it decreased among non-intervention group with decrease of hemoglobin level from (11g/dl to 10 .8g/dl). **Garg, etal, (2006)** in a study among Indian pregnant women, reported significant improvement in the hemoglobin level among interventional group compared to the non-interventional group (post-nutritional education vs non-education = 9.65 ± 0.97 vs 7.85 ± 1.58, p<0.001) and anemia prevalence reduced (post-education vs non-education = 78.7% vs 96%) in post-educational group.

According to relationship between pregnant women practices and their hemoglobin level at third trimester, findings of study (table, 7) revealed that existence of relationship in study group with (r =.001), and was no relationship in the control group (r=.772), which explained the effect of practices on the improvement of hemoglobin level in the study group, post-CNI. These results were supported by **(Irbihat, etal, 2001)** and by (**Gadallah, 2002)** who reported decrease in prevalence rate of anemia that after nutrition education program and iron supplement (32%) versus (46%) in the control group. In addition, (**Gag & Kashyap, 2006)** pointed out to significantly improvement in hemoglobin level in the intervention group compared to non-interventional group (9.65 g/dL, versus (7.85 g/dL) and pre- education group (8.84 g/dL).

Conclusion

It could be concluded that, the low level of perceiving risk and seriousness of IDA and the low estimation of perceived susceptibility to IDA and its complications is associated with poor dietary practices as a preventive behavior.

Using health belief method to change pregnant women dietary practices, our study revealed a significant changes pre-post nutritional intervention, in the level of pregnant women's perceptions regard risk and susceptibility to anemia. It also indicated positive relationship between pregnant women's perception level regard anemia and their eating practices and significant difference comparing study with control group. Regard the relationship between changing dietary practices level of pregnant women and their hemoglobin level, the study indicated a significant positive relationship between dietary practices and improving of hemoglobin level   in compare with control group. Also there was positive relationship between maternal hemoglobin level at third trimester of study group, and their fatigue level, in compare with control group.

Recommendation

Designing and implementing nutritional program that concerning women health during pregnancy starting pre-conception period at MCH centers and ensuring the use of micronutrient supplement dispensed to pregnant women.

Designing Health education program for mothers using health promotion models that emphasize on the perceptions regard the disease and health issues to ensure sustainable behaviors changes.

Designing Health education program for mothers that emphasis on the behavioral change and include materials related to food groups, nutritive food to eat during pregnancy.

Developing policy for IEC to ensure developing providing and presenting correct, harmony, clear, understandable message, using simple language, aiming to raise awareness and promote positive behavioral changing

Use of media in promoting positive diet practices, through presenting series related to nutrition especially those programs that teaching meal preparing and cocking, these programs must be reorganized so as to concentrate on preparing healthy meals considering socioeconomic status of all population and common health problems in the community.

Tables

Table (1): The Distribution of both groups regards their socio characteristics

Item	Study No.(51)	Control No.(51)	X^2 p.valu
Age	%	%	
<20	2.0	9.8	124.0
20-30	92.2	78.4	59
>30	5.9	11.8	.000
Education level			
Elementary	11.8	25.5	33.137
Secondary	45.1	43.1	.003
Diploma	5.9	5.9	
University	37.3	25.5	
Occupation			
Household	76.5	84.3	101.70
GO. Employee	11.8	5.9	6
NGO Employee	11.8	9.8	.000
Parity			
Prime gravid	25.5	33.3	
1-3	54.9	49.0	55.020
4-6	15.7	15.7	.001
>6	3.9	2.0	

Table (2): Distribution of both groups regards their use of iron supplement

Item	Study %	Control %	X^2 p. value
Patten of Iron use			
Regular	27.5	25.5	26.882
Irregular	58.8	54.9	.004
Don't take	13.7	19.6	
Causes of refusal iron tablet			
Regular intake	27.5	25.5	
Constipation	2.0	3.9	
Stomachache	7.8	13.7	
Nausea	2.0	2.0	100.980
Forgetting	39.2	39.2	.003
Afraid of having large baby	7.8	2.0	
Afraid of having baby with abnormalities	7.8	7.8	
Nothing mentioned	5.9	5.9	
Drinks taken with Iron tablet			
Water	64.7	70.6	102.314
Milk	15.7	7.8	.002
Juice	5.9	2.0	
Don't take it	13.7	19.6	

Table (3) Distribution of study and control group regarding their hemoglobin level pre-post -CNI

Item	Study No.(51)			Control No.(51)		
	Pre %	Post %		Pre %	Post %	
HB level	at 1st	at 2nd	at 3rd	at 1st	at 2nd	at 3rd
Mild	5.9	-	-	2.0	17.0	23.4
Moderate	94.1	20.0	26.0	98.0	80.9	74.5
Normal	-	80.0	74.0	-	2.1	2.1
Mean ±SD	9.8686± .42402	10.9412± .5390	11.388± .86346	9.9157± .29008	9.6149±. .613960	9.5277± .72192
t-test &*	1st-2nd	1st-3rd	2nd-3rd	1st-2nd	1st-3rd	2nd-3rd
p. value	12.084 001	11.914 001	4.670 .019	4.298 .032	4.095 .031	.871 .388
t-test &**	study –control at 1st		study –control at 2nd		study –control 3rd	
p. value	1.015 .312		11.296 .000		11.474 .000	

1st: first trimester of pregnancy, 2nd: second trimester of pregnancy, 3rd: third trimester of pregnancy

Table (4): Distributions of study and control groups regards their perception level about risk to IDA pre-post-CNI

Item	Study No.(51,50)			Control No.(51,47)			Test	
	Pre %	Post %	t-test p.value	Pre %	Post %	t-test p.value	t-test p.value	
Perception level regard risk of anemia								
Under	2	6		2	-			
Law	62.7	12	5.870	68.5	66.0	.443	.375	6.443
Moderate	31.4	28	.000	25.5	34	.669	.709	.000
High	3.9	54		3.9	-			
Mean± SD	2.3200 .5127	3.300± .90914		2.391± .5551	2.340± .47898			
Perception level regard susceptibility								
Under	11.8	12		19.6	18.8			
Law	43.1	10	.141	35.3	33.3	.573	1.03	4.598
Moderate	43.1	26	. 8	43.1	45.8	.569	.303	.000
High	2.0	52.0		2.0	2.1			
Mean±SD	3.326± 7.1752	3.180± 1.043		2.274± .8019	2.312± .8030			

Table (5): distribution of study and control groups regards their level of eating practices pre-post CNI

Item	Study No.(51,50)			Control No.(51,47)			t-test	
	Pre %	Post %	Z sig	Pre %	Post %	Z sig	*p. value*	*p. value*
Level of eating practices								
Good	7.8	83.7	11.011	11.8	18.8	1.353	.661	8.325
Poor	92.2	16.3	.000	88.2	81.2	.182	.510	.000
Mean± SD	1.9216± .2715	1.1633± .37344		1.882± .3254	1.8125± .3944			

Table (6): relationship between pregnant women level of practice and perceiving level of risk and susceptibility of anemia post-CNI

Variable	Level of practice					
	Study			control		
	Good %	Poor %	r	Good %	Poor %	r
Perceiving risk/danger						
Under	4	2	.350	-	-	.140
Law	6	6	.013	10.6	55.3	.347
Moderate	12	12		2.1	31.9	
High	46	6		-	-	
Perceiving susceptibility						
Under	6	6	.272	2.1	17	.008
Law	6	4	.05	4.3	27.7	.960
Moderate	14	12		6.4	40.4	
High	42	10		0	2.1	

Table (7): relationship between dietary practices and their hemoglobin level of both groups post -CNI

Variable	Level of Practices					
	Study			Control		
	Good	poor	r	Good	poor	r
Maternal HB level						
Mild	-	-	.473	2.1	21.3	.043
Mode	8	18	.001	10.6	63.8	.772
Normal	60	14		-	2.1	

تأثير التدخلات الغذائية على صحة النساء الحوامل المصابات بفقر الدم/ أنيميا نقص الحديد باستخدام نموذج التعزيز الصحي

ملخص

أنيميا نقص الحديد تعتبر من المشكلات الصحية الرئيسية في فلسطين ، حوالي ربع النساء الحوامل اللواتي ترددن على مراكز الامومة والطفولة في وزارة الصحة في الضفة الغربية مصابات بفقر الدم / أنيميا نقص الحديد .تعتبر انيميا نقص الحديد من المشاكل الصحية التي يمكن الوقاية منها ، في حين تعتبر نتائجها وعواقبها أكثر صعوبة من حيث العلاج حيث انها مرتبطة بزيادة مخاطر الولادة المبكرة ، وانخفاض الوزن عند الولادة وكذلك تسهم في زيادة معدل وفيات الامومةوالطفولة . ان تحسين نوعية الغداء عنصرا هاما في منع ومكافحة فقر الدم.   يستخدم برامج التعزيز الصحي بشكل واسع في البرامج التي تهدف الى تغيير السلوكيات حيث ان إدراك مخاطر واحتمالية التعرض للأمراض لها تأثير على تغيير السلوكيات وتطوير أفضل للممارسات التي تسهم في منع أو التقليل من معدل انتشار الامراض . الهدف من هذه الدراسة التجريبية هو تقييم تأثير التدخلات التغذوية باستخدام نموذج تعزيز الصحة من خلال التغيير في معتقدات النساء الحوامل عن مخاطر انيما نقص الحديد .طبقت الدراسة باستخدام مجموعة المراقبة و تم اختيار العينة الدراسية المكونة من مائة واثنين سيدة من النساء الحوامل اللواتي تلقين خدمات رعايةالحوانل   في مراكزالامومة والطفولة التابعة لوزارة الصحة الفاسطينية في مدينة نابلس / فلسطين. تم اجراء مقابلة شخصية مع كل سيدة وتعبئة النمادج الخاصة في الدراسة، وتم تحليل البيانات باستخدام البرنامج الإحصائي للعلوم الاجتماعية .   أظهرت نتائج الدراسة وجود علاقة ذات دلالة بين إدراك مخاطر/حطورة فقر الدم/انيميا نقص الحديد و الممارسات و السلوكيات الغذائية،   كدلك بين و الممارسات و السلوكيات الغذائية و التحسن في مستوى الهيموجلوبين لدى النساء الحوامل.

References

Allen, H.L. (2000): Anemia and Iron Deficiency: Effects on Pregnancy Outcome .*American Journal of Clinical Nutrition*, Vol. 71, No. 5, Pp1280-1284. USA. Retrieved from http://www.ajcn.org pdf

Bakhtiar, U.J.   Khan, Y.,   Nasar, R. (2007): Relationship between maternal hemoglobin and Perinatal outcome. *Rawal Medical Journal; 32:*Pp102-104. Retrieved from http://www.elsevierscience.com

Block, G., Block, T., Wakimoto, P., Block, CH. (2004): Demonstration of an e-mailed worksite nutrition intervention program. Prev Chronic Dis [serial online] [*4*]. Available from: URL: http://www.cdc.gov/pcd/issues/ oct/04_0034.htm

Burger, S.   (2002):   How to assess iron deficiency anemia and use the hemocue. *Nutritional Journal*,   Park Avenue South Suite New York, NY. Retrieved from www.hkworld.org

Campbell, C. (2008)*:* Health education behavior models and theories; a review of the literature Part I**.** Health Curriculum Research. Mississippi Cooperative Extension Service   Retrieved   from   http://www.msstate.edu/web/legal   URL: http://msucares.com/health/health/appa1.htm

Denison, J. (2002):   Behavior change: a summary of four major theories, Family Health International   (FHI).   Retrieved   from   http://www.fhi.org/en/aids/aidscap/aidspubs/behres/bcr4theo.html

Gadallah, M., Rady, M., Salem, B., Aly, EM., Anwer, W. (2002): The effect of nutritional intervention program on the prevalence of anemia among pregnant women in rural areas of Belbis district-Sharkia Governorate-Egypt; *Ain Shams Medical Journal, 77(3-4):*Pp261-73

Galloway, R., Dusch, E., Elder, L., Achadi, E., ; Grajeda, R.,   Hurtado, E., Favin, M., Kanani, S., Marsaban, J., Meda, N., Moore, KM., Morison, L., Raina, N., Rajaratnam, J., Rodriquez, J., Stephen, C. (2002): Women's perceptions of iron deficiency and anemia prevention and control in eight developing countries. *Socio Science Medical Journal, 55(4)*:529-44. ISSN, the World Bank, Washington, DC   USA. Retrieved from http://www.medscape.com

Garg, A.,   Kashyap, S., (2006): Effect of counseling on nutritional status during pregnancy. *Indian Journal of Pediatric,73(8):*Pp687-692.Retrieved   from: http://www.ijppediatricsindia.org/text.asp? 2006/73/8/687/27198

Glanz K, Lewis FM, Rimer BK. (1997): Health behavior and health education: theory, research and practice (2nd ed.), San Francisco: Joey Bass

Hazavehei, SMM., Sharifirad, G., Mohabi, S. (2007): The effect of educational program based on health belief model on diabetic foot care. *International journal of diabetic in developing countries.* vol 27,issue 1,pp 18-23

Hilary, M., Tula, G., Bartolini, MR., Fukumoto, N.M., Lopez,T., Zavaleta MN., and Bentley, EM. (2000): improving dietary intake to prevent anemia in adolescent girls through community kitchen in a Periurban population of Lima, Peru. *Journal of Nutrition: 130:459S*-461S. Retrieved from **http://www.pubmid**.

Holli, B., Calabrese, JR., Maillet, OJ., Radler, RD. (2003): Communication and education skills for dietetics professionals, (4th Ed.). Lippincott Williams &Wilkins.

 Irbihat, etal,(2001 Irbaihat, H., Qatatshehm, J., Dawoodeyah, I. (2001): Primary Health Care Initiatives, (PHCI). the effect of a health education program on prevalence anemia among pregnant women in Tafila governorate. Retrieved from http://www.elsevierscience.com

Likert, R. (1932): "A Technique for the Measurement of Attitudes". *Archives of Psychology* 140: 1–55. Retrived from Wikipedia, the free encyclopedia http://www.wikipedia.com

Menon, U., Szalacha, L. (2008): Health Belief Model, The international encyclopedia of communication. ISBN. Retrieved from http:///www.encyclopedia.net

Mora, O.J., Nestel, S.P. (2000): Improving prenatal nutrition in developing countries: strategies, prospects, and challenges. *American Journal of Clinical Nutrition; Vol. 71, No. 5*: Pp1353S-1363s. American Society for Clinical Nutrition. Retrieved from http://www.ajcn/misc/term.shtml

Moradi, F., Mohammadi, S., Kadivar, AA. and Masoumi, JS. (2007): Knowledge and practice of pregnant women in fars province about intake of iron supplements .*Acta Medica Iranica ; 45(4):* 301-304. Retrieved from http://www.pubmid

Nisar, N ., White, F. (2003): Factors affecting utilization of Antenatal Care among reproductive age group women (15-49 years)in an urban squatter settlement of Karachi, *Journal Of Pakistan Medical Association Vol 53 ,No.2,.* Department of Community Health Sciences, The Aga Khan University, Karachi. Retrieved from http://www.elsevierscience.com

(PCBS) Palestinian Central Bureau of Statistics (2004): Demographic and Health Survey. http://www.pcbs.gov.ps

(PCBS) Palestine Central Bureau of Statistics (2004): Foreign Trade Statistics, various issues. Palestine - Human Development http://www.pcbs.gov.ps

(PHIC-MOH): Palestinian Health Information Center: Ministry of Health –Primary Health Initiative   Care (2004): Women Health; Health Status in Palestine 2003.

Piper, S. (2009) Health Promotion for Nurses, Theory and Practice, paper back , Routledge ISBN p 256

Schumann,K.,   (2007): Safety of interventions to reduce nutritional anemia . Kraemer,K., Zimmermann,B.M. *Nutritional   Anemia***.** Sight and Life Press**.** Retrieved from **http://**www.sightandlife.org download/ nutritional -anemia.pdf

Skikne, B. (2007: Anemia: diagnosis and treatment option for women. *The Journal of Family Practice***. From** http://www.jfponline.com

Thompson, B. (2007): Food-based approaches for combating iron deficiency . **Klaus Kraemer &Michel- Zimmermann**. *The Guidebook Nutritional Anemia(337)* . Sight and Life Press. Retrieved from http://www.sightandlife.org. download/ nutritional anemia.pdf

UNICEF, WHO, UN (2001): WHO/UNICEF/UNU (2001). Iron deficiency anemia: Assessment prevention and control: A guide for programme managers. Geneva,WHO/UNICEF/UNU.

Waweru, J., Mugenda,O., Kuria,E.(2009)anemia in the context of pregnancy and HIV/AIDS: A case of PUMWANI maternity hospital in Nairobi Kenya. American Journal of Food Agriculture Nutrition and Development V9, No. 2;pp 1684-5374

WHO   (2009):   Health   conditions   in   the   occupied   Palestinian territory, including east Jerusalem, and in the occupied Syrian Golan, general fact sheet www.http://who.org

(WHO) World Health Organization, (2004): Iron deficiency anemia assessment, prevention, and control A *guide for programme managers,* WHO/NHD/01.3. http://www.who.org

WHO World Health Organization (2004): Prevalence and Current Situation of Iron Deficiency Anemia among Pregnant Women in Other Aimag, Districts of Mongolia, **report of survey**

(WHO) World Health Organization, UNICEF, United Nation University (2001): Iron deficiency anemia; assessment, prevention, and control, A guide for programme managers. Retrieve   from   http://www.who.org

(WHO)World Health Organization (2001): Antenatal care in developing countries: promises, achievements and missed opportunities: an analysis of trends, levels and differentials. Retrieve   from   http://www.who.org

WHO (1996): Operational problem of an iron supplementation program for pregnant women: an assessment of URWA experience; 74(1) 25-33 http://www.who.org

Winichagoon, 2002) Winichagoon, P. **(**2002): Forging effective strategies to combat iron deficiency; prevention and control of anemia: Thailand Experiences. *Journal of Nutrition; 132*:862S-866S. The American Society for Nutritional Sciences Retrieved from http://www.jn.nutrition.org

Yekta, Z., Ayatollahi, H., Pourali, R., Farzin, A.(2008): Predicting factors in iron supplement intake among pregnant women in urban care setting. *Journal of Research Health Science; 8.(1)*: pp. 39-45 . Retrieved from http://www.elsevierscience.com