

DIETARY KNOWLEDGE AMONG PREGNANT WOMEN ATTENDING PRIMARY HEALTH CARE CENTERS IN KARBALA

Methal Ibraheem Alwakeel¹, Ali A. Abutiheen², Nora Sabah Rasoul³

¹ M. B. CH.B. Specialist / General practician Al-Zubailiya Centre (Al-Abbas Residential Centre)

² Family and Community Medicine department \College of Medicine\ University of
Kerbala\Karbala\Iraq

³ Obstetrics and Gynaecology department \College of Medicine\ University of
Kerbala\Karbala\Iraq

Abstract:

Background: Pregnancy is associated with changes in woman's nutritional needs. The mother's nutritional status affects her own health, and that of the fetus, and the outcome of the pregnancy. This study aims to determine the knowledge of pregnant women towards proper nutrition and factors associated with their knowledge.

Methods: A cross-sectional study was conducted on 364 pregnant women from 20 weeks and above who attended primary health care centers in Karbala city, using a specially prepared questionnaire. Data was collected by direct interview with pregnant ladies. A systematic sample was used on select patients. Data collection was conducted from 10th of April to 15 June 2022.

Results: According to baseline responses of pregnant women and their scores, the mean total knowledge score was (4.39 ± 2.43) out maximum 11 and total knowledge score percentage was (39.9%), the knowledge scores increase with increase education of the mother as higher education, with increase age and large family size.

Conclusion: The overall knowledge was poor regarding nutrition during pregnancy among pregnant women. Women education was the most important factor that affect their knowledge and there was weak counselling by primary health care physicians to pregnant women about nutrition. So there is a need for greater emphasis on nutritional counselling and education to optimize maternal diets.

Keywords: pregnancy, nutrition, diet, knowledge, Karbala

Introduction:

Pregnancy is a crucial period of every woman's life. At this important period nutritional status of pregnant woman is very essential as it affects the pregnancy outcome. Inadequate nutrition during pregnancy may have unfavorable effects on fetus. It is also seen that the diet during pregnancy is related to the disease pattern of the resulting child in adult life (1). Inadequate nutrition may lead to problems like premature delivery, low birth weight babies, anemia, cardiovascular diseases, hypertension, diabetes, obesity to mother and child (2). The problem of malnutrition among women is of serious public health concern (3). The well-being of mother and the newborn infant is greatly determined by the nutrition of the mother during pregnancy and it further influences the health of the child during childhood and adulthood. However, certain deficiencies, such as iron or vitamin D deficiency, have been identified as especially harmful to pregnant women (4). During

pregnancy, energy requirement of women increases by 330 Kcal per day and protein by 15 gram per day (NIN, ICMR 2011). Nutrient deficiency can be due to inadequate intake of protein, energy, Vitamin C, iron, etc but by other conditions like environmental factors, socio-economic factors, malaria, and worm infestation (5). Intake of adequate amount of vitamins and minerals in adolescent and preconception phase reduce risk of neural tube defects among neonates (6).

The advised protein consumption during pregnancy is 60 g per day, up from 46 g/d in non-pregnant stages. This rise indicates a shift from 0.8 g of protein/kg/d to 1.1 g of protein/kg/d during pregnancy period. Protein consumption enhances birthweight independent of calorie intake, mother age, BMI, or lifestyle-related variables, according to observational studies from the United Kingdom and Spain. The impact, however, is minor, with a 1g increase in protein resulting in a 7-13 g rise in birth weight (7). Because carbohydrates become digested at varying rates, their effects on blood glucose and insulin levels vary. With 6 to 9 servings of whole grains each day, carbohydrates should account for 45 to 64 percent of total daily calories. In pregnancies complicated by gestational diabetes mellitus, low glycemic index (GI) meals reduced the amount of insulin required to maintain adequate glycemic control (GDM) (8). Dietary fiber and reduced glycemic load (GL) consumption have also been linked to better pregnancy outcomes.

The recommendations for daily micronutrient intake during pregnancy are determined by the Recommended Dietary Allowance (RDA) data (9). RDA refers to the levels of intake of essential nutrients that are judged by the Food and Nutrition Board of the Institute of Medicine (IOM) to be adequate to meet the known nutrient needs of practically all healthy persons. The Recommended Dietary Allowances have been modified for pregnant women (10).

Nutrition counselling is an important part of prenatal care for all pregnant women. Dietary needs during pregnancy differ significantly from those of nonpregnant, thus physicians and other health care providers must be aware of them. A certified dietitian or nutritionist may assist with nutritional advice and intervention (11).

This study aims to assess the knowledge of pregnant women regarding maternal nutrition in Karbala city, factors associated with knowledge and to evaluate if they have been counselled by primary health care physician about nutrition during pregnancy.

Subjects and Methods :

A cross-sectional study was conducted on 364 pregnant women from 20 weeks and above who attended primary health care centers in Karbala, Data collection was conducted from 10th of April to 15 June 2022.

Four PHC centers were selected by using random lottery method which was used 2 times, the first one we select centers from center sector and the second one from periphery. The selected centers (Altahdi, Bab Baghdad and ALabasia Algharbia) within the center sector and Abu Rawia within Al_Hindia sector.

A systematic sample approach used where every other client was selected from those pregnant ladies who attended the health centers in Karbala. After providing informed consent to 364 women who were pregnant 20 weeks and above, data was collected using questionnaire. The sample size was calculated using sample size calculation for population survey using Epi Info program version

seven at confidence level of 95%, margin of error of 5%, population proportion of 50%, and population size of 4800 (which represent the total estimated number of pregnant women in the 4 PHCCs, from annual target of pregnant women within their area. As a result, the minimal sample calculated was 356 women. Moreover, we achieve a sample of 364 pregnant women.

Pregnant women from 20 weeks gestation and above were eligible for the study. Those who refuse to participate were excluded from the study.

The study was approved by the medical research bioethical committee in College of Medicine in University of Kerbala and from the research ethical committee in Kerbala health directorate.

After providing informed consent to 364 women who were pregnant 20 weeks and above, data was collected using questionnaire. The interview was done in an open place and keeping social distance due to corona pandemic, data collected 3 days per week the interview took 10-15 minutes. The questionnaire includes demographic data (age, education, occupation of women and husband, education of husband, income, number of family members and living area) pregnancy information (gestational age in weeks, number of children, previous miscarriage, disease before pregnancy, symptoms during pregnancy, weight before pregnancy and now). Dietary knowledge (15 questions).

To assess the pregnant women's knowledge, a score composed of 10 items, each item scored (0-1) the maximum total score is 11.

0 For wrong answer or I don't know answer.

1 For right answer.

Statistical analysis: Information from the questionnaire and all test results from study groups samples were entered and analyzed using SPSS program, version 28.0. Descriptive statistics was performed on the data of each group. Values were illustrated by n (%) for categorical, Scale variables were presented by mean \pm standard deviation (SD) for normal data. Fisher's LSD method was used in ANOVA to create confidence intervals for all pairwise differences between biomarkers and study groups while controlling the individual error rate to a significance level that specify. All hypothesis tests with p-values less than 0.05 (two-sided) were judged statistically significant.

Result:

The mean age \pm SD of pregnant women was 25.59 \pm 6.28 year and the age group 24-33years was 44%.The higher percentage of gestational age was 20-28 weeks (68.4%). 37.9% were of primary school education, and 87.4% were housewives. Among them, 76% had middle income, 74.2% lived in urban areas, and 29.9% had a history of previous abortions, as shown in (Table 1).

Table 1: Demographic data of the women included in the study

Variable	Group	Frequency	Percentage
Age (Years)	14 - 23	156	42.9
	24 - 33	160	44.0
	34 - 43	48	13.1
Gestational age (Weeks)	20 - 28	249	68.4

	29 - 38	115	31.6
Education	Illiterate\ read and write	41	11.3
	Primary school	138	37.9
	Secondary school	127	34.9
	University and higher	58	15.9
Occupation	Housewife	318	87.4
	Student	16	4.4
	Employee	30	8.2
Income	Weak	78	21.4
	Middle	279	76.6
	Good	7	1.9
Husband educational level	Illiterate\ read and write	19	5.2
	Primary school	135	37.1
	Secondary school	133	36.5
	University and higher	77	21.2
Husband job	Non employee	12	3.3
	Student	8	2.2
	Free worker	244	67
	Employee	100	27.5
Residence	Rural	94	25.8
	Urban	270	74.2
No. of children	< 2 Children	264	72.5
	2 - 5 Children	91	25.0
	> 5 Children	9	2.5
Family Size	2	35	9.6
	3 – 4	62	17.0
	≥5	267	73.4
History of Abortion	No	255	70.1
	Yes	109	29.9
History of chronic diseases	No	332	91.2
	Yes	32	8.8
Symptoms: heart burn Motion sickness Dizziness constipation	No	62	17
	Yes	302	83

The knowledge domain consisted of 10 items with 2 responses for each item scored (0 – 1); the maximum total score is 11. According to baseline responses of pregnant women and their

scores, the mean total knowledge score was (4.39 ± 2.43) giving a mean knowledge score percentage of 39.9%, as shown in (Table 2).

Table 2: Baseline characteristics of Participants Responses to the Knowledge Items

Baseline characteristics of pregnant women	Groups	No	%
Food is important for growth and development of fetus	Yes*	312	85.7
	No	20	5.5
	I don't Know	32	8.8
Food is important for providing heat and energy and for the normal functioning of women's body	Yes*	212	58.2
	No	24	6.6
	I don't Know	128	35.2
Food is important for fighting infection or disease	Yes*	280	76.9
	No	12	3.3
	I don't Know	72	19.8
An inadequate diet can cause miscarriage	Yes*	78	21.4
	No	177	48.6
	I don't Know	109	29.9
Number of cups of water per day (Cups)	4	23	6.3
	6	52	14.3
	8 *	80	22.0
	I don't Know	209	57.4
Fruits (Serving)	Two*	117	32.1
	Three*	53	14.6
	Five	4	1.1
	I don't Know	190	52.2
Vegetables (serving)	1	66	18.1
	3 *	82	22.5
	5 *	4	1.1
	I don't Know	212	58.2
Meat and chicken (servings)	0 - 1	105	28.8
	2 - 3 *	20	5.5
	4 and more	3	0.8
	I don't Know	236	64.8
Protein source	Banana	11	3.0
	Meat*	70	19.23
	Apple	3	0.8
	Egg*	25	6.87
	Meat & Egg*	85	23.4

	I don't Know	170	46.70
Carbohydrate source	Potatoes*	30	8.22
	Meat	2	0.5
	Eggs	5	1.4
	Breads*	40	11
	Potatoes & Breads*	60	16.48
	I don't Know	227	62.36
Mean Score of Knowledge		4.39±2.43	
Mean Score of Knowledge Percentage		39.90%	
The correct answer was highlighted as (*)			

By comparing the mean scores across the baseline characteristics of pregnant women, the test revealed a significant difference in mean knowledge scores within the age groups ($P= 0.003$), education of pregnant women ($P=< 0.001$), occupation ($P=< 0.001$), income ($P= 0.011$), husband's educational level ($P= < 0.001$), husband Occupation ($P= < 0.001$), Family Size ($P=< 0.001$) and pregnant women who had symptoms ($P= 0.050$). Post hoc tests revealed that the total knowledge of pregnant women in the age group (34 – 43 Years) was significantly higher than in other groups (5.27 ± 2.50), university and higher education group (6.91 ± 2.05), employee group (7.47 ± 1.66), good income group (6.71 ± 2.21), husband university and higher education group (6.21 ± 2.28), husband employee group (5.48 ± 2.61) and more than 5 number size of family group (4.00 ± 2.23) was significantly higher than those in other groups. No significant differences had been found in the mean total knowledge score across other baseline characteristics of pregnant women, Residence and History of Abortion, ($P>0.05$), (Table 3).

Table 3: Comparison of mean baseline total knowledge score according to baseline characteristics of pregnant women (n=364)

baseline characteristics of pregnant women		Total Knowledge score	P value
		<i>Mean±SD</i>	
Age (Years)	14 - 23	3.97±2.31	0.003
	24 - 33	4.54±2.45*	
	34 - 43	5.27±2.50*	
Gestational age (Weeks)	20 - 28	4.42±2.37	0.751
	29 - 38	4.33±2.55	
Education	Illiterate\ read and write	2.73±2.06	<0.001
	Primary school	3.64±1.99*	
	Secondary school	4.58±2.23*	
	University and higher	6.91±2.05*	
Occupation	house wife	4.04±2.26*	<0.001
	Student	5.63±2.53*	

	Employee	7.47±1.66*	
Income	weak	3.96±1.96	0.011
	middle	4.45±2.52	
	good	6.71±2.21*	
Husband educational level	Illiterate\ read and write	3.11±2.05	<0.001
	Primary school	3.80±2.25	
	Secondary school	4.12±2.23	
	University and higher	6.21±2.28*	
Husband Occupation	Non employee	3.83±2.44	<0.001
	student	1.88±1.64	
	free worker	4.05±2.21	
	employee	5.48±2.61*	
Residence	Rural	4.23±1.95	0.411
	Urban	4.44±2.57	
No. of Children	< 2 Children	4.55±2.47	0.125
	2 - 5 Children	3.96±2.30	
	> 5 Children	4.11±2.09	
Family Size	2	5.77±2.72	<0.001
	3 – 4	5.27±2.61	
	≥5	4.00±2.23*	
History of Abortion	No	4.46±2.45	0.410
	Yes	4.23±2.39	
History of chronic diseases	No	4.33±2.43	0.101
	Yes	5.06±2.37	
Symptoms: heart burn Motion sickness Dizziness constipation	No	3.84±2.61	0.050
	Yes	4.50±2.38	
The significant results of Attitude score according to baseline characteristics of pregnant women was highlighted as (*)			

Multivariate Analysis

The logistic regression model was statistically significant. The age group (34 – 43) was with high knowledge score (OR=1.196, 95%CI [1.037, 1.379]) P = 0.014. The knowledge scores increase with increased education of the mother as higher education (OR=1.567, 95%CI [1.086, 2.17498.747]), family size with 2 & (3 - 4) numbers group (OR=1.330, 95%CI [1.136, 1.557]) p = <0.001, OR=1.225, 95%CI [1.083, 1.384]) p= 0.001, and so on for other variables, as shown in Table (4).

Table 4: Logistic regression analysis of knowledge scores with demographic characteristics.

baseline characteristics of pregnant women		B	P value	OR (95% CI)
Age (Years)	14 – 23	-	-	1 ^a
	24 – 33	0.065	0.198	1.067 (0.967- 1.177)
	34 – 43	0.179	0.014	1.196(1.037 - 1.379)
Education	Illiterate\ read and write	-	-	1 ^a
	Primary school	0.241	0.012	1.273(1.053 - 1.538)
	Secondary school	0.449	<0.001	1.567(1.289 - 1.904)
	University and higher	0.936	<0.001	2.550(2.001 - 3.249)
Occupation	house wife	-	-	1 ^a
	Student	0.300	0.008	1.082 (1.082- 1.683)
	Employee	0.677	<0.001	2.436 (1.589-2.436)
Income	weak	-	-	1 ^a
	middle	0.909	0.113	1.091 (0.980 - 1.215)
	good	0.458	0.006	1.581 (1.139 - 2.195)
Husband educational level	Illiterate\ read and write	-	-	1 ^a
	Primary school	0.158	0.193	1.171(0.923 - 1.485)
	Secondary school	0.223	0.066	1.250(0.985 - 1.586)
	University and higher	0.610	<0.001	1.841(1.425 - 2.377)
Husband Occupation	Non employee	-	-	1 ^a
	Student	-0.535	0.041	.586 (0.351 - 0.979)
	Free worker	0.043	0.744	1.044 (0.806 - 1.353)
	Employee	0.296	0.031	1.344 (1.028 - 1.757)
Family Size	2	0.285	<0.001	1.330 (1.136 - 1.557)
	3 – 4	0.203	0.001	1.225 (1.083 - 1.384)
	≥5	-	-	1 ^a
Symptoms: sickness	heart burn Motion Dizziness constipation	0.118	0.051	1.125(1.000 - 1.266)
P<0.05 considered significantly different, [S] = Significant, [NS]=Non-significant, OR = Odds Ratio, CI= Confidence Interval, a= reference category.				

The source of information of patients who participated in the study shows that the higher

frequency was from family and relatives 49.7%, as shown in Figure (1). Regarding counselling by a primary health care physician about nutrition during pregnancy, 62.9% of the participants didn't receive counselling, as shown in Figure (2).

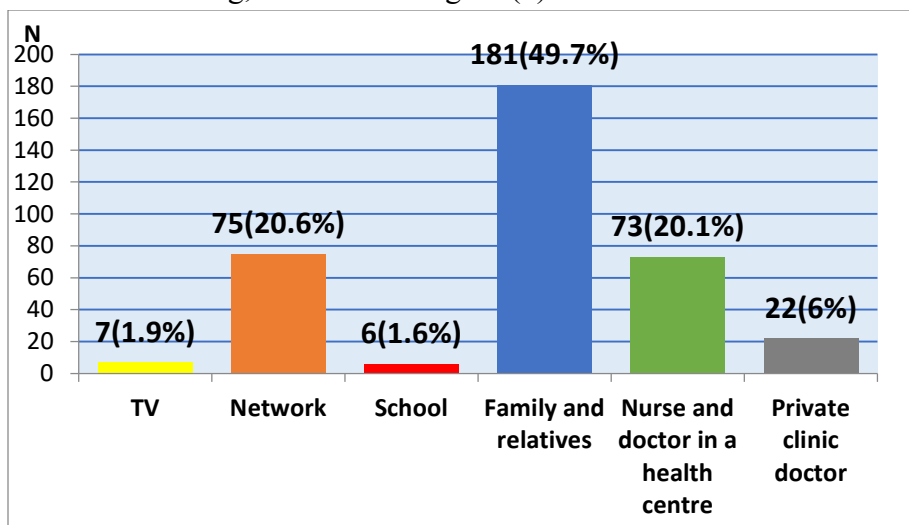


Fig. 1: Frequencies of source of information of the participants

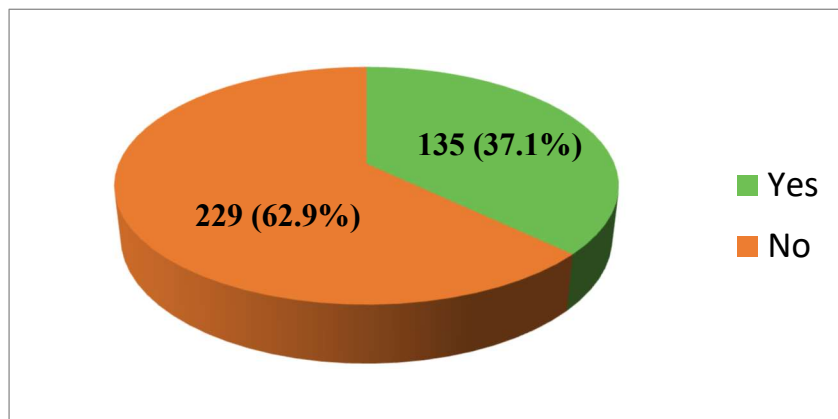


Fig. 2: Frequencies of counselling by a primary health care physician about nutrition during pregnancy

Discussion

Proper nutrition throughout pregnancy is critical for both the mother's and the fetus's health. There are various changes in pregnant women's nutritional demands, some of which are connected to the needs of the baby and some of which are related to other changes that alter food absorption and metabolism. The effects of malnutrition during pregnancy have been identified in many studies which can be prevented by paying attention to food (12).

While 85.7% of pregnant women know the importance of food for growth and development of fetus, just less than 60% know the importance of food for the function of pregnant women's body, this result was in line with study done in Egypt (13).

More than three quarter of participants know the importance of food for fighting infection

or disease, and only 21.4% know the effect of inadequate diet on the occurrence of miscarriage. Our findings were lower than study conducted in northwestern Ethiopia **(14)**. The discrepancy might be attributable to differences in educational level of pregnant participants since high percentage of participants in our study had lower educational level.

Only (22%) of participants know the number of cups of water that should be taken per day. Knowledge about the recommended intake of food groups include fruits, vegetables, meat and other protein source food, milk and dairy products and cereals were (46.7%), (23.6%), (5.5%), (13.7%), (0.8%) respectively. Our findings were lower than study done in Australia **(15)**. The differences between the two results may be due difference in socio-economic characteristic and educational level.

Below half of pregnant participants in our study didn't know protein food source and (3.8%) choose the wrong answer and (62.36%) didn't know carbohydrate food source and (1.9%) choose the wrong answer. we observed that (12.4%) only know vitamin A food source, (41.2%) know iron food source and (38.2%) know iodine food source. While study done in Ethiopia showed that (20.9%) didn't know protein food source and (24.8%) didn't know carbohydrate food source, (64.1%) know vitamin A food source, (60.4%) iron source and (48.7%) iodine source **(14)**. The low nutritional knowledge level of common food sources may be due to low nutritional information and low socioeconomic status of the participants in this study.

The mean knowledge score percentage was (39.9%) which consider poor knowledge.. Also, we found (49.7%) of women took nutritional information from their families and relatives, it is possible that their information was wrong and affect their nutritional knowledge score. Our result was lower than the result from study done in Iran, which found about 59.10% of participated pregnant women had a good level of knowledge **(16)**.

Our result disagreed result of study done in Egypt, that found (82.9%) of participants had adequate knowledge **(13)**.

There was association between age and knowledge, higher the age groups had a good nutritional knowledge, this may be due to they had more experience than young age women. University education and higher had better knowledge than groups of lower education ,the explanation for this finding is the educated women had better access to internet and books and they gained information during their studies. Employed pregnant women also had better knowledge than housewives. There are several possible explanations for this finding, employed women may have better access to internet and books and they share their experiences with other women in the workplace compared to housewives. Our study was in line with study done in Southern Ethiopia which found that maternal education and occupation had a positive association with knowledge **(17)**.

Also we found pregnant women with high income had better knowledge , this finding may be explained by that cost may be a barrier to attending antenatal follow-up visits among antenatal mothers from lower socioeconomic status which lead to poor nutritional knowledge in women with low income. Husband educational level and husband occupation also affect nutritional knowledge of pregnant women in our study.

Our result was in line with study done in northeast Malaysia, which revealed that there was association between occupation and high monthly income of pregnant women with their nutritional knowledge(5).

Study done in Germany found that the age of women, gestational age, education and income were positive predictors for the sum score, indicating that women with increased age, higher education levels, high income and later gestational weeks possess significantly more knowledge regarding lifestyle factors during pregnancy, which is in line with our study except for gestational age (18). Our study revealed that there was no association between a gestational age and nutritional knowledge among pregnant participants, this may be due to our study was conducted on pregnant of 20 weeks gestations and above and difference in sample size. Our study was in line with study done in Ethiopia that reported poor level of knowledge and revealed monthly income and educational level were the significant factors affecting nutritional knowledge of mothers during pregnancy (19).

We found only (37.1%) of women were been counselled about nutrition during pregnancy, which mean poor counselling. This was in line with the result of study done in Ethiopia which showed most participants responded that maternal nutrition counselling provided to pregnant mothers is not adequate and neglected by most stakeholders (20). The explanation of this finding that there are a lot of clients each day in PHC centers, So it is difficult to tell mothers what to eat and how much to eat and this is another reason for the lack of knowledge among pregnant women about nutrition in our study.

Conclusions

The nutritional knowledge of pregnant women about diet is almost poor for many dietary items and on the effect of diet on pregnant own health. Where the overall knowledge was below 40%. Better knowledge was associated with having higher educational level, higher age and bigger family size. Further, there was insufficient and weak nutritional counselling of pregnant women by PHC physician. So greater emphasis on nutritional educational program for pregnant women and to develop the nutritional counselling at the PHC level is recommended.

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