Nutritional Status and Some Related Factors among Pregnant Women in Iran

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Abstract: Adequate nutrition is an indispensable part of people lives. Pregnancy, due to hormonal, metabolic, and physical changes which result in increasing the need for nutrients, leads to rise in vulnerability to malnutrition. This study has been conducted in order to determine the adequacy of nutrients intake and its relation to some factors in pregnant women. **Methodology**: This research is a cross sectional study carried out using simple-random sampling method. The research was conducted from March 2010 to January 2011 on 355 pregnant women who were referred to health care centers in Sanandaj in their third trimester of pregnancy. Nutrient intake was collected using the 24-hour dietary recall for three successive days. The checklist including items like characteristics, height, weight, order of pregnancy was filled in. Collected data was analyzed at significant level of 0.05. **Results**: The average age of subjects was 28±5. 295(83%) of whom were housewives and the rest were working women. Compared with RDA standards, 239(79.4%) of the subjects suffered from nutrient deficiency. The maximum nutrient deficiency was related to iron, vitamin C, zinc and vitamin A (85.8%, 80.3%, 66.5% and 65% respectively). Nutritional status had a significant relation with age (p = 0.018), the number of pregnancies (p = 0.007), BMI (P < 0.001) and educational level (p = 0.001). **Conclusion**: Nutrients intake for a remarkable rate of pregnant women was less than recommended amount, which is considered as a serious threat. It is recommended that vitamin A and zinc supplements be added to Iran health programming like Iron.
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1. Introduction

Adequate nutrition is an indispensable part of people lives and necessary for their health. Requirement of food alters under the influence of different genetic, environmental, food pattern, gender, and rate of growth factors. [1] The influence of inadequate food intake in some groups including pregnant women is more important. [2] Due to high pressure, resulted from harmonic, metabolic, and physical changes, nutritional requirements of pregnant women are increased. Therefore, they are more vulnerable to malnutrition. [3] A good diet for a pregnant woman is the one that provides energy and nutrients so that the needs of fetus growth are met and makes mother store required substances for fetus evolution and breastfeeding period. In addition, it meets would-be mother's usual requirements. [4] Poor maternal nutrition during the pregnancy period is considered a threat to both mom and the fetus. [5-7] The harmful effects of inadequate intake of some certain micronutrients including ferrous [8], vitamin B6, folic acid [9] as well as calcium [5] on producing congenital defect and pregnancy complications have been proved by some experts. Even based on a number of studies, some harmful effects of zinc and magnesium inadequate intake lead to low birth weight, immaturity, and hypertension. It has also been suggested that lack of folic acid results in neural tube defect (NTD); lack of folic acid accompanied by ferrous affect low birth weight (LBW) and cause immaturity and neonatal death; vitamin inadequate intake leads to mother's death and affects LBW; and lack of Vitamin C intake causes immaturity.[10] A study, conducted by Bawadi et al in Jordan, states that normal dietary intake, certain nutrients and nutrition related factors have affected pregnancy outcomes among a large group of women in the Middle East. [5] According to the National Nutrition

Monitoring, a lot of women at their pregnancies and even at higher ages do not intake sufficient vitamins A, C, B6, and E, Folate, calcium, ferrous, zinc, and magnesium.[11] A study in the UK, showed insufficient diet of 78% of pregnant women [12]; some studies in Iran indicated that 75% of pregnant women had insufficient diet ; and pointed out that based on DRI, micro nutrients are lower than standards[13,14]. In this study, we examine the nutritional status of pregnant women in Sanandaj and determine some effective factors on it.

2. Methodology

This cross-sectional survey has been conducted in Sanandaj, capital of Kurdistan province in west of Iran from March 2010 to January 2011. The population includes third trimester pregnant women who were referred to health centers. The reason for choosing this group of pregnant women is that at this period the size of fetus is big and as a result mother needs more food. 355 subjects using simple-random sampling entered the study. Multiple pregnant women, gestational or overt diabetes, women who suffered from pre-eclampsia, chronic hypertension, those who were hospitalized at the time of conducting study, gastroenteritis as well as those who were on a special diet, were all excluded from the survey. The selected subjects were trained by the midwife of the center. The training course was face to face in order to complete the 24-hour dietary recall for three successive days from all edible foods and all drinks based on understandable and convertible units such as weight(gr.), volume (for example the size of glass, plate or bowl), size (for example the amount of consumed bread), and number. Then a checklist including the following information was filled: demographic characteristics (including age, marriage age, occupation, husband's job, education, household), and some obstetric information (including gestational age, first pregnancy age, number of pregnancies, LBW of last delivery), and consuming ferrous complementary, multivitamins, and acid folic during the pregnancy. To calculate the BMI (Body Mass Index), based on standard techniques weight and height of pregnant women were recorded. A special code was allocated to each pregnant woman. The information regarding food substances such as carbohydrates, protein, fat, some vitamins, and minerals were converted separately. The average of three days was calculated and finally based on allocated code of each individual, this calculation, along with other information, entered SPSS 16.00. Consumed food substances were compared with RDA amounts. [15] It should be mentioned that consumed amount of ferrous, folic acid, and multivitamin, consumed in the form of pills, was not considered in this calculation. Only the rate of their dietary intake was calculated. Data were analyzed using SPSS software version 16 and subjected to analysis using t-test and k2.

3. Results

The study sample consisted 355 subjects whose age mean and standard deviation were 28±5.3 in the 15-41 age range. 295 women out of 355 were housewives and 184 (51.8%), 108 (30.4%), 42 (11.8%), and 21 (6%) were experiencing their first, second, third, and fourth (or above) pregnancies respectively. The information of 296 out of 355 subjects regarding energy intake was complete in which compared to RDA, 61 (20.6&) of women had adequate nutrition; whereas, 235 (79.4%) of them had inadequate nutrition.

Table 1 shows mineral and vitamins intake status of third trimester of pregnancy. As seen in table 1 the maximum rate of insufficient nutrition intake was related to ferrous (84.8). The relation between nutritional status and some factors was examined based on caloric intake. Significant relations between nutritional status and age group (P-value= 0.018), husband's job (P-value= 0.047), number of pregnancies (P-value= 0.018), literacy (P-value= 0.001), and BMI (P-value= 0.001) were found. However, there was no statistically significant difference between nutritional status and women's occupation (P-value= 0.158) (Table 2).

Table 1: Mineral and Vitamins Intake Status of Third trimester of pregnancy

Nutrient	Minimum required	Average intake	P-value	Sufficient nutrition (%)	Insufficient nutrition (%)
Calcium	1000 mg	1175.3	0.001	185(52.15)	70 (47.9%)
Ferrous	27 mg	49.68	0.171	54 (15.2%)	301 (84.8%)
Zinc	11 mg	13.89	0.114	119 (33.5%)	236 (66.5%)
Vitamin A	770 mcg	1750	0.000	124 (34.9%)	231 (65.1%)
B_1 Vitamin	1.4 mg	2.30	0.000	254 (71.5%)	101 (28.5%)
B_2 Vitamin	1.4 mg	3.01	0.000	283(79.9%)	72 (20.3%)
B_6 Vitamin	1.9 mg	2.18	0.072	144 (40.6%)	211 (59.4%)
Vitamin B_{12}	2.6 mcg	18.39	0.000	237 (66.8%)	118 (33.2%)
C Vitamin	85 mg	16.3	0.000	(19.7%) 70	285 (80.3%)

Table 2: Nutritional status and some related factors

		Nutritional Status		Total	P-value
		Sufficient	Insufficient		
Age group	<=19	1(8.3%)	11(91.7%)	12	*0.018
	20-30	49(27.5%)	129(72.5%)	178	
	>=30	11(10.7%)	92(89.3%)	103	
Occupation	Housewife	46(19.2%)	193(80.8%)	239	0.158
	Working women	15(26.3%)	42(73.7%)	57	
Husband's job	Employee	11(14.1%)	67(85.9%)	78	*0.047
	Self-employed	43(25.9%)	123(74.1%)	166	
	worker	1(4.8%)	20(95.2%)	21	
	Unemployed	2(20%)	8(80%)	10	
	Other	4(19%)	17(81%)	21	
Number of pregnancy	1	43(28.5%)	108(71.5%)	151	*0.007
	2	12(13.2%)	79(86.8%)	91	
	3	2(5.7%)	33(94.3%)	35	
	>=4	4(21.1%)	15(78.9%)	19	
BMI	<20	5(41.3%)	7(58.3%)	12	*<0.001
	20-25	35(32.1%)	74(67.9%)	109	
	25-30	17(13.1%)	113(86.9%)	130	
	>=30	4(9.5%)	38(90.5%)	42	
Education	Elementary or below	10(12.5%)	70(87.5%)	80	*<0.001
	Middle and high school	30(18.3%)	134(81.7%)	164	
	University degree	21(40.4%)	31(59.6%)	52	

* Level of significance =5%

4. Discussion

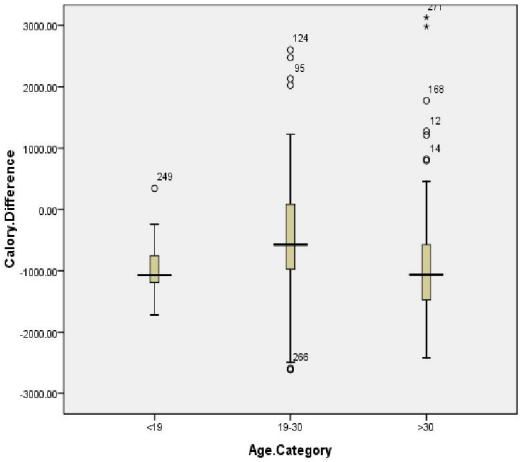
Good nutrition and adequate caloric intake as well as nutrient supply during pregnancy in order to give birth to a healthy baby is considerably important.[16] Caloric intake is considered the most important factor in weight gaining during pregnancy. However, various factors such as basal metabolism increase, physical activity, and fetus growth are involved in this regard.[15,17] Caloric metabolism changes vary among women.[16-18]Therefore, FAO and WHO recommend required extra calorie for pregnant women at their first trimester, second trimester, and third trimester of pregnancies 85 Kcal/day, 285 Kcal/day, and 475 Kcal/day respectively. [19] RDA recommends 300 Kcal/day though. [15]

Studies in Denmark, Australia, and US suggest that good nutrition leads to energy intake increase in pregnant women and consequently they deliver healthy babies; while, in societies with energy intake shortage, pregnant women do not seem to have gained appropriate weight and give birth to babies with low weight. [20] An investigation in Kenya states that babies' weight at time of birth is directly proportioned to pregnant women weight gaining. [21] Another study shows that sufficient nutrition of rural pregnant women in India brings about appropriate weight gaining of pregnant women and babies' weight gaining at the time of birth.[22] Some studies have been proved that there is a relationship between energy intake and protein intake during pregnancy and its outcomes.[23,24] Moreover, sufficient energy intake in this period increasing birth weight, leads to SGA and LBW birth rate decrease.[23] Mothers with energy intake shortage will have no sufficient storage for breast-feeding period. Therefore, energy intake is quantitatively and qualitatively an important index for nutrients intake which is typically accompanied by lack of other nutritious substances.[25,26] In this study, around 80% of pregnant women out of 533 suffered from lack of adequate caloric intake which is complied with other studies in this regard around the country [13, 14].

Inadequate caloric intake is typically accompanied by increase in pregnancy problems, high risk pregnancy, babies with low birth weight, mother's malnutrition and breastfed babies. [23] Energy shortage, however, vary in age groups that is 91.7% of nineteen years old or below and/or juvenile pregnant women suffered from inadequate caloric intake. Vulnerable juvenile group needs more calories to grow, therefore they need more cares. Inadequate caloric intake is usually due to lack of nutrition access or poverty. [13, 14] The results of this study show that there wasn't a significant relationship between pregnant women's job and inadequate caloric intake or mother's malnutrition, although the relation between their husbands' jobs and their income (husband's income) was significant.

As a result, pregnant women's energy intake needs to be considered as one of the risk factors of pregnancy in this city. Energy intake in 71.5% of women who experienced their first pregnancies was less than required amount. The outcomes of the current research indicates that dietary iron intake of 84.8% f pregnant women was less than recommended minimum amount by RDA, that is 27mg. So, giving iron supplement to pregnant women, which is a routine health program in Iran, seems necessary and is confirmed by our research. Studies show that there is a relationship between healthy baby birth and safe pregnancy and pregnant woman's nutritional status.

Insufficient food intake increases the possibility of preterm labor, LBW, and congenital defects. Inadequate zinc intake in pregnancy period is considered one of the causes of congenital abnormalities in human beings. Therefore, congenital abnormalities are more observed in the areas which zinc intake shortage is common. Based on some studies, zinc supplement prescription in these areas leads to fetus growth increase, baby death rate reduction, enhancement of baby's immune system, and their death reduction due to infectious diseases. [29].



Graph 1: The relation between nutritional status and age category

The results of our study show that a large number of pregnant women (66.5%) do not take the recommended minimum of zinc by RDA (11%). It is necessary to know that not only sufficient amount of zinc affect nutrition, but also its bioavailability and source are especially important. Since zinc supplements including iron are not usually prescribed for pregnant women, paying special attention to this element and its nutritious sources intake is of special importance in pregnant women nutrition in Kurdistan Province (Sanandaj is the center of this province).

During pregnancy period, the need for Calcium is increased because the fetus and its bones grow. This need is more in the last months of pregnancy and would be compensated in pregnant women with increase in intestinal calcium uptake, bone calcium release, and increased calcium uptake in kidney. [30] In many societies calcium intake amount is not sufficient in this period which results in bad effects on fetus and pregnant woman's health. [31] Some researchers have proved some other roles of this element in pregnancy period. It is believed that calcium is effective in preventing pregnancy blood pressure. Although calcium supplement is not prescribed to cure and prevent pregnancy blood pressure, some researchers believe that this nutritious substance is effective and necessary for women with inadequate intake, women with suspected high blood pressure, and pregnant juvenile. It is also useful to prevent hypertension. [32]

Calcium assimilation during pregnancy is almost twice more than non-pregnant women. However, if calcium is not provided through dietary program during pregnancy period, it will lead to osteoporosis and fracture as well as bone density reduction. Therefore, providing calcium in pregnant women nutrition is of special importance. [33]

Almost half of the subjects had less calcium intake than the recommended amount by World Health Organization. It is strongly advised to consume nutritious resources of calcium such as milk and its alternatives. Calcium supplements and other alternatives seem necessary to be considered in training programs and health care centers nutritious supports.

Limitation of our study is that the subjects were in different weeks of third trimester of their pregnancies, their weight gaining amount were not comparable. In carrying out similar future research, considering the recording of initiation and ending of pregnancy weight in order to examine this important factor is suggested. Since only client pregnant women of health care centers are included in the study, high risk pregnant client women who go to special health care centers were excluded from the study because inadequate caloric intake may have a negative effect on their pregnancy outcome. Therefore, it is suggested to conduct similar studied on this group of pregnant women as well.

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