ORIGINAL ARTICLE

DIET INTAKE TRENDS AMONG PREGNANT WOMEN IN RURAL AREA OF RAWALPINDI, PAKISTAN

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Background: Adequate and healthy diet during pregnancy is essential for the health of both mother and new-born. This study was designed to know the health status of pregnant women and new-born by determining food taking habits of pregnant women. **Methods:** A cross sectional study was conducted on pregnant women of 2nd and 3rd trimester in a rural area of district Rawalpindi. Food frequency questionnaire and 24 hours dietary recall methods were used to identify their food consumption practices. Analysis was done by SPSS, while Nutrisurvey software was used to check the presence of Vitamin A, C, and Iron in specific fruits or vegetables. **Results:** A total of 110 pregnant women participated in the study. Most of them were illiterate, had low household income, and unemployed. Intake of meal frequency was according to the standards of Institute of Medicine (IOM), but food group consumption was not according to the recommendations of the United State Department of Agriculture (USDA). Most participants 102 (93.2%) knew that food is important during pregnancy. However an increase in frequency intake was observed in 63 (57.3%); while, 19 (17.3%) reported no change in food intake practices. About 67 (61%) were taking some sort of dietary supplements. Avoidance of any food 24 (22%), intake of additional food 51 (46%), craving 86 (78%), and aversion to any sort of food 42 (38%) was also identified in the study sample. No significant association was found between food group consumption, food availability and accessibility. Dietary diversity score, calculated according to the Food and Agriculture Organization (FAO) guidelines, indicated that about half study participants were not consuming adequate food. **Conclusion:** Study results show that food intake practices of pregnant women in the study area were not satisfactory. The results suggest that pregnant women need nutrition counselling regarding food intake practices during pregnancy.

Keywords: food intake practices, diet consumption, pregnant women

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INTRODUCTION

According to the WHO, "health is not only the absence of disease, but a state of complete mental and physical well-being in relation to the productivity and performance of an individual". Imbalance of vital nutrients leads to malnutrition. This affects the mental and physical state of an individual, causing poor health and poor work performance thus compromising whole life. Evidence from fifty four middle and low income countries show that nutritional deficiencies begin in the initial 1000 days of life. Many of these are irreversible.[1] Thus the most critical time to meet the nutritional requirement is from conception to the child's second birthday.

The food women eat during pregnancy is the main source of nutrients for the baby. Malnutrition occurs when the daily food consumed does not fully cover the required nutrients. Inadequate nutrition during pregnancy can result in intra uterine growth retardation (IUGR), leading to low birth weight and length of babies[2] and raises the risk of ailments due to common infections, such as diarrhoea, pneumonia, measles and malaria. It may also influence foetal development, priming the child to be more susceptible to hypertension, diabetes and heart disease in later life.[3] On the other hand overnutrition may lead to metabolic and labour complications for mother such as gestational diabetes, preeclampsia, and hypertension[4] induction of labour, longer labour, as well as significant increase in birth defects and increased risk of caesarean section[5].

Research has demonstrated that healthy eating habits during pregnancy have a positive impact on health of the mother and foetal development. Institute of Medicine (IOM) recommends an optimal pattern of healthy diet as three meals and two or more snacks per day. The Food Guide Pyramid for pregnancy, developed by the United State Department of Agriculture (USDA), is an excellent tool to make healthy food choices. According to this pyramid tool 6–11 servings of grains, 3–5 servings of vegetables, 2–4 servings of fruits, 2–3 servings of protein and dairy each, and sparingly use of fats is required to fulfil the daily optimal need of nutrients.[6]

This study was designed to analyse the nutritional trends among pregnant women regarding adequate intake and quality of diet according to recommendations of IOM and USDA food guide pyramid.

MATERIAL AND METHODS

A cross sectional study was conducted in a rural area of Rawalpindi, Pakistan. Pregnant women of 1st and 2nd trimester with age group 16–40 years in the catchment area were included in the study. Study participants were

selected through random sampling technique from list of pregnant women registered with LHWs of the selected area. Women with a history of chronic disease, any food allergy and those who had twin pregnancy were excluded from the study. By using simple proportion formula [$n=z^2$ P (1-P) $/e^2$] sample size, was estimated on the basis of expected 53.2% prevalence of malnutrition in pregnant women (NNS 2011)[7], and 10% significance level. By adding 10% non-response rate, sample size was calculated as 110. Pre-structured questionnaire was developed with the questions regarding sociodemographic factors, reproductive characteristics, food availability and accessibility. Standard Food Frequency Questionnaire (FFQ) and 24 hours dietary recall method was adopted from National nutrition survey 2011 (NNS) to obtain the information about food intake.[7]

The data was checked, cleared, and entered into the SPSS-21.0. Data was analysed to find out the frequency of consumption of five major food groups. Results were compared to the daily recommended intake suggested by food pyramid by the United State Department of Agriculture (USDA). Food and agriculture organization (FAO) guidelines were adopted to calculate the Women Dietary Diversity Score (WDDS) to assess the adequacy of food consumption.[8] Ethical clearance and permission for this research was obtained from the Ethical Committee of the Health Services Academy, Islamabad. The nature of the study was fully explained to the study participants to obtain their consent prior to participation in the study.

RESULTS

The mean age of pregnant women was recorded as 27.6 years (SD 5.3). Among the participants 29% of the women were illiterate; literacy levels for the rest ranged from primary to higher masters, the percentage of which are given in figure-1.

A large number (92%) of women were unemployed. Monthly household income of most families (43%) was < 10,000, 26% earn in the range of 10,000–20,000 while 31% earn >20,000 per month. Average family size was reported as 7±3.3. About half were nuclear families. On an average respondent had 3 children with a range of 1–9. About 19% mothers were having first pregnancy. Almost half (45%) had miscarriages or abortion history. Most (56%) had planned while (44%) had an unplanned pregnancy. The vast majority of women, (81.9%) started to receive antenatal care in the first trimester.

About 58% of participants were reported as second while 42% were in the third trimester of pregnancy. Most women consume Institute of Medicine (IOM) recommended frequency of food which is three meals and two or more snacks per day, but consumption of many food groups was not on a daily basis. Following food consumption trends were observed.

The mean of daily meal consumption was calculated as 4.74 (SD 1.16) and about 5 meals per day. The most consumed meals were breakfast (100%) followed by dinner (97%) and lunch (95%) respectively. Number of meal/snack consumption was statistically significant with *p*-value 0.019 which is compatible with the IOM standards. (Table-1) The diet of most participants did not fulfil the guidelines of food group's intake. According to results of our study most consumed food groups according to USDA standards, was dairy, which was consumed by 36% of pregnant women per day. There was not much difference between the consumption of poultry products (14%) and fruits (13%). Only 2% pregnant women were taking the recommended servings of vegetables.

Fats are consumed by pregnant women one to two times and three times per day as 40% and 60% respectively. There was a significant difference in the consumption of grains, vegetables and poultry groups between respondents and USDA standards. The mean of daily vegetable, fruit, poultry and dairy consumption were reported as 0.97 (SD 0.697), 0.82 (SD 0.693), 0.79 (SD 0.755), and 1.34 (SD 0.960) respectively. The mean fat consumption is 2.37 (SD 0.833) per day. Consumption of grains, vegetables, and poultry was not according to USDA recommendations. (Table-2) The results for food groups and number of meal consumption were not significant for vegetables, fruit, and poultry groups with *p*-values 0.12, 0.28, and 0.15 respectively. There was no significant association between recommended food groups and standard numbers of meal consumption except for dairy group for which the results were significant with *p*-value 0.03. (Table-3)

Results of feeding practices variables indicate that the majority of participant's think that food is important during pregnancy but food intake practices of these participants were not as good. According to the results, 93.6% pregnant women, food is important during pregnancy. Change in food intake practices by increasing frequency of meal, the amount or both were reported by about 57.3% participants, 17.3% reported reduced intake, while 25.5% pregnant women had no change in food consumption. About 22% avoid taking some food during current pregnancy, such as beef, chicken, egg, salt, fruits, fried food, milk, oil, rice, tea, butter, and Methi. About 46.4% started to take some additional food like cabbage, chicken, coconut, pomegranate, egg, milk, fruit, meat, rice, Brassica and sweets. Around 61% mothers started to take some food supplement during current pregnancy. Wide use was reported for folic acid, calcium tablets and energy syrup.

According to the results, 78% participant mothers had a craving for foods like for sour food (2%), sweets (36%), salty food (15%), clay (12%), fried food (2%) and spicy food (9%). Aversion to specific food was reported in 34.5% of women. Out of these most women showed aversion against poultry products (53%), fried food, Pulses, Spicy food and vegetables (3% each), Milk and rice (5% each), Tea (10%), and Sweets (15%). (Table-4)

Association of meal consumption with food accessibility and availability was assessed by number of visits to the market, distance of market from home, and difficulty in food accessibility. About 87% respondents could walk to market, 10% by bike/cycle while 3% reach to market through public transport. About 32% of respondents bought food on a daily basis, 24% on a weekly basis while 16% visit to market two times in a week and 28% bought food on a monthly basis. Most of the (50%) pregnant women could have access to market within 10 minutes, 28% took 10–20 minutes, for 11% it was 20–30 minutes and an equal proportion took more than 30 minutes to reach markets.

According to most respondents, variety of food was available in the market, they faced no difficulty in access to fresh food, but the association between food availability and consumption was not significant at *p*-value >0.05 (Table-5). Women dietary diversity score was estimated as 4.47 with minimum and maximum values as 2–8. According to the analysis of 24 hours dietary recall, most food groups were consumed by less than 50% of the study participants. It showed that the individual nutrient intake was inadequate. Participants consuming daily vitamin A were reported as 19.1% while daily iron intake was reported by 40% of the participants.

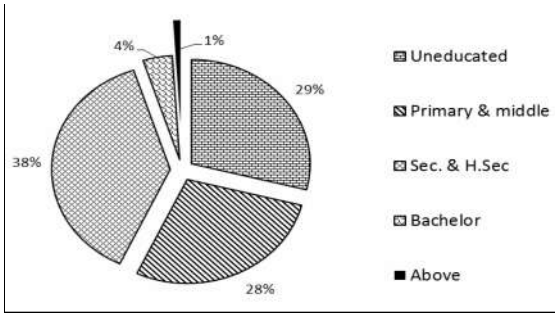

Figure-1: Educational level of pregnant women

Table-1: Meal consumption per day

No. of meal	n (%)	Mean(SD)	*p*-value*
Breakfast	110 (100)	4.74(1.16)	0.019
Lunch	104 (94.5)		
Dinner	107 (97.3)		
Before BF	8 (7.3)		
After BF	62 (56.4)		
After lunch	66 (60)		
After dinner	65 (59)		

*p=One sample t-test

Table-2: Consumption of Food Groups/Day

Food groups	Mean (SD)	*p*-Value*
Grains	3.10 (.0.888)	0.24
Vegetables	0.97 (0.697)	0.68
Fruits	0.82 (0.693)	0.007
Poultry	0.79(0.755)	0.34
Dairy	1.34 (0.960)	<.001
Fats	2.37 (0.833)	<.001

*One sample t-test

Table-3: Food groups and number of meal consumption

Food group	Standard Consumption	No of meals			*p*-value*
		1–3	4–5	>5	
Veg	Yes	0 (0)	0 (0)	2 (1.8)	0.12
Fruit	Yes	1 (0.9)	10 (9.1)	3 (2.7)	0.28
Poultry	Yes	2 (1.8)	5 (4.5)	8 (7.3)	0.15
Dairy	Yes	4 (3.6)	18 (16.4)	18 (16.4)	0.02

*$p=x^2$/Fisher Exact test

Table-4: Feeding practice of pregnant women

Feeding practices	Frequency	%
Importance of food during pregnancy (Yes)	103	93.6%
Change in food intake		
No change	28	25.5%
Frequency	9	8.2%
Amount	41	37.3%
Both	13	11.8%
Reduced intake	19	17.3%
Craving (Yes)	86	78.%
Aversion (Yes)	38	34.5%
Avoidance (Yes)	23	21%
Use of food supplements (Yes)	67	61%

Table-5: Meal consumption Vs food availability and accessibility

Variable	n (%)	
Source to go to market		
By walk	96 (87.3)	
By Cycle/bike	11 (10)	
Public transport	3 (2.7)	
Visit to market		
Daily	35 (31.8)	
Weekly	26 (23.6)	
2 times in a week	18 (16.4)	
Monthly	31 (28.2)	
One way distance of market from home		**p-value***
10 minutes	55 (50)	>0.05
10–20 minutes	31 (28.2)	
20–30 minutes	12 (10.9)	
>30 minutes	12 (11)	
Difficulty in food availability (No)	93 (84.5)	>0.05

*$p=x^2$/Fisher Exact test

DISCUSSION

Malnutrition is like an iceberg phenomenon. Most people in the developing as well as developed countries live under the burden of malnutrition. Maternal malnutrition is most serious public health concern as it not only cause complications during and after pregnancy but also causes negative effects on neonates which compromises their

whole life. This present study demonstrated the dietary practices of pregnant women as well as the influence of sociodemographic factors on nutrient intakes.

This study demonstrates that the majority of pregnant women met the IOM recommendation to consume three meals and two or more snacks per day which are similar to another study of North Carolina.[9] These results differ from the study of Ethiopia, which are not according to the standards. Most of the respondents (66.1%) had diet frequency of meal 1–2/day while 20.3% and 13.6% had frequency of meals 3–4 and >5 per day respectively.[10]

Regarding the timings of food intake in between meals only few study participants (7.3%) took food before breakfast. Most took snacks "after lunch" (60%), followed by after dinner (59%), and after breakfast (56.4%) respectively. These results are much better than the study of Ogun State. In this high frequency was reported for "after breakfast" 30%. Frequency reported for "After lunch" is 18% and for "after dinner 6%.[11] Another study of Ethiopia showed that more than half (59.9%) of the respondents did not practice the habit of eating snacks between meals.[10]

More eating does not mean healthy eating. According to the results of this study consumption of various food groups according to the recommendations are not satisfactory. Findings of this study support the conclusion of a previous study conducted in Queensland, that few pregnant women report meeting the guidelines for recommended fruit and vegetables intake.[12] The results of American study is at variance with this study wherein 60% of the pregnant women met the minimum recommendations for fruit consumption as suggested by the Food Guide Pyramid.[13]

About 93.6% pregnant women of this study know that nutritious food is important during pregnancy. This percentage is better compared to the study of California according to which 84% mothers had this knowledge.[14] About 46.4% started to take some additional food which was milk and fruits. About 22% participants avoid taking foods like eggs, beef, rice, fruits, and fish etc. during present pregnancy. Results are similar to the study of Poland which reported that more than a half of Polish women change their diet in pregnancy. White meat, fruits, vegetables, milk and dairy products were reported as frequently consumed.[15] While avoidance of foods like eggs, beef, fish, fruits, and brinjal was reported in the study carried out in California.[14]

Out of total participants 61% reported to consume energy syrups, Ca and or Iron supplements during current pregnancy. This is much better than that which was reported in NNS 2011 that is 24.4%.[7] This percentage is also better than 33.8% in the study of Algeria[16] but less than 96.8% reported in the study of Portugal[17].

The present study revealed that 78% pregnant women had craving for some sort of food mostly for sweets (36%). While aversion was reported in 34.5%. Most women showed aversion against poultry products (53%). Study of Saudi Arabia mentioned cravings for pica.[18] In the Sudan, 93% of pregnant women had various cravings.[19] Food craving and avoidance was reported by 67.7% and 44.8% of the women respectively in the study of Ghana. The most avoided food in this study was meat and fish.[20]

CONCLUSION

Study results show that food intake practices of pregnant women in the study area were not satisfactory. The results suggest that pregnant women need nutrition counselling regarding food intake practices during pregnancy.

AUTHOR'S CONTRIBUTION

Both the authors contributed equally to the study.

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