

Impact of Education on Knowledge of Women Regarding Food Intake During Pregnancy: A Hospital Based Study

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Abstract

Objective: To assess the nutritional knowledge of pregnant women about food intake during pregnancy and to find out association between education level and nutritional knowledge.

Methods: It was a cross-sectional study performed in Obstetrics and gynaecology outpatient department of private tertiary care centre Liaquat College of Medicine and Dentistry and Darul-Sehat hospital from June 2016 to December 2016.

The study was conducted among pregnant ladies who visited the antenatal clinics where they were interviewed regarding food intake and nutritional requirement in pregnancy using a pretested questionnaire. Their knowledge was then score into good, average and poor and then relation with educational level was calculated.

Results: A total of 372 pregnant women with age range of 17-38 years and mean age of 27.45 ± 7.24 years were anticipated. The result showed that majority of the patients (213/372) 57% have some knowledge about increase requirement of food intake in pregnancy and (189/372) 50% had knowledge of increased iron intake. Limited knowledge of pregnant women regarding increase in water requirement is surprising. The misconceptions of hot and cold properties of food still exist in our society with a fear of abortion and contribute to avoidance of some important nutrition from diet during pregnancy. Those with education level of graduation were more knowledgeable and study also pointed towards direct association with socioeconomic status.

Conclusion: The awareness regarding the increase intake of food and iron supplementation is sub optimal in our community and need better augmented campaigns and awareness programs. However there is strong co relation between educational level and information.

Keywords: nutritional knowledge, diet intake, nutritional status in pregnancy

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Introduction

Proper food and adequate diet are extremely important for, physical & mental development, performance and productive health. However, the nutrition requirement varies with respect to age, gender and during physiological changes such as pregnancy. Pregnancy, being a critical phase in a

woman's life, requires optimal nutrients of good quality for growth and development of foetus. Naturally, the urge to eat more is experienced by all pregnant mothers¹. Evidence manifested that adequate intake of nutrition is a key component for individual's health and well-being, particularly during pregnancy². Poor nutritional status of the mother leads to adverse birth outcomes like low birth weight babies, preterm delivery and intrauterine growth retardation. Similarly, good nutritional status of mother's results in a healthy birth outcome and maternal dietary intake has a strong association with birth weight of foetus at delivery even has its effects till one year of age of infant³. So the diet

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consumed by expecting mother should be balanced and diverse⁴ as monotonous diet results in deficiency of different major micronutrients⁵. Similarly, on the other hand exposure of the foetus to maternal obesity, diabetes, and excessive gestational weight gain can also increase risk of developing childhood obesity and chronic diseases later in life. Yet, many women do not sustain an optimal diet prior to and during pregnancy. Some pregnant women's diets are deficient in key nutrients, like folate, fibre, and iron. Their diets do not comply with official dietary guidelines with respect to consumption of some major food groups (including bread and cereals, fruit, vegetables, grains, and protein containing foods [nuts, beans, eggs, and fish]), and many are characterized as being high in processed meat, soft drinks, and takeaway foods. As far as balanced diet and nutrition in pregnancy is concerned previous concept of eating for two no longer exists. Instead healthy diet with balanced amount of all macro and micro nutrients are required for good outcome. It is also evident that low intake of carbohydrates has a negative effect on neonatal birth weight and abdominal circumference. Similarly, intake of milk is associated with positive impact on birth weight of newborn⁶. According to recent recommendation from Italian society of nutrition, adding of 350 Kcal/day in second trimester and 450 Kcal/day in third trimester is suggested⁷. Same study suggests that 60% energy should be from carbohydrates which makes > 9 servings of whole grains /day, 30 % from proteins which equals to 70 grams or 3 servings per day and 10% from fats, fruits and vegetables which are good sources of antioxidant and fibre and should constitute >7 servings /day. Not only taking antioxidant in the form of fruits and vegetables helps in health and birth weight of foetus but also results in reduce incidence of preeclampsia and eclampsia⁸. Patients at risk for low proteins intake are vegetarians', those with nausea and vomiting and low income population⁷. Optimal weight gain during pregnancy is rough indicator of healthy diet and is according to the pre-pregnancy BMI and should not be > 5kg in obese women in low income countries like Paki-

stan, where maternal malnutrition is a significant cause of not only poor perinatal outcomes but also of increase maternal morbidity and mortality. In early year 2000, Millennium Development Goals (MDG) set by WHO with the aim to reduce maternal and perinatal mortality and in response Pakistan has established the National Maternal New-born and Child Health Program (NMNCH) which sets two targets for achieving this goal. One is to reduce MMR by three quarters and other is to provide universal access for reproductive health to each Pakistani female by 2015. MDG was not met exactly but Pakistan showed significant reduction in MMR of 47 percent from last 10 years but this figure is still high as compared to other subcontinent countries and much more work is required for this. Keeping that point of view, the Pakistani society is a dual society, consisting of a small group of well-nourished and a very large group of undernourished. Due to Pakistan being a male dominant society the food distribution within the family is an important issue. The feeding practices for female children, adolescent girls are discriminatory which lead to poor nutritional status of young girls. Similarly, there are huge differences between rural and urban populations and their thoughts and conceptions⁹. National nutrition survey conducted in Pakistan in year 2001 reported that 45% of pregnant and lactating females are anaemic¹⁰. Iron deficiency anaemia is the most wide spread micronutrient deficiency during pregnancy and around one billion people worldwide are affected with this; the United Nations Children's Fund's (UNICEF) declares this a global problem and set a goal to reduce the prevalence of anaemia (including iron deficiency) to one third by 2010¹¹. Some sociocultural beliefs regarding food intake does exist in our society such beliefs like avoiding papaya with fear of spontaneous abortion, eating less for easy delivery and avoidance of hot and cold foods leads to restriction of nutrition during pregnancy. Avoidance of diet rich in iron are also observed for fear of dark complexion of new-born. The hot and cold concepts of food are perhaps the widely known medical disbelief system in the world. Unfortunately the women with some educa-

tion were also observed to believe in such things but no doubt less the women is educated more is the effect of food taboos similarly women living in rural areas also have more food taboos. Apart from some food restriction pregnant women also use some dietary remedies. Most common reason for using these remedies is better nourishment of mothers while others use it for relief of distaste and reduce nausea and vomiting. There is little doubt that poverty plays a very important contributory role in malnutrition. Other proximal deterrents of nutritional status include literacy rates, poor access to health care facilities, lack of birth spacing as well as cultural practices and beliefs. The complex relationship between maternal malnutrition and birth outcomes emphasizes the need for consistent and thorough assessment of women's diets throughout pregnancy and individualized nutritional education to promote positive birth outcomes. National nutritional survey of Pakistan 2013 indicated little change over the last decade in terms of core maternal and childhood malnutrition indicators. Instead prevalence of anaemia is increased to 51%. Increased rate of malnutrition in country is primarily due to poverty and high illiteracy among mothers¹². Information regarding knowledge, attitude and practice of women towards food intake in pregnancy is limited in our setup and not much work has been done in this regard; therefore the purpose of this study is to learn about nutritional knowledge of pregnant women in our setup and to identify the factors behind such beliefs and practices, and the effect of their educational status on their knowledge. This will help us to plan future health education campaigns about diet and nutrition, encourage decrease intake of unhealthy nutrients and to promote healthy diet in pregnancy, so that we can expect healthy outcomes from healthy mothers.

Subjects and Methods

This study was conducted in Liaquat College of medicine and dentistry/Darul sahat hospital. This is tertiary care private 250 bedded institute located in Gulistan-e-Johar Karachi. The area is in east district Karachi and estimated population is around 1.7

million. Majority Population locality belongs to middle and upper middle socioeconomic status with less contribution from lower class. It was a cross-sectional study carried out at the Gynaecology and Obstetrics Outpatient department after the fulfilment of ethical requirements. Study population was composed of pregnant women attending the antenatal clinics during June 2016 till December 2016. A sample of 372 pregnant women were selected using convenience non probability sampling technique. Sample size was determined by keeping $\pm 5\%$ margin of error, 95 % confidence interval and prevalence is 0.5. Based on all these assumptions actual sample size was determined by using formula: $n = (z\text{-score}) \times p \times (1-p) / (\text{margin of error})^2$ where n is sample size $P =$ expected proportion of knowledge of women regarding food intake (0.5) Daba G, Beyene F, Fekadu H, Garoma W (2013) Assessment of Knowledge of Pregnant Mothers on Maternal Nutrition and Associated Factors in Guto Gida Woreda, East Wollega Zone, Ethiopia. Z score z value corresponding to 95% CI= 1.96 is constant $(1.96) \times 0.5 (0.5) / .05 = 3.8416 \times 0.25 / 0.0025 = 384.16 n = 385$.

The study population included pregnant women who had attended antenatal clinics of the hospital with any parity and of any gestational age. Inclusion criteria included maternal ages between 18 and 35 years of age without any medical complications like diabetes, hypertension and any other medical disorders. Those with any kind of food allergies are excluded from the study. Participants were informed about the objective of the study and then verbal consent was taken. They were also informed that if they did not feel comfortable with the questionnaire or interviewer they can withdraw themselves from the study at any time, at the same time their name and identity would be kept confidential and privacy would be maintained. Junior doctors and midwives were trained with the objective of the study and explained the questionnaire and instructed to translate that Performa into Urdu for convenience of participants. Data was checked by principle investigator on daily basis. A pretested questionnaire was used to interview the respondents. The questionnaire

consists of two portions: first portion contains demographic feature like age, parity, residence, education level of respondents and their spouses, no of living children, family type, monthly income and whether they were taking antenatal care or not. The second portion contains 30 knowledge questions. Each question has three options yes, no and don't know, 1 mark was given to correct answer and 0 marks for incorrect or don't know options. Maximum score was 30. Those who scored >75 % were considered to have good knowledge and those with <30 % had poor knowledge. Rest of them had average or acceptable knowledge about nutrition in pregnancy. Question to assess knowledge and awareness of the subjects include anaemia, protein and calorie requirement, adding or avoiding some specific food items, hot and cold properties of different food items, servings required for different food groups and in the last sources of their beliefs and knowledge. The respondents were also guided at the same time about balanced nutrition and effect of healthy diet on their new-born. For data analysis purposes, the software SPSS version 21 was used. Relevant descriptive statistics, frequency and percentage will be obtained for presentation of qualitative variables like females' education, husband education, family type and their knowledge and beliefs about nutrition. Chi square test was used to assess the association, between dependent and non-dependent variables like education and socio-economic status and their beliefs regarding nutrition during pregnancy. Quantitative variable like family size, number of children and monthly income were presented by mean standard deviation.

Results

In the present study there were total 372 women participated with a response rate of 96%. The mean age of the participants were 27.45 ± 7.24 SD (± 4.2) with the age ranging between 17 - 37 years, about 75% of respondents were in age group of 28 - 37 years. Statistical analysis included the following demographic parameters: number of pregnancies, education level of respondents and husband, family type, family income, and socioeco-

nomical status. Most of the participants were primigravida 136 (36.6%), women having one child were 101 (27.2%) with two children were 100 (26%), with three children were 23 (6.7%) with 4 or more were 10 (2.7%) with a mean of 1.1 number of children (SD \pm 1.06) and range of 0-4. There were 16 (4.3%) females that were totally illiterates, 7 (1.9%) primary, 39 (10.4%) matriculation, 72 (19.5%) intermediate, 141 (37.6%) post graduate and 97 (25.9%) professional on the other hand 8 (2.1%) of husbands were illiterate, 17 (4.5%) were matric, 193 (51%) were graduate and 154 (41%) were professional. Majority of the cases belongs to middle income group 286 (76.3%) while 83 (21%) belong to lower income group and only 8% were from upper income class. There were 228 (60.5%) cases living in extended family and 143 (38%) had a nuclear family system. When their knowledge about nutrition was scored more than 212 (50%) had good knowledge while 81 (21.6%) & 79 (21%) had average and poor knowledge (fig 1.). Table 2. reveals the frequencies of various study parameters and it was shown that majority of the patients 213/372 (57%) knew about increase in food intake in pregnancy and 189/372 (50%) had some knowledge of increased iron requirement in pregnancy. Information about safety of food during pregnancy was lacking with only 31% respondents answered correctly. Educational status of women and their husband also found to have a direct effect on their nutritional knowledge. This study also pointed out towards the food taboos like hot and cold properties of different food item and they are being strictly followed by females during pregnancy; with 238/372 (63%) women believing in hot properties of different food which leads to miscarriage. Significant numbers of women showed avoidance of different food items in pregnancy due to fear of abortion. Information and knowledge regarding diet during lactation and breast feeding was also lacking. The most common food taken were roti followed by vegetables, milk, meat and fruits and the major source of information was family members as shown in Table 2. When the factors behind their knowledge was assessed it showed strong association with re-

spondents education with $p < 0.0001$. Association was also found to be statistically strong with socio-economic status $p < 0.0001$ and husband education $p < 0.0001$. However, the association with number of children is also found to be statistically significant $p = 0.036$ as illustrated in Table 3. This table also pointed that those who had one child before were found to have better nutritional understanding as compared to primigravidas.

Discussion

Diet is one of the most important factors to impact the health of mother and foetus during pregnancy. In our country which is low income country we are facing a growing epidemic of under nutrition resulting in stunting, wasting and micronutrient deficiencies in the population. The results of the Nutrition Survey in Pakistan (NNS) conducted in 2001 found that 13% of non-pregnant and 16% of pregnant women were undernourished. In the present study majority of the pregnant females (213/380) knew about increase in food intake in pregnancy and 189/380 had knowledge of increased iron intake. However, they were unaware in most of the times about the calorie intake and distribution in terms of carbohydrates, proteins, calcium etc. Knowledge of women about adequate requirement and recommendations in pregnancy was also found to be poor in different studies conducted in different part of the world^{13,14}. Not much work has been done regarding adequate intake of protein in pregnancy and their effects on neonatal outcome, results from ROLO study suggests that adequate intake of protein in early pregnancy is positively associated with weight of infant at term but this effect does not persist till 5 yrs of age^{15,16}, similarly adequate intake of fat is also required and should be only 10-15% of diet consumed as high fat both saturated and unsaturated is now suggested to have negative effects on infant behaviour and temperament¹⁷. As the incidence of high blood pressure and related complications like preeclampsia and eclampsia are also increasing, RCOG recommends increase intake of fruits and vegetable in pregnancy to at least 5 portions per day which lowers the incidence of high

blood pressure and related problems¹⁸. In the past different scores have been used to label the diversity of the food in pregnancies and it has been seen that this is significantly highly associated with socioeconomic status and different demographic properties¹⁹. Malnourishment of the mother leads to reduce producibility causing repercussions for herself, her family, her community, and the broader society²⁰.

In the present study most common food taken were roti followed by vegetables, milk, meat and cereals. The was similar to the study done by Ali F et al, where they found that the dairy products were the most widely used food ingredients along with the normal dietary intake. Change in nutritional habits were also observed in study conducted in other populations which showed increased intake of fruits and vegetables and avoidance of red meat and tea^{21,22}. They also stratified that the pulse and the meat intake was better in cases with middle and good socioeconomic status. Eggs were also commonly taken food and it is reported that around 1.3% of the pregnant females use it especially in lower socioeconomic class as part of organic food.

In the present study the majority of the females were unaware about the calories needed and especially in the different forms of carbohydrates, proteins and regarding calcium intake; however, they had better knowledge regarding iron intake in pregnancy and that can be attributed to wide prevalence of anaemia in Pakistan. According to a survey done in collaboration of Agha Khan university and UNICEF and it was seen that there is marked lacking of nutritional knowledge among pregnant females²³. This can be explained by the poor socioeconomic status, lack of education and deficiency in awareness programs. In contrast to this, in the developed countries there are well developed guidelines that are to direct to particular dietary improvement to avoid poor pregnancy outcome²⁴. The study by Yakoob et al also revealed that the knowledge about iron supplementation in pregnant females is more and have also shown its impact in improvement in anaemia in such cases²⁵.

Changes in dietary behaviour were also observed in this study. The reason of increase food intake is usually due to increase in pregnancy cravings and decrease intake of certain foods was usually done for better foetal health.

In Pakistan more than 70 percent females are uneducated or have less than primary education and in a country where 80 percent female belong to rural areas, providing health education and nutritional guidance is difficult due to poor access to health care facility. WHO recommends at least 4 antenatal visit to any pregnant women. In Pakistan approach to antenatal care depends on different factors including education level, availability of facility, sociocultural believes and so many²⁶. Pakistan is doing great effort for improving maternal health through different programs like Primary Healthcare Program (Lady Health Workers Program) and National Maternal and Child Health Program to overcome the situation but further educational programs are needed on regular basis. Evidence suggest that nutritional education has a significant positive effect on maternal dietary habits and results in achieving better maternal health and neonatal outcome. Educational programs also should not only focus pregnant women but also their family members especially their spouses for better understanding of women need and requirements²⁷. Masooma et al in her study regarding impact of nutritional education program on maternal diet showed a positive association²⁸. Similar effect of nutritional education programs was also observed in different surveys²⁹. Shandana et al in her study observed that the level of education attained by women and her spouse, her health knowledge, and her children's birth order are particularly important in determining whether she will seek maternal health and formal schooling has a great effect on understanding of women³⁰.

Conclusion

Based on this study it is observed that pregnant women have a low level of knowledge about proper diet and food intake during their pregnancy. The awareness regarding the increase intake of

food, iron supplementation is optimal in our community; however, information regarding the calories, carbohydrates and protein intake and better and safe food intake in pregnancy is still lacking and need better augmented campaigns and awareness programs. Multiple health and dietary education campaigns should be started on government and private sectors levels both and at same time every women seeking antenatal care should receive proper guidance about nutritional plan either by obstetrician or dieticians. Information on maternal healthcare broadcasted to the public particularly women of childbearing age through mass media public service programs can help increase women's awareness of maternal healthcare as well as their desire to learn how to better handle maternity.

Conflict of Interests

Authors have no conflict of interests and received no grant/funding from any organization.

Table 1. Demographics in study subjects

	Mean	Range	SD
Age (years)	27.45±7	17-37	+4.2
Parity	1.1	(0-4)	+1.06
Education			
	Female	Male	
Uneducated	16 (4)	8 (21.5)	
Matriculate	46 (12.3)	17 (4.5)	
Graduate & above	310 (83.3)	347(93)	
Socioeconomic status			
Low	25 (6.7)		
Middle class	344 (92)		
Upper class	3(8)		
Family type			
Nuclear	57 (15)		
Extended	323 (85)		
Antenatal care			
Yes	338 (90.1)		
No	34 (9.1)		

Table 2. Descriptive statistics of nutritional knowledge by respondents during pregnancy

Parameters	Yes	No
Patients knowledge about increase food intake in pregnancy	213 (57)	159 (42)
Patients knowledge about calories in pregnancy	234 (62)	138 (37)
Patients knowledge about iron intake in pregnancy	189 (48)	191 (51)
Patients knowledge about calcium in pregnancy	312 (74)	60 (16)
Patients knowledge about water intake in pregnancy	133 (35)	239 (64)
Patients knowledge about protein and carbs intake in pregnancy	122(32)	250(67)
Patients knowledge about frequency of food intake in pregnancy	66(17)	306 (82)
Patients knowledge about safety of food in pregnancy	116 (31)	256 (68)
Patients knowledge about food to increase lactation	302 (81)	70 (18)
Patients knowledge about food for better delivery	210 (56)	162 (43)
Patients knowledge about food leading to abortion	192 (51)	180 (48)
Patients knowledge about food's cold properties	221 (59)	151 (40)
Patients knowledge about food's hot properties	239 (64)	133 (35)
Most widely used food in pregnancy	Roti, vegetables, Milk, Meat, Fruits, Eggs, Cereals	
Causes of increased calcium intake	For bone protection, For increase lactation	
Source of iron	Vegetables, fruits	
Sources of calcium	Milk	
Reasons to avoid hot food	Abortion	
Source of information	Family members, Dai, Television, Doctor.	

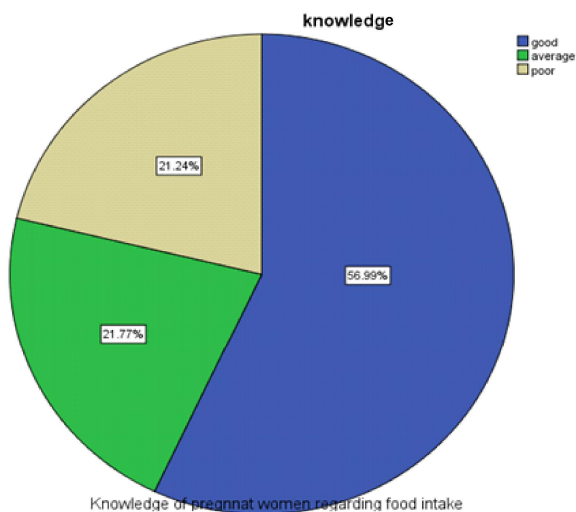


Fig 1. Distribution of knowledge score

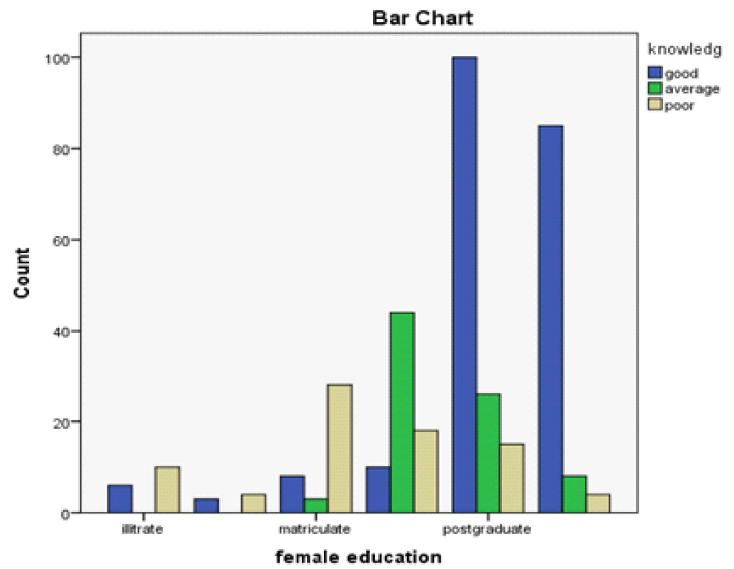


Fig 2. Association between nutritional score and women education

Table 3. Factors affecting the nutritional knowledge of pregnant women

	Nutritional Knowledge			Total	P- value
	Good	Average	poor		
Age					
17-23yrs	26 (32)	30 (37)	24 (30)	80	<0.001
24-30yrs	124 (64)	37 (19)	42 (21)	192	
31-37yrs	62 (69)	14 (15)	13 (14)	89	
Parity					
Primigravida	75 (55)	33 (24)	28 (20)	136	<0.03
One child	67 (66)	21 (20)	13 (12)	101	
2 children	53 (53)	26 (26)	21 (21)	100	
3 children	14 (56)	1 (56)	10 (40)	25	
4 children	3 (30)	0	7 (70)	10	
Female education					
Uneducated	6 (35)	0	10 (62.5)	16	<0.0001
Matriculate	11 (23)	3 (6)	32 (69)	46	
Graduate	110 (51)	70 (32)	33 (15)	213	
Professional	85 (87)	8 (8.2)	4 (4.1)	97	
Husband education					
Uneducated	3 (37)	0	5 (62.5)	8	<0.0000
Matriculate	6 (35)	0	11 (64)	17	
Graduate	92 (47)	57 (29.5)	44 (22)	193	
Professional	81 (52.5)	54 (35)	19 (12)	154	
Socioeconomic status					
Low income	7 (26.9)	7 (26.9)	12 (46.2)	26	<0.0001
Middle income	202 (58)	74 (22)	67 (19)	343	
Upper class	3 (100)	0	0	3	

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