ORIGINAL ARTICLE

ASSESSMENT OF DIETARY DIVERSITY AND NUTRITIONAL STATUS OF PREGNANT WOMEN IN ISLAMABAD, PAKISTAN

Fatima Ali, Inayat Thaver, Shahzad Ali Khan

Health Services Academy, Islamabad, Pakistan

Background: Maternal under-nutrition is one of the most important causes of maternal morbidity and mortality, particularly in the developing countries. Maternal nutrition has direct association with foetal nutrition. This study aimed to identify dietary diversity and determine any relationship of dietary diversity with nutritional status of pregnant women belonging to different socioeconomic conditions in Rawalpindi Islamabad region. **Methods:** It was a cross sectional survey involving 350 pregnant women in their second and third trimesters, conducted in outpatient department of Maternal and Child health centre at Pakistan Institute of Medical Sciences (PIMS) Islamabad. A semi qualitative questionnaire was used that contained structured questions regarding socio-demographic features, socioeconomic status, nutritional status, and three day dietary recall. A second section comprising of questions regarding dietary perceptions was also **Results:** Out of total, 47% of pregnant women had normal pre-gestational BMI while, 22% were overweight, 17% obese, and only 12% of pregnant women were under weight. Similarly 28.1% were anaemic. Medium dietary diversity was observed in 89% of pregnant women, while only 5% showed low, and high dietary diversity. Dietary diversity was not associated with socio-demographic, or socioeconomic status of pregnant women. Even though weight gain during second (p=0.2) and third trimesters (p=0.049) had a positive relationship with dietary diversity, more than 74% of pregnant women gained less than recommended level of weight gain. No association could be proven between haemoglobin and dietary diversity (p=0.51). **Conclusion:** Dietary diversity is a good proxy indicator for micronutrient adequacy in pregnant women, however if quantity of food consumed is added it can give better indication of determinants of nutritional status of pregnant women.

Keywords: Dietary diversity, Nutritional assessment, Pregnancy, Maternal nutrition

J Ayub Med Coll Abbottabad 2014;26(4):506–9

INTRODUCTION

Evidence suggests a strong association between maternal nutrition and foetal growth. Poor nutritional status of the mother leads to adverse birth outcomes like low birth weight babies, preterm delivery and intrauterine growth retardation.[1,2] Similarly good nutritional status of mothers results in a healthy birth outcome,[3] so the diet consumed by expecting mother should be balanced and diverse.[4] Dietary diversity is considered to be a key indicator in assessing the access, utilization, and quality of diet of individuals or household.[5]Individual dietary diversity scores have been shown to indicate adequate nutrient intake through diet. Dietary diversity can be used as a proxy indicator for measuring nutrient adequacy among pregnant females.[6] Dietary patterns are associated with socio-demographic characteristics like age, education, occupation, parity, race and ethnicity. Increasing age and education have been associated with a healthy and diverse dietary intake in pregnant women. On the other hand females that have less education, are nonworking and have increased parity, are more prone to an unhealthy non-diverse diet.[7]

In low and middle income countries maternal under nutrition is leading cause of maternal and child mortality and morbidity.[8] According to Pakistan National Nutritional Survey 2011 nutritional indicators of pregnant women in Pakistan are very poor.[9] Food insecurity, lack of knowledge and awareness regarding nutritious foods, myths and taboos, cultural practices, and gender discrimination are some of the most prevalent causes affecting dietary diversity and nutritional status of pregnant women in Pakistan.[10] Nutritional status of pregnant women is directly associated with the growth and development of the foetus, as the source of foetus's nutrition is through the placenta. A healthy balanced diet during pregnancy reduces the risk of maternal and child mortality and morbidity. If a pregnant female's diet lacks diversity it will be deficient in essential nutrients and as a result the foetus will not be provided the nutrition it requires to have a healthy growth.[11] Women's dietary behaviours and intake during pregnancy are strongly influenced by different cultural practices, myths and taboos.[12,13] Many studies have reported that foods are characterized as both hot and cold; hot foods are avoided as they are thought to cause abortion and cold foods are preferred.[14] Multiple cross country studies in 2011 have proven that dietary diversity scores are reliable

measures for micro and macro nutrient adequacy for women of reproductive ages.[15]

MATERIAL AND METHODS

It was a descriptive cross-sectional study comprising both quantitative as well as qualitative parts. Ethical clearance was taken from the Institutional Ethical Review Committee of the Health Services Academy Islamabad. Quantitative part comprised assessment of socio-demographic and socioeconomic characteristics, body mass index (BMI), haemoglobin and dietary perceptions questionnaire. Qualitative part comprised a three-day dietary recall questionnaire. The study population consisted of pregnant females in their second and third trimester visiting OPD of Maternal and child health unit of PIMS Islamabad. Pregnant females with past medical history of disease like diabetes, and hypertension were excluded.

The sample size was 350. Participants were approached in waiting area of the MNCH department of PIMS. After taking verbal consent, the purpose of research, and various parts of the tool were explained before commencing the interview. Body mass index was calculated by measuring weight using a calibrated weighing scale to the nearest gram, and height was measured to the nearest centimetre. Haemoglobin levels were noted from antenatal card, or blood test report available with the female at the time of interview. A three day dietary recall questionnaire was used and participant was asked to recall foods and drinks she had consumed over the previous three days. Separate ingredients of mixed dishes were also noted. Information on dietary perceptions was collected using a structured, closed ended questionnaire. For every study participant an individual dietary diversity score was calculated. A score of one was given to a food group if it was consumed at least once in the past three days, and a score of three if it was consumed on all three days. Similarly zero was given to food groups that were not consumed even once in the past three days. The sum of all scores was divided by three to get an average dietary diversity score for each individual for ease of analysis. This means that every pregnant female had a score ranging from 0-10. Data was entered and analysed in SPSS 17.

RESULTS

Mean age of study population was 25.6±4.35 years ranging from 17 to 40. With respect to their educational status, 306 (87.4%) of pregnant females had attended school. Out of these, 9 (2.9%) had education less than primary, 34 (11.1%) had primary education, 37 (12.1%) middle, 92 (30%) secondary, 47 (15.4%) intermediate, 65 (21.2%) graduate and 24(7.8%) were post graduate. Out of total, 323 (92.3%) were housewives while 27 (7.7%) were working.

With respect to gestation period, 184 (52.6%) were in their second trimester and 166 (47.4%) were in their third trimester of pregnancy. One hundred and thirty seven (39%) were primigravida, 100 (28.5%) had one previous delivery, 65 (18.5%) had two previous deliveries, and 48 (14%) participants had 3 or more deliveries. With respect to their socioeconomic class, 67 (19.1%) women were poor (score range 0–34), 133 (38%) women were transitory non-poor (35–50), and 150 (42.9%) women fell in the non-poor category (score range 50–100).

The mean dietary diversity score of study population was 6.17±0.99 ranging from 3–9. They were further divided into low, medium and high diversity. Pregnant women having a diversity score of less than or equal to 4 were classified as having low dietary diversity, scores of 5–7 were labelled as having a medium dietary diversity, and the ones with a score of 8–10 were classified in the high dietary diversity category.

Out of total, 166 (47.42%) were normal weight, 45 (12.8%) were underweight, 79 (22.6%) overweight, and 60 (17.14%) females were obese with 102 (29.1%) having anaemia. Weight gain was normal in 51 (14.57%) cases while 262 (74.84%) gained less weight than recommended range and 35 (10%) gained more than the recommended weight.

Age and dietary diversity score did not show any association (p=0.152). No association was established between parity and dietary diversity score (p=0.37). Similarly no association was seen between socioeconomic status and dietary diversity score (p=0.88). Linear regression was done to determine if an association existed between dietary diversity score, and total weight gain for pregnant women in their second and third trimesters. It was deduced that for an increase of one score of dietary diversity the pregnant female gained 0.24 kg in the second trimester (p= 0.2). In third trimester 0.71 kg is gained for an increase of one score (p=0.049) in dietary diversity. For an increase of every one score of dietary diversity they gained 0.02 Kg per week. (p=0.008)

The effect of different food groups on weight gain during pregnancy was calculated. It was observed that out of ten food groups, three were associated with weight gain during pregnancy. These included meat, chicken and fish (p=0.00); eggs (p=0.01); pulses, legumes and nuts (p=0.7)

Dietary diversity did not have an association with haemoglobin status of pregnant females (p=0.551). However a strong association was

detected between haemoglobin status and supplement intake (p=0.005).

The dietary perceptions of females during pregnancy have shown to have an effect on their diet quality. A section of the questionnaire was developed to monitor the perceptions of pregnant females regarding diet during pregnancy. One hundred and eight females believed that foods like ghee, karalay, mangoes, fish, tea, meat, eggs, and pickles, fried food like samosay and pakoray were hot, and avoided these, as they thought they could cause abortion, were bad for the mother's and the baby's health. Only four women avoided cold water, and ice in their last trimester, as they believed it could make delivery difficult. Rice and fried food was considered baadi, and bhaary, and were believed to cause discomfort to the pregnant mother.

DISCUSSION

In this study no significant association was observed between age, parity, gestational age, occupation and dietary diversity. Similarly socioeconomic status was not seen to be associated with the dietary diversity score of the pregnant females. Various studies carried out in different parts of the world have shown relationship between dietary diversity, socioeconomic status and demographic characteristics.[16,17]

Linear regression for dietary diversity and total weight gain revealed, that these two variables are directly associated with each other, in both the second, and the third trimester of pregnancy. It was noted, that during the second trimester for every one unit increase in dietary diversity the pregnant female gained 0.24 Kg, while in the third trimester the weight gain was 0.7 Kg, and however a weekly gain of 0.02 kg for both trimesters had also been evaluated. This indicates that increasing dietary diversity in diet can result in increased weight gain in pregnant women both in the second as well as the third trimester. Even though the majority of the study population was of normal weight, suboptimal weight gain was illustrated by more than 70% of pregnant women, for all four categories of BMI. A higher number of normal, and underweight women, had gained less than recommended level of weight, as compared to overweight and obese pregnant women. These results are comparable to other studies done in Pakistan.[18] Weight gain was associated with the intake of meat, chicken, fish, eggs, pulses, legumes, and nuts. It is a clear indication for health care providers to emphasize more on a diet that is balanced, and diverse, both in quantity, as well as quality, for an improvement in the nutritional status of the mother, as well as her newborn. In our study more than 70% of pregnant women were not anaemic, while only a small proportion were anaemic, even though the rates of Iron deficiency anaemia during pregnancy are very high in Pakistan.[19]

Milk, yogurt, cheese, ice-cream, or any other food that involved milk in its production was included in the milk and milk products group. More than 75% of the study population, in all three socioeconomic statuses, took milk and milk products more than two times in the previous three days. On the other hand, the consumption of pulses, legumes and nuts was more prevalent in the poor socioeconomic status (45%), as compared to the non-poor, and transitory poor status, where up to 30% of the study population consumed this food group. Pulses and legumes were the commonly consumed group; a very small number of females took nuts in their diet. Chicken, meat and fish group was associated with the socioeconomic status. In this group the highest consumption was of chicken than meat, however fish was not consumed by any female.

It is a well-known fact that eggs and organ meat are rich sources of Iron. In our study population only 1.3% of pregnant women ate organ meat, and that too belonged to the non-poor, while none of the participants in the other two socioeconomic categories took organ meat even once. Similarly the consumption of eggs was very low in all socioeconomic classes. This is similar to other studies showing only one percent of the pregnant females were taking eggs, and organ meat.[20{Kemunto, 2013 #48}]

CONCLUSION

The results show that dietary diversity is a good proxy indicator for nutritional status of pregnant women. We need to counsel patients on the nutritional value of different food groups e.g. organ meat, eggs, poultry etc. They may be informed about the inexpensive food choices for meeting pregnancy related nutrient needs.

REFERENCES

1. Tomkins A. Nutrition and maternal morbidity and mortality. Br J Nutr 2001;85(S2):S93-S9
2. Abu-Saad K, Fraser D. Maternal nutrition and birth outcomes. Epidemiol Rev. 2010;32(1):5–25.
3. Wu G, Bazer FW, Cudd TA, Meininger CJ, Spencer TE. Maternal nutrition and fetal development. J Nutr 2004;134(9):2169–72.
4. Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M, *et al*. Maternal and child undernutrition: global and regional exposures and health consequences. Lancet 2008;371(9608):243–60.
5. FAO. Guidelines for measuring individual and household dietary diversity. 2011.
6. Wen LM, Flood VM, Simpson JM, Rissel C, Baur LA. Dietary behaviours during pregnancy: findings from first-time mothers in southwest Sydney, Australia. Int J Behav Nutr Phys Act 2010;7(13):1–7.

7. Northstone K, Emmett P, Rogers I. Dietary patterns in pregnancy and associations with socio-demographic and lifestyle factors. Eur J Clin Nutr 2007;62(4):471–9.
8. Horton R. Maternal and child undernutrition: an urgent opportunity. Lancet 2008;371(9608):179.
9. National Nutrition Survey of Pakistan. Aga Khan University, Pakistan Medical Research Council. Islamabad: Nutrition Wing, Cabinet Division, Government of Pakistan, 2012.
10. Baig-Ansari N, Badruddin SH, Karmaliani R, Harris H, Jehan I, Pasha O, *et al*. Anemia prevalence and risk factors in pregnant women in an urban area of Pakistan. Food and Nutr Bull 2008;29(2):132–9.
11. Neggers Y, Goldenberg RL. Some thoughts on body mass index, micronutrient intakes and pregnancy outcome. J Nutr 2003;133(5 Suppl 2):1737S-40S.
12. Patil R, Mittal A, Vedapriya D, Khan MI, Raghavia M. Taboos and misconceptions about food during pregnancy among rural population of Pondicherry. Calicut Med J 2010;8(2):e4.
13. Meena G. Associations Between Maternal Nutritional Characteristics and the Anthropometric Indices of Their Full-term and Pre-term Newborns. Pak J Nutr 2012;4(11):343–9.
14. Zobairi SE, Freitas ML, Wasti SA. Diet and nutrition: a knowledge, attitude and practice study of pregnant women in Karachi. Australian and New Zealand journal of obstetrics and gynaecology. 1998;38(2):188-93.
15. Branca F, Mahy L, Mustafa TS. The lack of progress in reducing anaemia among women: the inconvenient truth. Bulletin of the World Health Organization. 2014;92(4):231.
16. Torheim L, Ouattara F, Diarra MM, Thiam F, Barikmo I, Hatløy A, *et al*. Nutrient adequacy and dietary diversity in rural Mali: association and determinants. Eur J Clin Nutr 2004;58(4):594–604.
17. Savy M, Martin-Prevel Y, Danel P, Traissac P, Dabiré H, Delpeuch F. Are dietary diversity scores related to the socio-economic and anthropometric status of women living in an urban area in Burkina Faso? Public Health Nutr 2008;11(02):132–41.
18. Munim S, Maheen H. Association of gestational weight gain and pre-pregnancy body mass index with adverse pregnancy outcome. J Coll Physicians Surg Pak 2012;22:694–8.
19. Yakoob MY, Bhutta ZA. Effect of routine iron supplementation with or without folic acid on anemia during pregnancy. BMC Public Health 2011;11(Suppl 3):S21
20. Kemunto ML. Dietary Diversity and Nutritional Status of Pregnant Women Aged 15-49 Years Attending Kapenguria District Hospital West Pokot County, Kenya. kenayatta University Institutional Repository 2013.

Address for Correspondence:

Dr. Fatima Ali, Health Services Academy, Islamabad, Pakistan
Ph: +92-51-9255592-6; Fax: +92-51-9255591
Email: fatimaali@hsa.edu.pk