Evaluation of Dietary Patterns and the Related Factors in Pregnant Women Who Referred to Health Centers in Qom, Iran

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\textbf{Background & Aims of the Study:} Pregnancy is one of the most important stages in the life of women. It is associated with increased nutritional requirements since pregnant women are very vulnerable to malnutrition. Therefore, this study was conducted to determine the food groups intake pattern and its effective factors in pregnant women in Qom, Iran.

\textbf{Materials and Methods:} This cross-sectional descriptive-analytic study was conducted on 360 pregnant women who referred to health centers. Two questionnaires were used to collect demographic and dietary recall information. The collected data were analyzed in SPSS software (version 20) using descriptive statistics, independent t-test, ANOVA, and chi-square.

\textbf{Results:} Based on the results of this study, the mean age, weight, and height of the subjects were 27.72 years, 72.59 kg, and 162 cm, respectively. Moreover, the mean daily intake of bread and cereals, milk and dairy products, fruits, vegetables, meat and egg, nuts and legumes, and miscellaneous groups were 8.26, 1.91, 4.60, 1.90, 2.43, 1.82, and 0.81 respectively. The mean of total daily calorie intake was 1424.81. Furthermore, a significant correlation was found between economic status and daily calorie intake (P<0.05).

\textbf{Conclusion:} The daily consumption of milk and dairy products, vegetables, meat and eggs, and nuts and legumes were less than the recommended standard. This indicates the need for education of pregnant women and the facilitation of the relevant factors for the reception of these food groups.

\textbf{Keywords:} Diet, Food groups, Iran, Pregnant women, Qom

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Iron deficiency can lead to anemia with decreased hemoglobin and red blood cells, premature birth, and maternal mortality (18). A healthy diet for pregnant women must include four or more units of fruits and vegetables, four or more units of fortified cereals or bread, four or more units of milk or dairy products, and three or more units of meat, legumes, and nuts in order to prevent complications caused by malnutrition. On the other hand, excessive amounts of nutrition intake also cause complications, such as high blood pressure, gestational diabetes, delayed birth, and increased prevalence of cesarean section (19).

Currently, nutritionists use dietary assessment to assess the overall effect of diet on health outcomes (20-23). Food patterns are based on culture, race, and various environmental factors (availability, buying power, and advertisement) (24). Calorie malnutrition has long-lasting effects on the health of mothers and children which indicates the need for a healthy diet during pregnancy. Assessment of the quantitative and qualitative nutrition status of pregnant women and the factors affecting it can be useful in the recognition of their needs and improvement of their diet so that it will be possible to maintain the health of the mothers and neonates and establish a healthy future for children. Therefore, the present study aimed to determine the food group consumption patterns and the factors influencing it in pregnant women who referred to health centers in Qom, Iran.

Materials & Methods

This descriptive-analytical study was performed on 360 pregnant women who referred to health centers in Qom. The statistical population of this study was pregnant women living in Qom in 2016. For sampling, the city was divided into four clusters based on the city divisions, and a health center in each cluster was selected and considered a category.
In each category, according to the number of patients’ active records and sample size, the required number of cases were randomly selected. The sample size of the study was calculated based on a study performed by Abedini et al. (25) and considering a type I error of 0.05, and a precision of 0.3. Finally, the sample size of the present study was calculated at 360 subjects.

\[ n = \frac{z^2 p(1-p)}{d^2} \]

The inclusion criteria consisted of 1) visit to health centers during pregnancy, 2) single pregnancy (as opposed to twin pregnancy), 3) health record in health centers of Qom, and 4) regular visits to a health center. On the other hand, the exclusion criteria were 1) unwillingness to participate in the study, 2) lack of cooperation, 3) lack of consent, and 4) non-completion questionnaire. After the purpose of the study was explained and the project manager was introduced to the subjects and the heads of the health care centers, the eligible mothers were asked to participate in the study if they were willing. Moreover, all the pregnant mothers were assured that the obtained information were recorded anonymously and kept confidential. The data collection was performed after presenting a letter of introduction from the Research Deputy of Qom University of Medical Sciences to the health centers.

The data were collected through questionnaires and interviews with pregnant women. The first part was a demographic characteristics form which included personal, social, and pregnancy history information. The second part collected information about the frequency and amount of consumed food, which was completed according to the 24-hour dietary recall questionnaire that recorded all the food consumed by the participant over the past 24 hours. This questionnaire was used in a study titled "Relationship of Vitamin E and C Consumption and Preeclampsia/Eclampsia in Pregnant Women" by Atarodi et al. and the scientific validity of the questionnaire was confirmed through content validity. Moreover, its scientific reliability was 100% confirmed through simultaneous observation and correlation coefficient (26). The completion of each questionnaire took 25-20 min.

Sufficiency of the food groups was determined using the index (number of consumed units divided by the recommended number of units) \( \times 100 \) (27). Values below 80%, 80-100%, and above 100% were considered less than (low), equal to (appropriate), and more than the recommended daily intake (high), respectively. The recommended amounts (based on the dietary guidelines for pregnancy provided by the World Health Organization) were 7-11 units of bread and cereals, 3-4 units of fruit, 4-5 units of vegetables, 3 units of meat, eggs, nuts, and legumes, 3-4 units of dairy products, and a maximum of one unit of sweets and junk food (28). The amount of the consumed food was calculated in units (shares) and the specified food groups were placed in the food pyramid.

The body mass index (BMI) was calculated by using the weight of the mother at the beginning of the pregnancy. The BMI was calculated by dividing the weight (in kilograms) to the square of the height (in meters). Values below 20, 20-25, 25-29, and above 29 were considered underweight, normal, overweight, and obese, respectively. The height of the subjects was measured with a tape measure while standing without shoes with an accuracy of 0.1 cm. It should be noted that the people in charge of the questionnaires and BMI measures were female. After the approval of the proposal of the research, the questionnaires were distributed to collect the data. Finally, the data were analyzed in SPSS software (version 20) using the independent t-tests, ANOVA, and chi-
square test to determine the relationship between the studied variables.

Results

According to Table 1, the average age of mothers was 27.27. The average weight was 72.59. The average height was 161.5. The average body mass index was 27.48 (15.59-61.43). The mean gestational age was 23.5 weeks (2-42 weeks). The average number of pregnancies was 2 pregnancies (1-7).

The analysis of the results by using descriptive statistics showed that 6.4% (23 people), 18.1% (65 people), 42.8% (154 people), 32.8% (118 people) of the participants had elementary school, junior high school, high school, and academic education, respectively. Moreover, in terms of employment, 14.2% (51 people) were employed, while 85.8% (309 people) were housewives. Regarding the education level of the spouse, 2.5% (9 people) were illiterate, while 6.4% (23 people), 16.4% (59 people), 33.6% (121 people), and 41.1% (148 people) had elementary school, junior high school, high school, and academic education, respectively. In terms of the occupation of the spouse, 22.6% (81 people), 53.8% (193 people), 5.8% (21 people), 2.5% (9 people), 0.3% (1 person), 41.1% (5 people), and 13.4% (48 people) were clerk, self-employed, clerics, farmers, retired, unemployed, and occupied with other jobs.

According to the Table 2 and the descriptive statistics, the mean value of daily received units in the groups of bread and cereals, milk and dairy products, fruits, vegetables, meat and eggs, and nuts and legumes group were 8.26, 1.91, 4.60, 1.90, 2.43, 1.82, and 0.81. This table shows that in the group of milk and dairy products and vegetables, the received amount by the mothers is less than the recommended standard. Moreover, the mean daily calorie intake of pregnant mothers was 1424, which is about 1000 calories less than the recommended standard.

Table 1) Demographic characteristics of the subjects

| Variable                  | Mean  | Range     | SD   |
|---------------------------|-------|-----------|------|
| Age                       | 27.72 | 17-43     | 5.25 |
| Weight                    | 72.59 | 40.167    | 15.45|
| Height                    | 162   | 145-178   | 5.48 |
| BMI                       | 27.48 | 61.43-15.59 | 5.48 |
| Gravidity                 | 2     | 1-7       | 1.039|
| Number of family members  | 2.86  | 2-6       | 0.85 |
| Gestational week          | 23.5  | 2-42      | 10.69|

Table 2) Food groups consumption pattern of the subjects

| Food groups                  | Number of recommended standard units | Number of daily received units | Range of the recommended standard units | Range of daily received units |
|------------------------------|--------------------------------------|---------------------------------|----------------------------------------|------------------------------|
| Bread and cereals            | 7-11                                 | 8.26                            | 80-100                                 | 75-118                      |
| Milk and dairy products      | 3-4                                  | 1.91                            | 80-100                                 | 47-63                       |
| Fruits                       | 3-4                                  | 4.60                            | 80-100                                 | 115-153                     |
| Vegetables                   | 4-5                                  | 1.90                            | 80-100                                 | 38-47                       |
| Meat and eggs                | 3                                    | 2.43                            | 80-100                                 | 81                          |
| Nuts and legumes             | 3                                    | 1.82                            | 80-100                                 | 60                          |
| Miscellaneous                | 1                                    | 0.81                            | 80-100                                 | 81                          |
| Calorie                      | 2403                                 | 1424.81                         | -                                      | -                           |
Table 3) Received food units and calories per meal

| Time            | Bread and cereals | Dairy product | Fruits | Vegetables | Meat and egg | Legume and nuts | Other groups | Total calories |
|-----------------|------------------|---------------|--------|------------|--------------|-----------------|-------------|----------------|
| Before breakfast| 0.138            | 0.106         | 0.315  | 0.008      | 0.04         | 0.082           | 1.019       | 59.03          |
| Breakfast       | 1.80             | 0.80          | 0.22   | 0.15       | 0.17         | 0.279           | 0.71        | 301.53         |
| Snack           | 0.147            | 0.111         | 1.48   | 0.083      | 0.011        | 0.219           | 0.011       | 125.95         |
| Lunch           | 2.99             | 0.22          | 0.022  | 0.710      | 1.172        | 0.483           | 0.003       | 349            |
| Evening snack   | 0.289            | 0.146         | 1.51   | 0.168      | 0.22         | 0.283           | 0.025       | 153.67         |
| Dinner          | 2.789            | 0.235         | 0.96   | 0.767      | 0.99         | 2.789           | 0.025       | 331.29         |
| Before sleep    | 0.094            | 0.296         | 0.915  | 0.022      | 0.018        | 0.093           | 0.018       | 104.9          |

The findings revealed that based on the results of the Pearson correlation coefficient test, the calorie intake had no significant relationship with age, weight, height, gestational age, gravidity, and the number of family members (P>0.05). Furthermore, the ANOVA and independent t-test showed that the calorie intake was not associated with the education level and occupation of the subjects and their spouses (P>0.05). However, there was a significant relationship between calorie intake and economic status (P<0.05).

Based on the findings, the results of the Pearson correlation coefficient test revealed a significant relationship between meat consumption and weight of the subjects. Moreover, the gestational age had a significant association with the consumption of meat, dairy products, and snacks. Furthermore, the results showed that BMI had no significant relationship with the total calorie intake, while it did have a significant relationship with the consumption of meat and eggs. Moreover, there was no significant relationship between BMI and other food groups. Most of the pregnant women who participated in this study were overweight and obese (about 65%), while about one-third of them had normal weight. The number of underweight subjects was less than the other ones.

**Discussion**

Based on the results, the majority of pregnant women were overweight and obese, while they received about 1,000 fewer calories than the recommended standard in terms of energy intake. This indicates their unhealthy diets which include the consumption of low-value foods. Similar to the present research, in a
study conducted by Delvarian et al., in Shahroud, the energy intake of women was lower than the standard (28). Moreover, in a study performed by Poboelik et al., despite the fact that the energy intake and consumption of other nutrients in pregnant women were lower than the standard level, most mothers were overweight (29).

A study carried out by Bakhtiari et al. in Babol found that more than 90% of pregnant women consumed all the food groups (8), which is inconsistent with the findings of the present study. This difference could be due to varieties in environmental and cultural factors. On the other hand, the inappropriate and excessive use of food or an unhealthy diet can cause overweight and obesity in pregnant women. Overweight and obesity should be checked and controlled before pregnancy, and the best solution is to reach a normal weight before trying to conceive. Pre-pregnancy care and checkup, planned pregnancy, prevention of unwanted pregnancies, and delay in pregnancy until a more appropriate weight is achieved, especially in obese women, are good solutions for this problem. It is also important to follow a healthy diet and control weight and weight gain for each part of the body based on the recommended standards. Failure to do so will cause a pregnant woman who had a normal weight before pregnancy to become overweight and obese during pregnancy.

The results also showed that the consumption of dairy products and vegetables was much less than the recommended daily intake. However, few studies have been conducted on milk consumption in pregnant women. A study carried out in the United States found that 66% of pregnant women consume milk. Besides, another study on the milk consumption of female adolescents in different countries showed that in Bangladesh, the majority of them do not consume milk. While in France and Canada, milk and dairy products were among the most consumed items (30-33). The consumption of milk and dairy products in the study population of the present research was less than the other countries (34).

Another study performed by Montazerifar et al. found that the insufficient consumption of milk and dairy products was more prevalent among the people under the age of 18 (35). In the studies conducted by Abedini et al. and Karimi et al., the results regarding the consumption of dairy products were consistent with those of the present study. Given the importance of milk and dairy products during pregnancy and breastfeeding both for the mother and the fetus, it is recommended for future studies to investigate the reasons for the inadequate consumption of milk and dairy products in order to develop appropriate plans and implement necessary measures.

In the present study, the consumption of bread and cereals was within the recommended range and in a better status than the other food groups. However, according to the results of a study conducted by Montazerifar et al., the consumption of bread and cereals was less than the standard level in women over 30 years old (especially in the last trimester of pregnancy) and those with less than or normal weight (35). Similarly, in the studies carried out by Karimi et al. (37) and Farahaninia et al. (1), pregnant women consumed insufficient amounts of bread and cereals. Another study performed in Maku by Esmailzadeh et al. found that urban women consume significantly more bread, cereals, dairy products, and fruits in comparison with urban women (34). This difference could be due to several reasons, including different food patterns in cities and villages, access/lack of access to healthier foods, and desire/lack of desire to eat fatty or fast food.

The results of the present study indicate that the consumption of the fruit was desirable, while that of the vegetables was not. The results of the study conducted by Karimi (37) et al. showed that 43% of pregnant women consumed the proper amount of fruits and vegetables. The
findings of the above-mentioned study are consistent with those of the studies performed by Esmaillzadeh et al. (34), Nasrabadi et al. (38), and Takimoto et al. (39) (in Japan) and inconsistent with those of the studies carried out by Van et al. (40) and Farahani Nia et al. (1).

The results of the present study showed that the consumption of meat and legumes was below the recommended standard. These results were consistent with those of a study performed by Karimi et al. and inconsistent with those of another study conducted by Takimoto in Japan (39). One of the reasons could be the widespread consumption of seafood in Japanese culture.

The results of the present study also showed that the consumption of the miscellaneous group and the preference for its use in snacks before breakfast was more frequent than the other groups. There was also a significant relationship between the consumption of other groups and the gestational age. Montazerifar et al. in their study found that the consumption of other groups, such as fat and sugar was less common in underweight pregnant women (35). Furthermore, the results of another study conducted by Abedini et al. indicated that overweight and obese pregnant women consumed more sweets and sugars, compared to the other groups (25). It seems that there is a need to inform and educate mothers about the standard level of consumption of the miscellaneous group and its harms.

Moreover, the findings of the present research revealed that the most calorie intake happened at lunch and dinner in that order. On the other hand, despite the recommendations that say breakfast is an important meal and should provide a good calorie intake, compared to other meals, fewer calories were consumed at breakfast. Furthermore, it is emphasized that the dinner should contain the least number of calories in comparison to other meals. A diet that provides more calories at dinner than breakfast can affect weight gain and cause obesity in pregnant women.

In the present study, the calorie intake had no significant relationship with age, weight, height, BMI, gestational age, number of pregnancies, number of family members, as well as the education level and occupation of the subjects and their spouses. However, in the study performed by Delvarianzadeh et al., the nutritional status of pregnant women had a significant relationship with the level of education, occupation, the date of the last visit to the doctor or health centers, and possession of a house (28). Mohammadi Nasrabadi et al., in their study found that during pregnancy, the weight of the mother increases with parity and the gestational week, while it decreases with the increase of age and pre-pregnancy BMI (38). Another study performed by Mahmoudi et al. (37) on the relationship of demographic variables with the diet showed that the employed pregnant women had a better status regarding the consumption of meat, legumes, fruits, and vegetables compared to housewives. Furthermore, pregnant women with academic education had a better status regarding the consumption of all the food groups, compared to women with high school education or less. This difference was statistically significant.

In the present study, the dietary pattern had a significant relationship with the income level, while it had no significant relationship with the other demographic variables. Increase in the level of income and, in turn, the increase of food purchasing power seems to affect and improve the nutritional status of mothers. Regarding the non-significance of other demographic variables in the present study, additional and more specialized studies are needed to further investigate the issue. In addition, since the study was conducted on women referring to Qom health centers, employed women may have less time to refer to the health center. As a result, more planning and research should be performed to identify the reasons.
On the other hand, training programs and large-scale national decisions should be made to improve the nutritional status of pregnant women. Among the barriers and limitations of the study were the generalizability of the findings, the self-report data collection tools, and the lack of investigation of the cause-and-effect relationships. The strengths of this study were the use of a 24-hour dietary recall questionnaire and the separation of meals, the number of consumed calories, and food groups.

Conclusion

According to the results, the daily intake of the mothers regarding the groups of milk and dairy products, vegetables, meat and eggs, and nuts and legumes was less than the recommended daily intake. Moreover, their mean daily calorie intake was approximately 1000 calories less than the recommended daily standard; however, overweight and obesity were prevalent among them. The findings also revealed that the nutrition pattern had a significant relationship with the level of income, while it did not have such a relationship with the other demographic variables. Therefore, further planning and research are needed to identify the reasons why overweight and obesity are prevalent among pregnant women, despite their low calorie intake. Besides, large-scale national education and decision-making are required to improve the nutritional status of pregnant mothers.

Footnotes

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Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this article.

References

1. Farahaninia M, Farahaninia S, Chamari M, Haghani H. Nutritional pattern of pregnant women attending to health centers affiliated to Tehran university of medical sciences. Iran J Nurs 2013;25(80):34-45. (In Persian) Link
2. Abu-Saad K, Fraser D. Maternal nutrition and birth outcomes. Epidemiol Rev 2010;32(1):5-25. PMID: 20237078
3. Arrish J, Yeatman H, Williamson M. Midwives and nutrition education during pregnancy: a literature review. Women Birth 2014;27(1):2-8. PMID: 23562582
4. Leino AT. Supporting self-care in nutrition with pregnant young adult women. [Master Thesis]. Finland: Seinäjoki University of Applied Sciences; 2014. Link
5. Fadakar SK, Ghavi A, Niknami M, Kazemnejad LE. Relationship between mothers’ nutritional status and weight gain during pregnancy with low birth weight. J Guilan Univ Med Sci 2012;21(83):27-35. (In Persian) Link
6. Arkkola T. Diet during pregnancy, dietary patterns and weight gain rate among Finnish pregnant women. [PhD Thesis]. Finland: University of Oulu; 2009. Link
7. Northstone K, Emmett PM, Rogers I. Dietary patterns in pregnancy and associations with nutrient intakes. Br J Nutr 2008;99(2):406-15. Link
8. Bakhtiar A, Sajadi P, Hajian K. Nutrient consumption pattern in pregnant women referred to health care centers in Babol. J Babol Univ Med Sci 2007;9(2):31-7. (In Persian) Link
9. Delvarianzadeh M, Bolbol HN, Ebrahimi H. The relationship between nutritional status of mothers in their third trimester and delivery of low birth weight
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infants. Arak Med Univ J 2007;10(1):54-63. (In Persian) Link
10. Pregnancy and nutrition. Women's Health. Available at: URL: http://womenshealth.gov; 2012. Link
11. Shahrokhi Sardou M, Kamyabi Z, Ghahraman M. Clinical midwifery in a comprehensive view. Tehran, Iran: Salem Publications; 2011. (In Persian) Link
12. Ajantha GS, Singh AK, Malhotra B, Mohan SK, Joshi A. Evaluation of dietary choices, preferences, knowledge and related practices among pregnant women living in an Indian setting. J Clin Diagn Res 2015;9(8):LC04-10. PMID: 26435972
13. Muth ND. Nutrition needs for clients who are pregnant or nursing. IDEA Fitness J 2007;4(5):48-57. Link
14. Old SB, London ML, Ladwigs PW. Maternal-newborn nursing: a family and community-based approach. 6th ed. California: Prentice Hall; 2000. Link
15. Hawksworth S, Walker CG, Sawo Y, Fulford AJ, Jarjou LM, Goldberg GR, et al. Nutritional supplementation during pregnancy and offspring cardiovascular disease risk in The Gambia. Am J Clin Nutr 2011;94(6 Suppl):1853S-60S. PMID: 21677054
16. Destaillets F, Bezelguès JB, Dionisi F, Cruz-Hernandez C. Long-chain polyunsaturated fatty acids (lc-pufa) in maternal nutrition during pregnancy and lactation. New York: United States Patent Application US; 2011. Link
17. Raiten DJ, Picciano MF, Coates PM. Dietary supplement use in women: current status and future directions-introduction and conference summary. J Nutr 2003;133(6):1957S-60S. PMID: 12771345
18. Goldberg G, Shetty P. Nutrition through the life cycle. 1st ed. New York: McGraw Hill; 2002. Link
19. Kecskeméthy H. Eating during pregnancy. Kids Health: Then Nemours Foundation. Available at: URL: http://www.indiah24.com/yourfamily/women/pregnancy.asp; 2011. Link
20. Kim MK, Sasaki S, Sasazuki S, Tsugane S. Prospective study of three major dietary patterns and risk of gastric cancer in Japan. Int J Cancer 2004;110(3):435-42. PMID: 15095311
21. Kant AK, Graubard BI, Schatzkin A. Dietary patterns predict mortality in a national cohort: the National Health Interview Surveys, 1987 and 1992. J Nutr 2004;134(7):1793-9. Link
22. Hu FB. Dietary pattern analysis: a new direction in nutritional epidemiology. Curr Opin Lipidol 2002;13(1):3-9. PMID: 11790957
23. van Dam RM, Rimm EB, Willett WC, Stampfer MJ, Hu FB. Dietary patterns and risk for type 2 diabetes mellitus in U.S. men. Ann Intern Med 2002;136(3):201-9. PMID: 11827496
24. Jinlin F, Binyou W, Terry C. A new approach to the study of diet and risk of type 2 diabetes. J Postgrad Med 2007;53(2):139-43. PMID: 17495384
25. Ahmari Tehran H, Ahangari R. Calorie intake of pregnant women and related factors in health centers of urban areas Qom, 2007. Qom Univer Med Sci J 2011;5(1):12-8. (In Persian) Link
26. Bakhshian F, Gholivahidi R. Nutritional interventions for women's health network in pregnant women in East Azerbaijan and Zanjan. Tabriz: Tabriz University of Medical Sciences and Health Services Ninth Congress of Nutrition; 2005.
27. Gaskins AJ, Rich-Edwards JW, Hauser R, Williams PL, Gillman MW, Pennia A, et al. Prepregnancy dietary patterns and risk of pregnancy loss. Am J Clin Nutr 2014;100(4):1166-72. PMID: 25240079
28. Delvarianzadeh M, Ebrahimi H, Bobol BN, Surveying pregnant women's nutritional status and some factors affecting it; in cases referring to Shahrood health-care centers. J Birjand Univ Med Sci 2007;13(4):42-8. Link
29. Poboelik RS, Heathcote G, Spiers J, Otto C. Nutritional and anthropometric assessment of a sample of pregnant women and young children in Palau. Asia Pacific J Clin Nutr 2004;9(2):102-14. PMID: 24394396
30. Fowles ER, Walker LO. Correlates of dietary quality and weight retention in postpartum women. J Community Health Nurs 2006;23(3):183-97. PMID: 16863403
31. Speykerelle Y, Herbeth B. Dietary habits of adolescent girls in Lorraine. Arch Fr Pediatr 1990;47(5):455-9. PMID: 2403272
32. Mcdonald LA, Wearing GA, Moase O. Factor effecting the dietary quality of adolescent girls. J Am Dietetic Assoc 1983;82(2):260-3. PMID: 6827007
33. Ahmed F, Zareen M, Khan MR, Banucp CP, Haq MN, Jackson AA. Dietary pattern, nutrient intake and growth of adolescent school girls in urban Bangladesh. Pub Health Nutr 1998;1(2):83-92. PMID: 10933404
34. Esmaillzadeh A, Samareh S, Kalantari N, Rahmani K, Azadbakht L, Khoshtettar M. Food consumption pattern in pregnant women attending prenatal care centers in Maku. J Qazvin Univ Med Sci 2006;9(4):69-75. Link
35. Montazerifar F, Karajibani M, Sotoudeh M, Amrollahi BE. Evaluation of nutritional status in pregnant women in Iranshahr, Iran. Med Surg Nurs J 2014;3(2):91-8. (In Persian) Link
36. Abedini Z, Gaimi M. Dietary food intake of pregnant women based on food guide pyramid and its related factors. Iran J Nurs 2011;24(73):36-46. (In Persian) Link
37. Karimi M, Morghobayat V. Nutritional knowledge,
attitude, and practice of pregnant women based on food guide pyramid. J Health Care 2017;19(3):125-35. Link

38. Mohammadi M, Amir AliAkbari S, Mohammadi F, Estaki T, AlaviMajd H, Mirmiran P. Weight gain and food group consumption patterns in pregnant women of north and east hospitals of Tehran. Iran J Endocrinol Metab 2011;12(6):609-17. Link

39. Takimoto H, Yoshiike N, Katagiri A, Ishida H, Abe S. Nutritional status of pregnant and lactating women in Japan: a comparison with non-pregnant/non-lactating controls in the National Nutrition Survey. J Obstet Gynaecol Res 2003;29(2):96-103. PMID: 12755530

40. Wen LM, Flood VM, Simpson JM, Rissel C, Baur LA. Dietary behaviour during pregnancy: findings from first-time mothers in southwest Sydney, Australia. Int J Behav Nutr Phys Act 2010;7:13. PMID: 20181084