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Original Article

The Association between Socioeconomic Status with Knowledge, Attitude and Practice toward Use of Iron and Vitamin A-D Supplements among Infants and Pregnants: The NUTRI-KAP survey

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Abstract

Background: The goal of the current study was to investigate the association between socioeconomic status (SES) and knowledge, attitude and practice (KAP) of Iranian households toward use of iron and vitamin A&D supplements in infants and pregnant women.

Method: Overall, 14,136 Iranian households from urban and rural areas of 31 provinces were considered as the study population. A multi-stage cluster sampling technique was applied in each province and the size of clusters was 8 people. Data were collected by interviewing the qualified person and using a structure questionnaire. Socioeconomic status was considered as three levels (good, moderate or weak) based on five variables: household assets, occupation and education levels of head of family and respondent and number of family members. The percentage of KAP in households was measured by questions about essential supplementation in pregnancy and infancy.

Result: The percentage of knowledge of using vitamin A&D and the beginning time of iron intake was 67.4%, and 67.8%, respectively. More than three forth of respondents had a favorable attitude about iron intake in pregnancy and infancy. Almost 80% of households used iron and vitamin A&D for their infants and 78% of pregnant women used iron supplement. Generally, the percentage of KAP was significantly higher in urban households. There was a linear association between KAP and SES.

Conclusion: KAP in urban and rural households was not desirable; however, urban households had better status than rural ones. One of the suggested ways of ameliorating nutritional issues in pregnant women and infants aged less than two years olds is educating households about the importance of supplementation in pregnancy and infancy.

Keywords: Socioeconomic status, Knowledge, Attitude, Practice, Iron, Vitamin A-D

Introduction

Malnutrition is a serious public-health issue that has been related to a significant rise in mortality and morbidity. Women and young children are the most vulnerable individuals who endure the bur-

den of diseases associated with malnutrition (1). Multiple micronutrient supplementation is a promising strategy to improve maternal nutritional condition and reduces adverse pregnancy outcomes (2, 3). There is an increase in iron requirements during pregnancy, therefore pregnant women need to take additional iron to prevent iron deficiency (4). Iron was known as a crucial micronutrient for more than a century. In spite of availability of iron-rich foods, its deficiency is so common (5). According to World Health Organization (WHO), Anemia in pregnant women is 41.8% worldwide.(6). A systematic review carried out in 2010 showed that the overall prevalence of maternal anemia was 12.4 % in Iran (7). Iron deficiency has many adverse outcomes in both pregnant women and infants. It may lead to adverse psychomotor, cognitive, and socioemotional development in infants (8) and increase the rate of premature delivery, maternal and child mortality and infectious diseases in pregnant women (9). Nutritional needs of infants are covered by an exclusive breastfeeding and use of vitamin A&D drop in the first 6 months of child's life (10). In developing countries, Vitamin A deficiency is common among children, one to two million deaths and half a million new cases of blindness are caused by vitamin A deficiency every year. Improving vitamin A status can considerably promote health, vision and survival status of child (11). Serum calcium and phosphorus concentrations are maintained by vitamin D. Vitamin D deficiency in children leads to rickets(5). In Iran, one of the main strategies that have been applied to prevent and control micronutrients deficiencies is iron supplement and multivitamins intake. Appropriate nutrition in childhood affects growth and health of child, especially in infancy more than any other time (12).

With regard to high prevalence of iron deficiency anemia and malnutrition in Iran, it is necessary to study nutritional knowledge, attitude and practice (KAP) of mothers or a key person who plays a main role in health status of family members. Moreover, it has been shown that some factors such as; age, gender and education can influence nutritional KAP (13). Also it has been shown in some studies that SES can interact with nutritional knowledge and beliefs (14). Low SES index may expose individuals at risk of poor health through lack of access to health care, improper living conditions, lack of knowledge of what and greater psychological stress (15-17).

Therefore, the goal of this study was to assess KAP of Iranian households in both rural and urban areas towards essential supplementation in pregnant women and infants less than two year olds and to assess if SES of households is a predictor of supplementation in pregnancy and infancy.

Materials and Methods

The study population

The study population included Iranian households in both rural and urban areas of 31 provinces of Iran (2011-2012). Interviewees were mothers or any member of the household who was older than 15 years old and was in charge of cooking for the entire family. Only Iranian households were considered in this study. The households were asked in condition that they had under-2 year infants and pregnant women in their family. In addition, if the families were not present at the time of interview for three times, they were excluded from the survey.

Sampling design and Sample size

The protocol of the study was published elsewhere(18). Briefly, subjects were selected by using multi-single cluster sampling technique in each province and the size of clusters was the same. The sample size was estimated as 385 households (57 clusters of 8 person), and final sample size was considered as 14, 136 people.

Tools for collecting data

Data were collected using a structured questionnaire and in each family, the qualified person was interviewed. Demographic and socioeconomic data were collected. Demographic questions included sex, age, marital status, and number of children, educational level, occupation and partner's occupation, and the ownership of the house and

assets. Based on five variables; household assets, occupation and education levels of head of family and respondent and the number of family members, SES was considered as three levels ; good, moderate or weak. Another section was devoted to KAP of households towards iron supplement intake in pregnant women and vitamin A & D supplement intake in infants aged less than two years old.

We carried out a pilot study in a cluster of households to validate the questionnaire. Three day food record was obtained to validate practice of households (r = 0.83, $P< 0.001$)(18).

The quality assurance was performed in two phases. 1) Designing phase: in this phase, tools of data collection were standardized and questionn-aires were validated in the pilot study. 2) Interviewers and supervisors followed the protocol of the study and monitoring officers checked all phases of the survey in each province. The process of sampling was monitored by auditors who were randomly rechecked 10% of questionnaires in each province to capture any possible problem (18). In case of missing or inconsistent information, questionnaires were returned to interviewers for follow up.

Statistical analysis

Data were analyzed by STATA version 11.0 (STATA Corp, College Station, Tex.).The qualitative variables were reported as percentages and 95% confidence interval (CI). The Pearson's Chi-square test was used to analyze categorical variables *P* value less than 0.05 was considered as statistically significant.

Results

Table 1 shows general characteristics of households according to residential locations. Mean age of respondents was 39.7 ± 14.4 years. More than 97% of respondents were women. 12.5 % of households claimed that they had pregnant women in their family and 11.3 % of them were in urban areas and 14.8 % in rural areas. Overall, 10.1% of households had infants aged less than two years old. Respectively, 33.3%, 33.3%, and 33.4% of households had weak, moderate and good SES.

Table 1: Characteristics of households based on residential regions: The NUTRI-KAP survey

	Urban	Rural	Total	*P*-value
Sex of head of family				
Male	88.1(87.3, 88.9)*	90.1 (89.1, 91.1)	88.8(88.2, 89.5)	<0.001
Female	11.9(11.1, 12.7)	9.9(8.9, 10.9)	11.2(10.6, 11.8)	
Age of head of family				
20 – 39	32.8(31.7, 33.9)	37.5(36, 39.1)	34.5(33.6, 35.4)	<0.001
40- - 64	52.1(51, 53.2)	46.3(44.8, 47.8)	50.1(49.2, 51)	
0ver 65	15.1(14.3, 16)	16.1(14.8, 17.5)	15.5(14.8, 16.2)	
Sex of respondent				
Male	2.5(2.2, 2.9)	2.0(1.6, 2.5)	2.3(2.1, 2.6)	0.06
Female	97.5(97.1, 97.8)	98.0(97.5, 98.5)	97.7(97.4, 97.9)	
Age of respondents				
Under 20	2.1(1.8, 2.4)	4.7(4.2, 5.4)	3.0(2.7, 3.3)	<0.001
20 – 39	49.4(48.3, 50.6)	56.9(55.8, 58.5)	52.1(51.1, 53.0)	
40- - 64	40.8(39.7, 41.9)	32.7(31.1, 34.3)	37.9(37.0, 38.8)	
0ver 65	7.7(7.1, 8.3)	5.8(5.0, 6.6)	7.0(6.5, 7.5)	
SES				
Weak	23.4(22.1, 24.8)	51.3(48.8, 53.8)	33.3(32.0, 34.6)	<0.001
Moderate	33.8(32.6, 35.0)	32.4(30.6, 34.3)	33.3(32.3, 34.3)	
Good	42.8(41.0, 44.6)	16.3(14.6, 18.2)	33.4(32.0, 34.8)	
Number of pregnant women	11.3(10.5, 12.1)	14.8(13.5, 16.0)	12.5(11.9, 13.2)	<0.001
Number of infants	11.6(8.6, 10.0)	9.3(10.6, 12.7)	10.1(9.5, 10.7)	<0.001

*(%(95% CI)), *P*-value <0.05, SES; socioeconomic status

Table 2 shows, 50.6% and 67.4% of respondents answered correctly about beginning time and amount of vitamin A&D drops for infants, respectively; the percentage of knowledge of amount of vitamin A&D drop was significantly higher in urban households than rural (70.2% vs. 63.5%). Urban households had better knowledge of the required amount of vitamin A&D drop. In terms of iron dosage, 57.5% of households mentioned the correct response. However, there was not a significant difference between rural and urban households. Households with good SES had the best percentage of knowledge of using vitamin A&D and iron in the right time. Whereas families with moderate SES had the best percentage of knowledge of the amount of required vitamin A&D drops.

Table 2: Knowledge of households based on residential regions and SES: The NUTRI-KAP survey

Correct knowledge	Region				SES			
	Urban	Rural	Total	*P*-value	Good	Moderate	Weak	*P*-value
Infants								
Beginning time of vitamin A&D drops	52.2 (48.2, 56.3)*	48.4 (43.9, 52.9)	50.6 (47.7, 53.6)	0.2	54.1 (49, 59.07)	53.5 (48.8, 58.1)	45.4 (407, 50.2)	0.01
Amount of vitamin A&D Drops	70.3 (66.8, 73.6)	63.5 (59.0, 67.9)	67.4 (64.6, 70.1)	0.01	64.7 (59.9, 69.3)	75.4 (71.3, 79.1)	61.8 (57.0, 66.4)	<0.001
Beginning time of iron drops	71.2 (67.9, 74.3)	63.8 (59.0, 67.2)	67.8 (65.2, 70.3)	0.00	80.2 (75.0.7.84)	66.6 (62.1, 70.8)	59.9 (55.7, 64.0)	<0.001
Amount of iron drops	58.3 (54.8, 61.8)	56.5 (52.2, 60.6)	57.6 (54.8, 60.2)	0.5	55.7 (50.5, 60.8)	59.6 (55.0, 64.0)	57.0 (52.6, 61.3)	0.5
Pregnant women								
Beginning time of iron supplementation	49.5 (46.3, 52.8)	50.5 (46.4, 54.6)	49.9 (47.4, 52.5)	0.7	53.0 (48.3, 57.6)	48.8 (44.9, 52.8)	48.4 (44.2, 52.6)	0.2
Amount of iron supplement	81.2 (78.1, 84.0)	79.5 (75.8, 82.7)	80.8 (78.2, 82.6)	0.4	79.8 (75.3, 83.7)	83.9 (80.7, 86.7)	77.5 (73.6, 80.9)	0.02

*(%(95% CI)), *P*-value <0.05, SES; socioeconomic status

Attitude of households toward iron consumption is shown in Table 3. The percentage of favorable attitude of needs for iron intake in infants was 80.3% and 74.5% in urban and rural households, respectively ($P<0.05$) and the households with good SES had better attitude ($P<0.05$).

Table 4 shows supplementation practice of households. In general, more than 89% of respondents had a favorable practice of vitamin A&D drops intake. This rate was 92.7% in urban areas, which was better than rural households. In addition, the households with good SES had the best practice in urban areas ($P<0.05$). 85.6% of urban households used iron drops for their infants appropriately and they had better practice compared to rural households (71%). The percentage of appropriate practice among households with good, moderate and weak SES was 89.6%, 78.9%, and 72.3%, receptively ($P<0.05$).

As Table 2 shows, more than 49% of respondents knew when pregnant women must take an iron supplement. In terms of dose of iron supplement, there was not a significant difference between urban and rural households. Households with moderate SES had better knowledge of dose of iron supplement and there was not a significant difference with SES about beginning time of Iron supplement though.

96% and 95.5% of households in urban and rural areas were agreed with increasing nutritional requirements in pregnant and lactating women (Table 3). The best favorable attitude was associated to households who had good SES ($P < 0.05$). More than 85% of urban households had a favorable attitude of need for iron supplement intake in all pregnant women even in well-nourished cases. Urban households and those with moderate SES had the best attitude of needs for iron supplementation in pregnancy ($P <0.05$). Seventy eight per-

cent of respondents claimed that they used iron supplements for pregnant women. The best practice in this case was observed in families with good SES ($P < 0.05$) (Table 4).

Table 3: Attitude of households based on residential regions and SES: The NUTRI-KAP survey

Attitude		Region				SES			
		Urban	Rural	Total	*P*-value	Good	Moderate	Weak	*P*-value
Infants									
Need for Iron intake in infants even in case of dental staining	I agree	80.3 (79.1, 81.4)*	74.5 (72.6, 76.3)	78.3 (77.2, 79.2)	<0.001	83.1 (81.7, 84.4)	81.4 (80.0, 82.7)	70.5 (68.7, 72.2)	<0.001
	I have no idea	4.5 (4.0, 5.0)	5.4 (4.6, 6.3)	4.8 (4.4, 5.3)		3.5 (2.9, 4.2)	3.3 (2.7, 3.9)	7.6 (6.8, 8.6)	
	I disagree	15.2 (14.0, 16.2)	20.1 (18.5, 21.8)	17.0 (16.1, 17.8)		13.4 (12.2, 14.8)	15.4 (14.2, 16.6)	22.0 (20.4, 23.5)	
Pregnant women									
Increasing requirements in pregnant and lactating women compared to other women	I agree	96.1 (95.5, 96.5)	95.6 (94.8, 96.2)	95.9 (95.5, 96.3)	0.3	96.8 (96.1, 97.4)	96.1 (95.4, 96.6)	94.7 (94, 95.4)	<0.001
	I have no idea	2.0 (1.7, 2.4)	2.1 (1.7, 2.6)	2.1 (1.8, 2.4)		1.4 (1.0, 2.0)	1.7 (1.3, 2.2)	3.1 (2.6, 3.7)	
	I disagree	1.9 (1.6, 2.3)	2.3 (1.9, 2.8)	2.1 (1.9, 2.4)		1.8 (1.4, 2.3)	2.2 (1.9, 2.7)	2.2 (1.8, 2.7)	
Need for iron supplement intake in all pregnant women even in well-nourished cases	I agree	85.3 (84.2, 86.3)	82.4 (80.6, 84.0)	84.3 (83.3, 85.2)	0.00	84.5 (83.1, 85.9)	85.6 (84.3, 86.8)	82.8 (81.2, 84.2)	0.00
	I have no idea	5.1 (4.5, 5.8)	5.6 (4.7, 6.6)	5.3 (4.8, 5.8)		5.8 (4.9, 6.9)	4.2 (3.6, 4.9)	5.8 (5.0, 6.7)	
	I disagree	9.6 (8.8, 10.5)	12.1 (10.6, 13.6)	10.5 (9.7, 11.3)		9.7 (8.7, 10.8)	10.2 (9.1, 11.4)	11.5 (10.2, 12.9)	

*(% (95% CI)), *P*-value <0.05, SES; socioeconomic status

Table 4: Practice of households based on residential regions and SES: The NUTRI-KAP survey

Correct practice	Region				SES			
	Urban	Rural	Total	*P*-value	Good	Moderate	Weak	*P*-value
Infants								
Vitamin A-D drops intake	92.7 (90.0, 94.7)*	85.3 (80.9, 88.8)	89.5 (87, 91.5)	<0.001	95.1 (91.2, 97.4)	89.1 (84.6, 92.4)	85.6 (81.2, 89.1)	0.00
Iron intake in infants	85.7 (81.7, 88.9)	71.0 (65.9, 75.5)	79.4 (76.2, 82.2)	<0.001	89.6 (84.8, 93.0)	78.9 (73.6, 83.4)	72.3 (67.0, 77.0)	<0.001
Pregnant women								
Iron intake in pregnant women	78.0 (71.5, 83.3)	78.1 (70.6, 84.1)	78.0 (73.6, 83.0)	0.9	89.9 (80.6, 95.0)	81.8 (73.0, 88.2)	69.1 (62.0, 75.4)	<0.001

*(% (95% CI)), *P*-value <0.05, SES; socioeconomic status

Discussion

In this study, we assessed KAP of Iranian households toward essential supplementation in pregnant women and infants in rural and urban areas of all provinces. Results of our study showed that urban households had better knowledge of the required amount of vitamin A&D drops and the time of iron intake in infants. They had better attitude of iron intake in case of dental staining of infants and "needs for iron supplement intake in all pregnant women" and better practice for iron

and vitamin A&D drop intake in infants. SES affected KAP of households. The best KAP was observed in households with good SES. However for the amount of vitamin A-D drops, families with moderate SES had better knowledge.

Our results showed more than half of households knew the time and amount of iron intake in infants. In previous studies in Mashhad (19) and Tabriz (20), 89.1% and 27.95% of subjects had the knowledge of time of iron intake in infants. In Mashhad, 99.5% of parents knew the right dose of required iron for infants. The percentage of subjects who used iron supplement for their infants was about 84% in Tabriz (20) whereas it was 79.36 % in our study. In Abdinia's study (20), mean knowledge and attitude of mothers toward essential supplementation in infants were not acceptable. It seems that we do not have enough KAP toward iron intake in infants in Iran. Therefore, parents should be informed of the time and the amount of required iron supplement more as anemia is considered as a serious health problem in Iranian children (21) and iron supplementation at an early age can be a preventive strategy to reduce iron deficiency (22).

In our study KAP of iron and vitamin A&D supplementation in infants and pregnant women was not desirable in urban and rural households. However, urban households had better status than rural households. This finding is supported by the study conducted by Heshmat et al. (23). They reported that KAP of Iranian households toward IDA iron deficiency anemia was not acceptable; however level of KAP was higher in urban households than rural ones.

A poor nutritional KAP in rural areas may be caused by lack of information about basic principles of nutrition. Therefore it can lead to a poor nutritional attitude and practice and also more problems associated with nutrition such as IDA. Targeting mothers for nutritional training related to infants or other groups who are at risk of nutrition related complications might be a preventive strategy (23). About beginning time of vitamin A&D drops, in present study half of subjects knew the correct answer but in Abdinia's study (20) only 24% of mothers knew the right time of vitamin A & D intake. The percentage of vitamin drop use was almost near to the presented results in Tabriz. We found that almost half of subjects knew when pregnant women must take iron supplement and 80.47% knew its dosage as it was close to the result of Moradi's et al. (24) study. Also in this study, 91% of pregnant women used supplements containing iron after fourth month of pregnancy; however, in our study 78.01 % of subjects mentioned that pregnant women in their families used iron supplement.

Differences that are seen in different studies may be caused by the study population. The NUTRI-KAP survey was conducted in all provinces of Iran with larger population and it considers the rural households too. Other studies were just in one or a couple of provinces with smaller sample size. In addition, questionnaires were different among these studies.

Pregnant women are particularly susceptible to IDA due to increased demand of iron during this period (4). Regarding the consequences of IDA in both mother and fetus (8, 9) , more research is needed to assess an effective interventions to prevent or minimize maternal anemia (25).

One of the main strengths of this study is its large sample size and in each province study subjects was representative of general population in urban and rural areas. The main limitation in the study was lack of information of the possible reasons of not taking supplements in infants and pregnant women.

Conclusion

KAP of essential supplementation in infancy and pregnancy was not desirable in Iran. Because of importance of nutritional KAP on health status and complications rate, we need pay attention to this regard more in order to increase nutritional KAP of community and decrease rate of nutrition-related disease and complications in all areas of country.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, and/or falsification, double publication) have been considered carefully.

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Reference

1. Blössner M, De Onis M, Prüss-Üstün A, Campbell-Lendrum D, Corvalán C, Woodward A (2005). Quantifying the health impact at national and local levels. Geneva, World Health Organization. Environmental Burden of Disease Series, No. 12.
2. Bhutta ZA, Ahmed T, Black RE, Cousens S, Dewey K, Giugliani E, Haider BA, Kirkwood B, Morris SS, Sachdev H (2008). What works? Interventions for maternal and child undernutrition and survival. *The Lancet,* 371:417-440.
3. Bryce J, Coitinho D, Darnton-Hill I, Pelletier D, Pinstrup-Andersen P (2008). Maternal and child undernutrition: effective action at national level. *The Lancet,* 371:510-526.
4. Viteri FE (1994). The consequences of iron deficiency and anemia in pregnancy. In: *Nutrient regulation during pregnancy, lactation, and infant growth.* Ed(s): Springer, pp. 127-139.
5. Mahan LK, Escott-Stump S, Raymond JL, Krause MV (2012). *Krause's food & the nutrition care process*. ed. Elsevier Health Sciences.
6. Benoist Bd, McLean E, Egll I, Cogswell M (2008). *Worldwide prevalence of anaemia 1993-2005: WHO global database on anaemia*. ed. World Health Organization.
7. Barooti E, Rezazadehkermani M, Sadeghirad B, Motaghipisheh S, Tayeri S, Arabi M, Salahi S, Haghdoost A-A (2010). Prevalence of iron deficiency anemia among Iranian pregnant women; a systematic review and meta-analysis. *J Reprod Infertil,* 11:17-24.
8. Szajewska H, Ruszczynski M, Chmielewska A (2010). Effects of iron supplementation in nonanemic pregnant women, infants, and young children on the mental performance and psychomotor development of children: a systematic review of randomized controlled trials. *Am J Clin Nutr,* 91:1684-1690.
9. Bothwell TH (2000). Iron requirements in pregnancy and strategies to meet them. *Am J Clin Nutr,* 72:257s-264s.
10. Dewey KG, Chaparro CM (2007). Session 4: Mineral metabolism and body composition Iron status of breast-fed infants. *Proceedings of the Nutrition Society,* 66:412-422.
11. Sommer A, West KP (1996). *Vitamin A Deficiency: Health, Survival, and Vision*. ed. Oxford University Press.
12. Tatala S, Kihamia C, Kyungu L, Svanberg U (2008). Risk factors for anaemia in schoolchildren in Tanga Region, Tanzania. *Tanzania J Health Res,* 10:189-202.
13. Mirmiran P, Mohammadi-Nasrabadi F, Omidvar N, Hosseini-Esfahani F, Hamayeli-Mehrabani H, Mehrabi Y, Azizi F (2010). Nutritional knowledge, attitude and practice of Tehranian adults and their relation to serum lipid and lipoproteins: Tehran lipid and glucose study. *Ann Nutr Metabol,* 56:233-240.
14. Beydoun MA, Wang Y (2008). Do nutrition knowledge and beliefs modify the association of socio-economic factors and diet quality among US adults? *Preven Med,* 46:145-153.
15. Adler NE, Boyce T, Chesney MA, Cohen S, Folkman S, Kahn RL, Syme SL (1994). Socioeconomic status and health: the challenge of the gradient. *Am Psychol,* 49:15.
16. Chen E (2004). Why Socioeconomic Status Affects the Health of Children A Psychosocial Perspective. *Current Directions in Psychological Science,* 13:112-115.
17. Marmot MG, Kogevinas M, Elston MA (1987). Social/economic status and disease. *Ann Rev Public Health,* 8:111-135.
18. Azemati B, Heshmat R, Sanaei M, Salehi F, Sadeghi F, Ghaderpanahi M, Mirarefin M, Abdollahi Z, Hemami MR, Larijani B (2013). Nutritional knowledge, attitude and practice of Iranian households and primary health care staff: NUTRIKAP Survey. *J Diabetes Metab Disord ,* 12:12.

19. Talebi M, Parisay I, Mokhtari N (2012). The parents' knowledge and behavior towards the effects of using iron supplements on tooth staining and dental caries in Mashhad, Iran. *Dental Res J,* 9:715.
20. Abdinia B (2014). Maternal knowledge and Performance about Use of Iron and Multivitamin Supplements in children in Northwest, Tabriz-Iran. *Int J Pediatr,* 2:119-123.
21. Sayyari A, Sheikhol-Eslam R, Abdollahi Z (2006). Prevalence of anaemia in 2-12-year-old Iranian children. *East Mediterr Health J,* 12:804.
22. Ziegler EE, Nelson SE, Jeter JM (2009). Iron supplementation of breastfed infants from an early age. *Am J Clin Nutr,* 89:525-532.
23. Heshmat R, Azemati B, Keshtkar A, Salehi F, Abdollahi Z, Kolahdouz F, PourAram H, Farivar F, Bagheri M, Sheykh-ol-Eslam R (2009). Comparison of knowledge, attitude and practice of urban and rural households toward iron deficiency anemia in three provinces of Iran. *Iran J Public Health,* 38:83-90.
24. Moradi F, Mohammadi S, Kadivar A, Masoumi S (2007). Knowledge and practice of pregnant women in Fars province about intake of iron supplements. *Acta Medica Iranica,* 45:301-304.
25. Cao C, O'Brien KO (2013). Pregnancy and iron homeostasis: an update. *Nutr Rev,* 71:35-51.