Comparison of Knowledge, Attitude and Practice of Urban and Rural Households toward Iron Deficiency Anemia in three Provinces of Iran

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Abstract

Background: Lack of nutritional knowledge is one of the most important reasons of nutritional problems and consequently improper practice, which can lead to several complications. This study has been designed in order to compare knowledge, attitude and practices of the urban and rural households regarding iron deficiency anemia (IDA) in Boushehr, Golestan and Sistan & Balouchestan provinces in 2004.

Methods: The sampling method at household's level in each province was the single-stage cluster sampling with equal size clusters. The necessary data were gathered with a structured questionnaire and via the interviews between the questioners and the eligible people in each household. Comparison of frequency of variables between urban and rural areas were tested by chi square test.

Results: A total of 2306 households were selected as overall sample size. In urban areas, people recognized iron food sources better than rural areas. Knowledge level of respondents about vulnerable group for IDA and the favorite attitude of households toward IDA were better in urban areas of Sistan & Blouchestan and Golestan provinces. In Sistan & Balouchestan and Golestan, rural households who drank tea immediately before or after meal was more than urban ones. The majority of pregnant and lactating mothers (except for rural areas of Bushehr) did not take iron supplement regularly. Less than 60 percent of children used iron drop regularly.

Conclusion: Knowledge, attitude, and practice levels of households toward IDA were not acceptable. One of the best ways of improving nutritional practice is nutritional education with focus on applying available food resources.

Keywords: *Knowledge, Attitude, Practice, Iron deficiency anemia, Urban, Rural, Iran*

Introduction

One of the most important reasons of nutritional problem is lack of nutritional knowledge and consequently improper practice in this issue which can cause complications such as malnutrition and non contagious diseases. Iron deficiency anemia affects over two billion people worldwide. The World Health Organization estimates that 58% of pregnant women in developing countries are anemic (1, 2). The consequences of anemia for women, include reduced energy and capacity for work, poor pregnancy and birth outcomes including premature delivery, low birth weight, and increased perinatal mortality and increased risk of death during delivery and postpartum. It is estimated that as many as 20% of maternal deaths are caused by anemia and it may be an associated cause in as many as 50% of maternal deaths worldwide, (3, 4). This issue in children can cause failure in physical growth, development of cognition and immune system (5). Different studies in Iran show that knowledge level of people in the society about different aspects of nutrition is not sufficient and desirable and consequently, weak practice of households toward proper diet can be resulted by this issue (6-12). FAO reported that in Africa, lack of nutritional

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knowledge rather than food unavailability is responsible for nutrition inadequacy (13).

In as much as, determination of knowledge, attitude and behavioral pattern of the population is important for improvement of health programme (14), attitude and practice of household toward nutrition is also one of the effective factors in nutrition status, community of nutrition office proposed several interventions for approaching their mission to improve nutrition of vulnerable group and according to theses items, related interventions take into consideration.

The aim of the present study was, comparison of knowledge, attitude and practice of urban and rural households towards IDA in mentioned provinces in 2004 (as a pilot study for flour fortification with Iron and folic acid) so that, its results can help community of nutrition office in planning and implementation of effective interventions for improvement of nutritional health of households.

Materials and Methods

This cross sectional study was carried out to compare knowledge, attitude and practice (KAP) of urban and rural households towards IDA in Boushehr, Sistan & Blouchestan and Golestan provinces, Iran. The methodology of this study was presented by details elsewhere (15).

Subjects and sampling

The study population was Iranian households who live in rural and urban areas of mentioned provinces. We considered mother of household or each member of family who was above 15 yr old and was responsible of affording and cooking meals as an eligible subject. The sampling method at households' level in each province was the single-stage cluster sampling with equal size clusters. Regarding of design effect, total sample size was estimated 384 (32 cluster of 12 people in urban and rural regions of each province), therefore, in three provinces, 2306 people took part in this study.

To identify clusters, we obtained the list of all households in each population (urban and rural) from deputy of health in all 3 provinces based on last health census. For finding first household of each cluster we used systematic random sampling method. We provided the cumulative list of households in each area. The sampling interval was calculated (number of clusters in each area divided by total number of households in the area). The first household of the first cluster was identified by randomly selecting a number between 1 to a less than or equal to sampling interval. The first household of the second cluster was located by adding the sampling interval to the random number. For subsequent clusters (cluster 3, cluster 4, cluster 5, etc.), we identified the first household by adding the sampling interval to the running total of adding the sampling interval to the random number. The right side neighbor (clockwise direction) of the first household in each cluster was selected as the second household of that cluster.

Data collection

The necessary data were collected with a structured questionnaire and via the interviews between the trained interviewers and the eligible subject in each household. The collected data were regarding household's knowledge in food groups, iron sources foods, iron deficiency anemia and vulnerable groups, enhancer and inhibitor factors of iron absorption in foods, attitude toward iron, right or wrong beliefs about foods iron and households' practice or consumption regarding iron containing foods or iron supplements. Comparison of frequency of variables between urban and rural areas were tested by chi square test and significant level was $P < 0.05$.

Results

A total of 2306 households were selected as overall sample size, 770 households in Boushehr, 767 households in Sistan & Balouchestan and 769 households in Golestan province. Eighty five to 90% of households' caretaker was between 20-65 yr old. More than 95% of respondents were women and the most frequency of respondents was in the category of 20-39 yr old (61.8%, Table 1). In urban area of Boushehr province, there was

not any case of illiterate and in three provinces; the most frequency of education was 9-12 yr.

40-50% of respondents were aware of food group roles in the body (Table 2). In three provinces, knowledge level of people about iron food sources was greater in urban areas (Table 3). Knowledge level of respondents about vulnerable group for IDA was below 30% (except for urban households of Boushehr and Sistan & Balouchestan). Knowledge level about vitamin B complex especially folic acid as a preventive factor of IDA was less than 15% in all areas and about the tea role as a preventive factor in iron absorption, knowledge level of rural households was 15-50%. More than 50% of urban households and 70% of rural households were not aware of vitamin C effect on iron absorption. Urban households' knowledge level about excellent source of vitamin C was 30-49% and it was 5-39% in rural areas (Table 4). The favorite attitude of households toward Iron and IDA was 47-80% (Table 5). In Sistan & Blouchestan and Golestan, the number of rural households who drank tea immediately after meal was greater (*P*= 0.000), but in Boushehr there was not any difference (Table 6). Rural households of Boushehr province, regularly

used iron supplement (*P*= 0.004), but in other provinces this difference was not significant. Regarding using iron drop, there was not any significant difference between households (Table 7).

Our study showed that in Boushehr province 75.1%, in Sistan & Balouchestan and in Golestan 59.6% of households used red meat or liver weekly. The frequency of poultry consumption in Boushehr, Sistan & Balouchestan and Golestan households was 87.9, 63.8 and 69.7 percent, respectively, therefore, in all regions, poultry intake was more than red meat. The frequency of weekly fish intake in Boushehr, Sistan & Balouchestan and Golestan was 86.6. 46.0 and 36.6 percent respectively. Using egg in all areas was popular, weekly frequency of its intake was 78.1, 45.2 and 52.6 percent in Boushehr, Sistan & Balouchestan and Golestan provinces. The frequency level of weekly consumption of legumes was 81.2, 66.0 and 70.8%t in households of Boushehr, Sistan & Balouchestan and Golestan. The frequency of using nuts was less than 0.33% in all households. The frequency level of vegetables intake was 86.1, 59.0 and 58.9 percent in Boushehr, Sistan & Balouchestan and Golestan respectively.

Table 1: Age distribution of respondents in urban and rural households

Age group	Boushehr		Sistan & Balochestan		Golestan	
	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)
- Less than 20 years old	35 (9.0)	42 (11.0)	45 (11.9)	51 (13.4)	27 (7.1)	37 (9.6)
- 20-39 years old	256 (66.0)	253 (66.2)	240 (63.5)	238 (62.5)	205 (53.8)	219 (56.9)
- 40-64 years old	93(24.0)	73 (19.1)	89 (23.5)	84 (22.0)	123 (32.3)	117(30.4)
- Above 65 years old	4(1.0)	14 (3.7)	4 (1.1)	8 (2.1)	26 (6.8)	12(3.1)
Total sample	388	382	382	385	384	385

Table 2: Correct knowledge of households about the roles of basic food groups

Food group	Boushehr		Sistan & Balochestan		Golestan	
	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)
- Breads, Grains and Starches	202 (52.1)	177 (46.3)	158 (41.4)	147 (38.2)	148 (38.5)	134 (34.8)
- Meat and Meat Substitutes	167 (43.0)*	131 (34.3)	131(34.3)*	59 (15.3)	149 (38.8)*	47 (12.2)
- Milk & dairy products	211 (54.4)	186 (48.7)	178 (46.6)*	84 (21.8)	225 (58.6)*	137 (35.6)
- Fruits & Vegetables	209 (53.9)	183 (47.9)	173 (45.3)*	110 (28.6)	197 (51.3)*	114 (29.6)

*Comparison of urban and rural households, significant level *P*<0.001

Table 3: Correct knowledge of households of iron food sources

Food Sources	Boushehr		Sistan & Balochestan		Golestan	
	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)
- Meat (red meat, poultry)	287 (74)	267 (69.9)	162 (42.4)	138 (35.8)	176 (45.8)	153 (39.7)
- liver	218 (56.2)†	174 (45.5)	109(28.5)‡	63 (16.4)	101 (26.3)‡	51 (13.2)
- Egg	140 (36.1)*	113 (29.6)	58 (15.2)	60 (15.6)	56 (14.6)*	35 (9.1)
- Legumes	175 (45.1)	172 (45.0)	133 (34.8)*	108 (28.1)	109 (28.4)‡	63 (16.4)
- Spinach	142(36.6)‡	99 (25.9)	128 (33.5)‡	37 (9.6)	165 (43.0)‡	77 (20.0)
- Vegetables§	181 (46.6)	182 (4.6)	160 (41.9)‡	111 (28.8)	171 (44.5)†	129 (33.5)
- Nuts	42 (10.8)	37 (9.7)	39 (10.2)‡	5 (1.3)	32 (8.30) †	15 (3.9)

* Comparison of urban and rural households, significant level, *P*< 0.05
† Comparison of urban and rural households, significant differences in, *P*< 0.01
‡ Comparison of urban and rural households, significant differences in, *P*< 0.001
§Such as: radish, parsley, leek, spring onion, sweet basil.

Table 4: Households' knowledge of vulnerable group to IDA, preventive elements of IDA, enhancer and inhibitor factors of iron absorption

Groups	Boushehr		Sistan & Balochestan		Golestan	
	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)
•**Vulnerable group to IDA**						
- **Children under 2 years old**	131 (33.8)	111 (29.1)	69 (18.1)†	40 (10.4)	94 (24.5)‡	40 (10.4)
- **Girls in puberty ages**	44 (11.3)	51 (13.4)	66 (17.3)‡	15 (3.9)	42 (10.9)†	21 (5.5)
- **Pregnant & lactating mothers**	106 (27.3)	89 (23.3)	153 (40.1)‡	101 (26.2)	55 (14.3)	45 (11.7)
•**Preventive elements of IDA**						
- **Iron**	231 (59.5)‡	176 (46.1)	130 (34.0)‡	68 (17.7)	162 (42.2)‡	80 (20.8)
- **B complex vitamins**	40 (10.3)	32 (8.4)	28 (7.3)*	16 (4.2)	28 (7.3)	16 (4.2)
- **Folic acid**	52 (13.4)‡	20 (5.2)	15 (3.9)*	5 (1.3)	10 (2.6)	12(3.1)
•**Enhancer and inhibitor factors of iron absorption**						
- **Tea after meal**	229 (59.0)†	192 (50.3)	134 (35.1)‡	58 (15.1)	142 (37.0)‡	58 (15.1)
- **Sodium bicarbonate, phytates, dietary fibers**	52 (13.4)	46 (12.0)	11 (2.9)†	2 (0.5)	9 (2.3)*	2 (0.5)
- **Vitamin C**	178 (45.9)†	139 (36.4)	146(38.8)‡	37 (9.7)	126 (33.1)‡	56 (14.5)

* Comparison of urban and rural households, significant level, *P*< 0.05
† Comparison of urban and rural households, significant differences in, *P*< 0.01
‡ Comparison of urban and rural households, significant differences in, *P*< 0.001

Table 5: Favorite attitude of households toward anemia and iron

Topic	Boushehr		Sistan & Balochestan		Golestan	
	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)
- Girls in puberty ages should consume meals with high iron content	316 (81.4)	292 (76.4)	293 (78.6)	293 (62.9)	305(80.3)*	225(58.6)
- Iron needs of pregnant & lactating women are different from others	231 (59.5)	230 (60.2)	264(70.6)*	189 (49.7)	275(72.6)*	200(52.2)
- Infants are required to intake additional iron supplement after starting complementary foods.	196 (50.5)	205 (53.7)	220(58.7)*	163 (42.9)	212(55.9)*	169(44.0)
- Pregnant or lactating women are required to take iron supplements, even though they are well nourished.	301 (77.6)	283 (74.1)	287(76.5)*	235 (62.0)	264(69.5)*	216(56.3)

*Comparison of urban and rural households, significant level *P*< 0.001

Table 6: Time duration between drinking tea and intaking meals (lunch & dinner)

Time Duration between drinking tea and meal intake	Boushehr		Sistan & Balochestan		Golestan	
	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)
- Immediately before or after meal	60(15.5)	64 (16.9)	109(29.1)	187(49.3)	63(16.6)	110(28.6)
- Less than an hour	24(6.2)	35 (9.2)	77(20.5)*	61(16.1)	35(9.2)*	63(16.4)
- From one to two hours	19(4.9)	23 (6.1)	55(14.7)	64(16.9)	43(11.3)	53(13.8)
- More than two hours	284(73.4)	257 (67.8)	134(35.7)	67(17.7)	239(62.9)	158(41.1)

*Comparison of urban and rural households, significant level *P*<0.001

Table 7: Practice of households about using Iron tablet or drop

Province	Boushehr		Sistan & Balochestan		Golestan	
	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)
● **Status of using Iron tablet †**						
- Regular	10(55.6)*	30 (81.1)	43 (44.8)	46 (48.4)	8 (40.0)	34 (54.8)
- Occasional or Irregular	1(5.6)	4 (10.8)	10 (10.4)	12 (12.6)	3 (15.0)	2 (3.2)
- Not using	7 (38.9)	3 (8.1)	43 (44.8)	37 (38.9)	9 (45.0)	26 (41.9)
● **Status of using Iron drop ‡**						
- Regular	26 (60.5)	39 (65.0)	46 (54.8)	45 (48.9)	16 (53.3)	23 (46.9)
- Occasional or Irregular	10 (23.3)	11 (18.3)	19 (22.6)	17 (18.5)	10 (33.3)	12 (24.5)
- Not using	7 (16.3)	10 (16.7)	19 (22.6)	30 (32.6)	4 (13.3)	14 (28.6)

* Comparison of urban with rural households, significant level; *P*=0.004
† Households with pregnant or lactating women
‡ Households with infant aged between 6 months to 2 years old

Discussion

The aim of the present study was comparison of household's knowledge in food groups, iron sources foods, iron deficiency anemia and vulnerable groups, enhancer and inhibitor factors of iron absorption in foods, attitude toward iron, right or wrong beliefs about foods iron and households' practice or consumption regarding iron containing foods or iron supplements. As, women are in charge of affording and cooking in the family, in this study, our samples were mothers and daughters above 15 yr old and more than 95% of respondents were women. Regarding correct knowledge of households about food groups role in the body; knowledge level about meat and its alternative was greater in urban areas of Boushehr province ($P= 0.000$), but this item for meat, milk, fruits and vegetables groups was better in urban households of Sistan & Balouchestan and Golestan provinces ($P= 0.000$).

Keyghobadi et al. reported that 20.6% of Kermanian mothers' knowledge level about food groups; was good but in 79.4% of cases, it was in medium and weak levels, however, after nutritional education their knowledge was in acceptable level. Authors of this study declared that literacy level is one of the important factors in knowledge level before and after training (16). Nasrabadi et al., was assessed knowledge, attitude and practice of adults who was living in 13th Tehran's districts, toward the importance of food groups. In this study, 52.7, 26.5 and 20.8 percent of participants had medium, acceptable and weak knowledge levels, more than 90% of participants were aware of necessity of using fruits and vegetables for healthy life (17). In another study in UK which was carried on 1040 people, of a possible 69 points for the section on food groups, the mean score was 45.6. Out of a maximum of 10 points on this section, the mean score was 7.4. The sample, though large, was not wholly representative of the general population. It was biased in favor of women, older people, high SES and education, and White people, probably reflecting differential response rates by different demographic groups (18).

In the present study, in Boushehr province, urban households had better knowledge about iron food group (liver, egg, spinach, $P< 0.05$). and in Sistan & Blouchestan for all items except for egg and meat, in Golestan for all items except for meat (red meat and poultry), knowledge level of urban households was better than rural areas. ($P< 0.01$). Although, knowledge of urban households is not acceptable, this item in rural areas is worse than that, in this regard, we should pay attention to this point that mothers, as a target group of PHC (primary health care) in rural areas, do not receive enough information about the basic principals of nutrition, therefore they have unacceptable attitude in nutrition and their undesirable practice can also cause nutritional problems such as IDA, so it is better that PHC services are revised for target group.

The result of the study which was sponsored by WHO, showed that 17.8% of 689 pregnant women, rarely used meat, 26.7% used enough cereals and 3.2% used fruits. 67.9% of participants were familiar with the word" anemia" but 11.1 percent did not know the exact meaning, 75.2% believed that using meat can prevent anemia, 98.2% thought using liver can be preventive factor for IDA (19).

A study in UK showed that approximately 40% of women did not have enough iron storage and the prevalence of anemia among them was one out of 12 women. An average iron intake of this population was 18% from red meat and its alternatives, 16% from vegetables, 14% from cereals, 16% from bread, 7% from cookies and biscuits and 3% from egg. As a whole, knowledge level of target group about iron food group was weak and 60% of them recognized red meat as an excellent source of iron, 22% and 40% of participants believed that legumes and vegetables were good sources of iron (20).

In the present study, there was not any difference between knowledge of urban and rural households about vulnerable group to IDA, but in Sistan & Blouchestan province, knowledge level of urban households in all items ($P< 0.002$) and in Golestan province in these items; "children under 2 yr old" and "adolescent girls" were better than rural areas ($P< 0.006$). Knowledge level of urban house-

holds about preventive factors of anemia in Boushehr province in two items of iron and folic acid, in Sistan & Blouchestan in all items and in Golestan about iron was greater. ($P= 0.000$, $P< 0.05$, $P= 0.000$ respectively).

The correct knowledge of households about enhancer and preventive factors of iron absorption in the body, in Sistan & Blouchestan and Golestan in all items ($P< 0.01$, $P< 0.03$) and in Boushehr province in these items "drinking tea after meal and vitamin C", urban households knowledge level was greater ($P< 0.01$). The favorite attitude toward iron and IDA, was not different between urban and rural households of Boushehr province, but in Sistan & Blouchestan in all items except "adolescent girls should use iron food sources more than others" and in Golestan in all items, attitude of urban households was more desirable than rural ones ($P< 0.001$).

In Sistan & Blouchestan and Golestan, the number of rural households who drank tea immediately after meal was greater ($P= 0.000$), but in Boushehr there was not any difference. Rural households of Boushehr province, used iron supplement regularly ($P= 0.004$), but in other provinces this difference was not significant. About using iron drop, there was not any significant difference between households. It seems that evaluating of possible reasons of unacceptable practice of rural households toward one of the most common nutritional problems; IDA, can be helpful for those in charge of planning and implementation of nutritional programs

In conclusion, KAP of households in mentioned provinces were not sufficient and acceptable. Since, the most important factor in implementation of nutrition principals is proper knowledge of households especially women as a responsible of feeding, nutritional education with focus on available food resources is the practical solution in improving nutritional status at urban and rural households' level. Preparing instructions for proper nutrition, as an effective factor, for different age group according to social, economical and cultural characteristics, can also play critical role in nutritional knowledge of people.

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