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The Effect of Nutritional Education on Knowledge and Practice at the Household Level in Zahedan

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ABSTRACT

Background: The present study was carried out to enable, motivate, persuade, and assist the households to use their nutritional knowledge for the promotion of their nutritional status. **Methods:** In this descriptive- analytical study, 188 households were randomly selected from four regions, which were selected as the population lab in Zahedan city in south-east of Iran. In the studied households, mothers were selected as the target group since they were the main caregivers in families. In the educational intervention, nutrition experts educated the participants individually. Pre- and post-tests were administered before and after the intervention. The educational program included three sessions with regard to every region of population lab. The questionnaire investigated the participants' knowledge (15 items) and practice (10 items). The total scores of knowledge and practice were calculated and participants were classified to be in weak, medium, and good status in this regard. $P < 0.05$ was considered as significant. **Results:** The mean scores of knowledge were 6.5 ± 2.7 and 8.6 ± 3.0 for before and after the intervention, respectively ($P = 0.0001$). A significant difference was observed between the two groups regarding the association of mothers' knowledge with their age and family size of households ($P < 0.01$). The results showed that the knowledge of participants was weak (55% vs. 21.5%), medium (43% vs. 51%), and good (12% vs. 27.5%) before and after the intervention, respectively. **Conclusion:** According to the findings, implementation of supplementary, participatory, and advisory programs are suggested for the improvement of household's nutritional practice.

Keywords: *Knowledge, Practice; Nutrition; Household; Zahedan.*

Introduction

Diet is associated with health and disease prevention; therefore, education of nutrition as well as enhancement of healthy eating behaviors and lifestyles has been attended by many researchers. Promotion of nutritional status depends on many factors, such as lifestyle and diet.

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Today, people have higher tendency towards healthier diets (Mokdad *et al.*, 2005) and people's lifestyles, especially nutritional habits have changed to a great deal. This, in turn, caused the prevalence of non-communicable diseases (NCDs) including cardiovascular disease, cancer, osteoporosis, high blood pressure, and obesity. To avoid such diseases, changes in eating habits may be considered as one of the most important factors. Therefore, nutrition education is considered as an important practical step in developing the nutrition knowledge, raising the public awareness, and eventually improving the general health of society (Manouchehri Naeeni *et al.*, 2014, Mirmiran *et al.*, 2007).

Nutritional habits are gradually formed become stable in life styles. Therefore, it is of great importance to conduct a study on the nutritional knowledge, attitudes, and practices of people in a society (Boulanger *et al.*, 2002). We need to know the status of nutritional knowledge, attitude, and practice in our society and try to promote them. In addition, nutritional education may improve the individuals' knowledge and tendency toward learning healthy diet, which can be helpful for the community.

The origin of poor nutritional habits can be traced back to the teenage years, and most nutritional habits are acquired during the adolescence. So, it is very important to study the nutritional knowledge, attitudes, and practices of adolescents (Manouchehri Naeeni *et al.*, 2014).

Although nutritional knowledge can be enhanced by education, a big gap exists between knowledge and practice (Mogre *et al.*, 2016). The percentage of Tehrani adolescents who have good nutritional behavior is really low; moreover, their nutritional practice is not mostly in accordance with their nutritional knowledge. These results suggest that we need to conduct nutritional intervention among Tehrani adolescents (Mirmiran *et al.*, 2007). It is important to carry out a need analysis among the target group and investigate their current knowledge, attitudes, and behavioral patterns (Buttriss, 1997). Nutrition education is an important practical aspect of nutritional knowledge that plays an important role in raising the public awareness and eventually public health (Manouchehri Naeeni *et al.*, 2014).

Nutrition education can significantly improve the dietary practices. Moreover, it can provide the necessary knowledge and skills to make healthy food choices in different situations and economic status (Food & nutrition service (FNS), 2010). Some interventions were conducted on the nutritional education to improve the nutritional status of different vulnerable groups in Iran (Hosseini *et al.*, 2006, Mehrabani *et al.*, 2009). These studies indicated that the health and nutrition education are required in adolescents to promote knowledge, attitude, and practice (KAP). Sistan and Baluchistan is a wide province located in south-east of Iran. Various efforts and programs have been implemented to eliminate the economical, nutritional, and social problems of the native people, support them, improve their living standards and quality of life, and provide facilities. However, nutritional problems prevail in this region and different classes of people suffer from improper nutrition. On the one hand, nutritional status development requires reliable methods and proper interventions. On the other hand, no study has ever investigated the effect of nutrition education on the caregivers of households in Sistan and Baluchistan province to the best of our knowledge.

The present study was conducted to empower, motivate, persuade, and assist the households to promote and use their nutritional status. Therefore, the present study was conducted to measure the effectiveness of a nutritional educational intervention program on the promotion of knowledge and practice of households' population lab in Zahedan city in Sistan and Baluchistan province, south-east of Iran.

Materials and Methods

Type study & Participants: The study was carried out among mothers as caregiver in four regions of Zahedan city. The regions were elected based on the location of mosques in the city; Region 1, Khadejea Kobrea, Region 2, Mohammad

Rasolelah, Region 3, Emam Mohammad Bagher, and Region 4, Mahadaveyea (Region 4). These four regions were selected as the core regions in Zahedan city and were considered as the original sites of research activities in population lab.

All populations lived in these four regions of population lab and a total number of 188 households were selected randomly. In all households, mothers were the main caregivers, who were selected as the target group. The average age of the mothers was 54 ± 0.2 years. Therefore, the inclusion criteria for the participants were household mothers as the main caregivers who resided in any one of these four core regions of population lab in Zahedan city, Iran.

In this study mothers were selected as the target group, because they are the key members of households, who manage the food and nutrition issues in families with different economic, social, and cultural conditions. Furthermore, they have an important role in the process of making food choices. We also received verbal informed consents from each participant to enter the study.

A questionnaire was designed to collect the data about mother's nutritional knowledge and practices. Demographic data were also collected from the participants using a questionnaire.

Nutritional education process: The educational program was implemented by nutritional experts. The training sessions consisted of lectures followed by questions and answers and group discussions. In this course, we used some educational aids including posters, brochures, and pamphlets to facilitate the learning process. In order to determine the level of knowledge and practice in participants, we designed a pre- and post-test study, in which the educational interventions were carried out during three months. The educational program included two sessions a month and a total of six sessions was conducted for each region. In general, the educational program on nutrition lasted 24 sessions. The educational program was conducted in the mosques and each session lasted one hour. Throughout the program, some nutrition experts educated mothers about the following topics:

1- Definition of food groups, food guide pyramid, nutritional value of different sources of food, as well as the process and preparation of traditional foods and their nutritional values.

2- Complications of under- and over-nutrition as well as preparation of food supplements.

3- Food patterns and nutrients among vulnerable groups and introduction of food hygiene.

In order to measure the status of participants' knowledge, attitude, and practice pre- and post-tests were administered before and after the intervention.

Construct validity of the questionnaire was assessed using the principal components. In order to evaluate the respondents' knowledge and practice levels, a researcher-made questionnaire was designed in multiple choice format before and after the intervention.

The nutritional education program was conducted in Ramadan (The month in which the Muslims fast), because in this month families refer to mosques more frequently and we could conduct our educational courses more easily. The educational curriculum also included an additional cooking program, which was conducted at the end of each educational session. The foods prepared during the cooking class were distributed among the participants of each population lab.

Measurements: The questionnaire of demographic characteristic included information such as age, job, family size, and education level. The researcher-made questionnaire comprised of information dealing with the participants' nutritional knowledge and practice.

The "knowledge section included 15 items and the practice section contained 10 items. The nutritional knowledge was measured using questions with3 choices including "true", "false", and "I do not know". Every correct answer got 2 scores, every false answer received zero, and "I do not know" gained 1 score. Then, the knowledge mean scores of participants were calculated and their status were classified into three levels of satisfactory (higher than 10), average (7 –9), and

poor (less than 7).

The questionnaire of nutritional practice included 10 items, which were designed based on the information of food guide pyramid, exchange list of food, process of food, food supplement, and food hygiene. The items of "nutritional practice" should be answered by choosing one of the three options of "Yes", "No", and "seldom". The participants' scores were calculated in this section and they were classified into three groups of satisfactory (more than 15), average (10 – 14), and poor (mean score less than 10) status.

In order to determine the reliability of this questionnaire, it was piloted on 30 similar participants from another district. The participants were asked to complete the questionnaires and give their comments about the clarity and appropriateness of items. The effectiveness of educational program on nutritional knowledge and practice levels of participants was investigated and the results of pre- and post-tests were compared.

Data analysis: Statistical analysis was conducted using SPSS version 20. The results were represented as mean ± SD and frequency. Paired t-test and Chi-square test were employed to compare the quantitative and qualitative data before and after the educational intervention, respectively. P-value < 0.05 was considered as the level of significance.

Results

The results showed that the mean age of mothers was 42.4 ± 15.4 years and they were in the age range of 37 – 52 years (**Table 1**). The participants' mean scores of knowledge were 6.5 ± 2.7 and 8.6 ± 3 before and after the intervention in all areas of population lab, respectively (P = 0.0001) (**Table 2**). The mean scores of practice level were also 9.5 ± 2.7 and 9.5 ± 2.8 before and after the intervention, respectively (P = 0.06) (**Table 2**).

The results showed that the knowledge of mothers in different regions of population lab were at the weak (55% vs. 21.5%), average (33% vs. 51%), and good levels (12% vs. 27.5%) levels before and after the intervention, respectively (**Table 3**). An increase was observed in the practice level of mothers, but it was not significant ($P > 0.05$) (**Table 3**). Furthermore, a significant difference was observed between the pre- and post-tests' scores of knowledge with regard to the increase of age ($P = 0.001$) and literacy in mothers ($P = 0.08$) as well as the family size ($P = 0.02$).

The knowledge scores of participants improved based on their literacy levels; weak level of knowledge reduced from 66.1 percent in the pre-test to. 44.3 percent in the post-test. However, the average level of knowledge increased from 28.5 percent in the pre-test to 50.9 percent in the post-test and good level of knowledge increased from 5.4 percent in the pre-test to 4.8 percent in the post-test ($P > 0.05$). Furthermore, we observed that the level of knowledge increased based on the family size; weak level of knowledge reduced from 55 percent in the pre-test to. 21.5 percent in the post-test. However, the average level of knowledge increased from 33 percent in the pre-test to 51 percent in the post-test and good level of knowledge increased from 12 percent in the pre-test to 27.5 percent in the post-test ($P < 0.05$).

There was also an improvement in the practice of mothers after education, so that the weak level of practice reduced from 57 percent in the pre-test to. 52.5 percent in the post-test. However, the average level of practice increased from 44.5 percent in the pre-test to 33 percent in the post-test and good level of practice increased from 3 percent in the pre-test to 5.5 percent in the post-test ($P > 0.05$).

Table 1. Demographic characteristics of population study

Variables	Region 1	Region 2	Region 3	Region 4	Total
Mean of age (y)	37.4 ± 14.0	37.6 ± 14.4	35.8 ± 14.8	52.5 ± 12.0	42.4 ± 15.4
Household size n(%)	45 (23.9)	44 (23.4)	50 (26.6)	49 (26.1)	188 (100)
Mean of family size	4.3	4.7	5.0	4.0	4.5

Table 2. Comparison mean (± SD) of knowledge and practice score of participants before and after the intervention

Variables	Region 1	Region 2	Region 3	Region 4	Total
knowledge					
Before	5.3 ± 2.6	35.8 ± 2.6	5.5 ± 2.7	9.7 ± 2.0	6.5 ± 2.7
After	7.8 ± 3.5	8.2 ± 3.0	9.3 ± 2.1	8.9 ± 3.0	8.6 ± 3.0
Practice					
Before	9.7 ± 2.8	9.6 ± 2.2	9.3 ± 3.0	9.4 ± 3.1	9.5 ± 2.7
After	10.0 ± 2.7	10.1 ± 3.5	8.9 ± 2.6	9.0 ± 2.1	9.5 ± 2.8

Table 3. Comparison of knowledge and practice status of populations before and after the intervention

Variables	Weak	Medium	Good	Total
knowledge				
Before	110 (55.0)[a]	66 (33.0)	24 (12.0)	200 (100)
After	43 (21.5)	102 (51.0)	55 (27.5)	200 (100)
Total	153 (38.2)	168(42.0)	79(19.8)	400 (100)
Practice				
Before	114 (57.0)	75 (37.5)	11 (5.5)	200 (100)
After	185 (52.5)	89 (44.5)	6 (3.0)	200 (100)
Total	219 (54.8)	164 (41.0)	17(4.2)	400 (100)

a: N(%)

Discussion

The results showed that the nutritional education was a more effective on increasing the knowledge of mothers than their practice. Educational interventional program was successful in improving the participants' nutritional awareness ($p < 0.0001$) and we observed increase of knowledge in all areas of population lab. This result is in the same line with another study in which significant difference was observed between the two groups of well-nourished and malnourished children regarding their nutritional knowledge scores (Appoh and Krekling, 2005). Although we conducted a nutritional educational program for mothers, nutritional knowledge can be acquired from other sources including families and friends, mass media, and community health services (Hara *et al.*, 2012). A study reported the positive and negative effects of nutritional knowledge, which may lead to correct and incorrect nutritional status and habits, respectively (Appoh and Krekling, 2005). With regard to the findings of this study, nutritional knowledge was significantly different before and after the intervention according to the participants' age ($P = 0.001$), literacy ($P = 0.08$), and family size ($P = 0.02$).

Demographic characteristics including family size, income, and ecological situation were investigated in different studies (Appoh and Krekling, 2005, Klohe-Lehman *et al.*, 2006). The improvement of nutritional knowledge can act as an important tool in

stimulating dietary behavior (Klohe-Lehman *et al.*, 2006). Higher nutritional knowledge levels were observed in households with fewer children (Boulanger *et al.*, 2002, Klohe-Lehman *et al.*, 2006). In nutritional programs, the change in nutritional behavior of participants needed more time compared to the increase in their nutritional knowledge. Evaluation of KAP showed important information about participants' health and its effective factors. The nutritional KAP of participants should be determined to implement the effective interventional strategies in health care area (Al-Zabrani and Al-Raddadi, 2009, Azemati *et al.*, 2013). Promotion of nutritional status depends on many factors. Acquisition of nutritional knowledge has a collective process. Individuals may receive information, but internalize is the contents that seem important to them. Several factors such as age, level of education, gender, and marital status may affect nutritional KAP (Mirmiran *et al.*, 2010). Nutrition knowledge was known as a predictor of behavioral change and an important factor in promotion of healthy behavioral changes (Nouri *et al.*, 2016).

Effective nutrition education and promotion includes several mechanisms: 1) skill structure to make easy positive change in behavior, 2) environmental and policy changes to make the healthy choices easier, and 3) conduction of integrated initiatives and social marketing to build community and social support. Nutritional programs help people to select and use healthy and enjoyable foods by improving their knowledge, skills, and motivation to take action at home, school, and work. The curriculum of such programs differs based on the target population, their status of knowledge and health, as well as their environmental factors. Successful interventions use different approaches for different groups and situations (Food & nutrition service (FNS), 2010). The findings revealed an increase in the knowledge of studied population. It should be noted that to achieve higher levels of awareness, long and comprehensive studies are required. The ultimate goal of training people and improving their nutrition knowledge is to help them to use their knowledge. Several factors can contribute to learning, teaching, and analyzing the information and processes. Nutrition education plays a major role in raising the awareness and performance. Nutrition education programs that only focus on data transfer are not successful in changing the bad food habits in individuals. It seems that factors including individual, social, economic, and cultural differences should be studied carefully. Effectiveness of nutrition education depends on knowledge and skills for behavior change, which can be transferred to a target group. There is a relationship between beliefs, attitudes, and behaviors. It is mainly emphasized to improve knowledge and attitude in order to modify the behavior (Karajibani *et al.*, 2014). They are the key components associated with the nutrition education and promotion of practice. This implies that enhancement of nutrition awareness does not necessarily lead to better nutritional status. Although knowledge is clearly a necessary component, other factors such as the type of curriculum, the aim of intervention, weight loss, reduction of dietary fat cholesterol, nutritional support of households, and physiological needs should also be considered. The effectiveness of instruction and participants' learning motivation may significantly influence the efficacy of education (Klohe-Lehman *et al.*, 2006). The findings of this study showed a tendency among the households to change their behaviors regarding the nutritional status. However, it was not significant (P = 0.06). The relationship between nutritional behavior and health status is complicated. A significant relationship was observed between nutrition knowledge and dietary intake as well as between nutrition-related attitudes and dietary intake, but these relationships were not significant (Spronk *et al.*, 2014). Consumption of fruits and vegetables is correlated to psychosocial and environmental factors. It seems that improvement of nutritional behavior needs different strategies including nutrition education and nutritional status improvement (Baldasso *et al.*, 2016) .

Taking all the above-mentioned ideas, further educational courses are required to improve the nutritional knowledge. In this study, improvement in the practice of mothers was only observed at

weak and average levels. This result represents that modification of practice takes longer time. Mothers were satisfied with the training program and asked the researchers to continue the classes. Although education improves the nutritional knowledge, there is often a gap between knowledge and practice (Mogre *et al.*, 2016). In order to conduct such educational program, we should initially consider the requirements of the target group and their present knowledge, attitudes, and behavioral pattern (Buttriss, 1997). A considerable gap was observed between the nutritional knowledge and behavior of Tehrani adults about the effect of nutrition on non-communicable diseases. More than half of the studied population were at the average level of knowledge, whereas, 25 percent of them had desirable level of practice (Mohammadi *et al.*, 2002) . Considering practice, the results of Mohammadi et al.'s study was similar to our findings. However, demographic characteristics of our population were different from Tehrani society. The limitations of this study include: deprivation of living facilities, poverty, droughts, and improper nutrition status of Sistan and Baluchistan area could have a great effect on the process of interventional programs. Findings of the present study revealed the satisfactory knowledge and positive practice among the participants. We also observed that the educational program was successful to improve the nutritional behavior of households.

Our findings indicated that households had a higher tendency to modify their life styles and paid more attention to their nutritional behavior after the intervention.

Moreover, social and cultural factors play important roles in determining the food choices, physiological needs, nutritional behavior, availability of foods, personal experiences, and food preferences of individuals (Mirmiran *et al.*, 2007). This study indicated that the nutritional knowledge and practice improved among mothers. After the intervention, a significant difference was observed in the participants' scores of knowledge and practice. The level of participants' knowledge developed after the intervention at the average and good levels. This finding indicates that households like to receive nutritional information by educational programs and modify their life styles according to it. However, future studies are required to investigate the status of nutritional behavior among the population lab. We also suggest the authorities to conduct other supporting and counseling programs on this group of people and help them to promote their nutritional awareness and practice.

After the intervention, the level of practice increased at weak and average levels. No relationship was observed between the participants' nutritional knowledge and behavior. A study reported that the nutritional knowledge was highly associated with behavior (Asakura *et al.*, 2017). Nutrition education programs emphasize on proper nutrition knowledge and improve the dietary behavior, because nutrition knowledge, nutrition attitude, and dietary behavior are related to each other (Choi *et al.*, 2008). Nutritional knowledge was found to be related with making healthier food choices. Several researches demonstrated the positive role of nutritional knowledge on the eating behaviors (Asakura *et al.*, 2017, Spronk *et al.*, 2014). Nutritional knowledge may influence the individual's eating habits, so that people with higher levels of nutritional knowledge consume less total calories and less energy-dense foods than those with lower levels of nutritional knowledge. However, it was mentioned that the nutritional knowledge was not in accordance with the nutritional behavior. Furthermore, no standard questionnaire exists on the nutritional KAP for households in Iran, which is considered as a limitation of this research. Another limitation of our study was the short period of intervention. The results of this study can help other researchers to design and implement appropriate interventions among the vulnerable groups.

Conclusion

According to the findings, implementation of supplementary, participatory, and advisory programs are suggested for the improvement of households' nutritional practices. Families are also recommended to use the households' resources,

local facilities, as well as educational and nutritional programs to develop their nutritional status. At the beginning of the study the participants' nutritional knowledge and practices were relatively low, but after the program the nutrition knowledge and practices improved marginally. This improvement was caused by the educational course; therefore, further training programs can help the households to modify their lifestyles effectively.

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Authors' contributions

Karajibani M drafted and prepared the manuscript. Montazerifar F performed the statistical analysis. All authors had equal roles in collecting data as well as designing and conducting the study.

Conflict of interest

This project was approved by Deputy of Research in Zahedan University of Medical Sciences, Iran. The authors have no financial conflicts of interest.

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