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For further information about this article or if you need reprints, please contact:

Daniel F. Fouladi,
Drug Applied Research Center, Tabriz University of Medical Science, Tabriz, Iran

Tel: +989144122542

Dietary Oil Profile in Northwest of Iran Before and after a Short-term, Educational Public Campaign

[1]Lida Saboktakin, [2]Ahmad Kousha, [3]Daniel F. Fouladi, [2]Ghasham Soleimanzade, [2]Vahab Asl Rahimi, [2]Hasan Farhad Gheibi, [2]Mahmud Parastandeh Khial and [2]Sevil Hakimi

Using unhealthy dietary oils and fats is a major public problem in Iran and many other countries. The objective of this study was to examine the impact of a short-term, public educational campaign on correcting knowledge, attitude and practice of a target population regarding dietary oils. In this knowledge, Attitude and Practice (KAP), combined pretest and posttest, cross-sectional study, five cities in northwestern Iran with poor-to-moderate socioeconomical status were randomly selected. Literate, married females aged 18-45 years were randomly selected and questioned using a standard, validated questionnaire from September 2010 through November 2011. Knowledge, attitude and practice of the sampled population in terms of dietary oils were assessed before (pretest, n = 920) and after (posttest, n = 735) a six-month, public educational campaign through the mass media and other similar methods. Domains of the questionnaire were about type of healthy oils/fats, proper using/reusing, appropriate way of keeping/storing and criteria for purchasing. At the post test, all the investigated domains except for knowledge about correct action in the cases with oil color change and attitude toward choosing between high-fat and low-fat diets were significantly improved ($p<0.01$). The most dramatic change was in terms of knowledge about the most healthiest dietary oil. The rate of unhealthy oil consumption decreased by roughly 20% (from 70-50%) after the educational campaign in the target population. According to the findings of the present study, a short term, public educational campaign can correct knowledge, attitude and practice of a target population even with a poor-to-moderate socioeconomical status regarding healthy way of dietary oil use. The results of the present work may be found useful by similar societies with such a problem.

Key words: Dietary oil, KAP study, public education, nutritional habits

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[1]School of Medicine,
[2]Provincial Health Center,
[3]Drug Applied Research Center, Tabriz University of Medical Science, Tabriz, Iran

INTRODUCTION

It is now clear that many health problems such as obesity (Hill *et al.*, 2000; Willett and Leibel, 2002), cardiovascular disease (Bodenheimer, 1991; Navali *et al.*, 2011; Shakeri *et al.*, 2011a, b; Ghorashi *et al.*, 2012; Tarzamni *et al.*, 2012) and cancer (Wiseman, 2008) are associated with high fat intake. Saturated and Trans fats (unsaturated fats with trans-isomer fatty acids) are the main culprits. They have notorious effects on blood lipid profile. A study in Isfahan Province in central Iran showed a significant linear association between the amount of hydrogenated fat intake and serum level of total cholesterol and triglyceride. Despite fat consumption within the recommended daily allowance range, higher percentiles of serum total cholesterol, Low Density Lipoprotein (LDL) and triglyceride and lower percentiles of High Density Lipoprotein (HDL) were reported in persons consuming saturated fat comparing with individuals with healthier diet (Kelishadi *et al.*, 2004). According to available data, saturated fats and partially or totally hydrogenated vegetable oils are still popular in Iranian households, restaurants and food industries despite wildly provided educational programs and national instructions (Kelishadi *et al.*, 2004; Mirmiran *et al.*, 2005). In a study by (Mozaffarian *et al.*, 2007), 7158 Iranian households including 35924 individuals were evaluated. Partially hydrogenated oils were the most common consumed oils in this population with an average per person intake of 14 g 1000 kcal. Trans fatty acids accounted for 33% of fatty acids in these products, or 4.2% of all calories consumed (12.3 g day^{-1}). It was concluded that 39% of coronary heart disease events could be prevented by replacement of Trans fatty acids with cis-unsaturated fats. In another study by Jahangiri and Rajabi (2001) in Shiraz, nutrition culture of women was investigated. This study showed that only a minority of the studied population was aware of appropriate methods of cooking and selecting healthy materials in daily diet. The average fat intake was 36 and 41 g in urban and rural areas, respectively. Saturated, liquid and animal-derived fats consisted 52.2, 40.5 and 1.2% of total dietary oils, respectively. Lack of knowledge and wrong beliefs were proposed as major underlying causes of wrong or improper use of fats. According to an official report in 2004 partially hydrogenated vegetable oils constituted almost 90% of total fat consumed in the province of East Azerbaijan, northwest of Iran. It should be noted that the average percentage of Trans isomers in domestic commercial fat products is between 24-48%, too much higher than the maximum amount of 2% in the west (Ministry of Health, 2004). In a previous study in this region, population-based investigations on dietary choice were recommended (Dastgiri *et al.*, 2006). It is thought that in this type of investigations females are better targets than males, because they play main role in determining dietary patterns of households (Jahangiri and Rajabi, 2001). To perform a public interventional strategy in a large population, it is pivotal to engage an appropriate method of assessment as the first step. "KAP" study measures knowledge, attitude and practices of a community. It serves as an educational diagnosis of a community (Kaliyaperuma, 2004). The main objective of this KAP study was to examine changes in knowledge, attitude and practices of a population in northwest of Iran with regard to an important dietary problem; which is using unhealthy dietary oils/fats, after a six-month community-based educational lifestyle interventional program, designed to assess to what extent a voluntary participating member of a population would be able to change its selection and using oils, as the main purpose.

MATERIALS AND METHODS

Study design and population: In this cross-sectional, pretest and posttest KAP study five Iranian cities in the Province of East Azerbaijan (including Sarab, Azarshahr, Bonab, Bostanabad and Jolfa) were selected randomly from September 2010 through November 2011. The target population included literate married women aged 18-45 years, who were randomly selected from various districts in each city according to a list of randomly generated numbers of houses by a computer software. Four hundred households were sampled in each city for both pretest and posttest phases. At pretest and posttest phases, a total of 920 and 735 females returned completed questionnaires, respectively. This study was funded by East Azerbaijan Province Health Center. The Ethics Committee of Tabriz University of Medical Sciences approved this study.

Questionnaire: The employed questionnaire was designed and validated in the region by a group of experts in East Azerbaijan Province Health Center affiliated to Tabriz University of Medical Sciences. This questionnaire separately investigates knowledge, attitude and practice of participants regarding dietary oils and fats (Table 1). The questionnaire included 19 close-ended questions with one correct answer. After the questionnaire was handed to each participant, an investigator waited to collect the completed from. Participants were allowed to withdraw.

Table 1: Translated version of the questionnaire used to examine knowledge, attitude and practice of azeri married women regarding dietary oils and fats

Domain	Question
Knowledge	Q1 Which is better: A low fat diet, or a high fat diet?
	Q2 Which oil is the best for cooking?
	Q3 Is special oil available for frying?
	Q4 Can oil be reused?
	Q5 What do you do with oils with color change?
	Q6 How do you store oils?
	Q7 Which place is the best for keeping oils?
	Q8 What are the best criteria for purchasing oils?
Attitude	Q9 Which one do you prefer: High-fat or low-fat diet?
	Q10 Which one is your preferred oil for cooking?
	Q11 Which one is your preferred oil for frying?
	Q12 What do you prefer to do with used oils?
	Q13 What do you prefer to do with oils with color change?
Practice	Q14 Which one is your regular diet: High-fat or low-fat?
	Q14 Which oil is your routinely used one for cooking?
	Q15 Which oil is your routinely used one for frying?
	Q16 What do you do with used oils?
	Q17 What do you do with oils with color change?
	Q18 Where do you usually keep oils?

Table 2: Demographics and general data of pretest and posttest populations

Variables	Pretest (n = 920)	Posttest (n = 735)	p-value
Age (year)	29.48±7.28	29.91±7.61	0.24
No. of child			
≤2	704 (76.5)	559 (76.1)	0.87
2-5	183 (19.9)	142 (19.3)	
5<	33 (3.6)	34 (4.6)	
Education			
Elementary school	127 (13.8)	80 (10.9)	0.13
Guidance school	351 (38.2)	251 (34.1)	
High school	215 (23.4)	179 (24.4)	
High school diploma	171 (18.6)	161 (21.9)	
College/University	56 (6.1)	64 (8.7)	
Occupation			
Housewife	837 (91)	659 (89.7)	0.37
Career woman	83 (9)	76 (10.3)	

Data shown as Mean±SD or frequency (%)

Table 3: Rate of correct answers in pretest and posttest populations

Domain	Question	Pretest (n = 920)	Posttest (n = 735)	p-value
Knowledge	1	102 (11.1)	210 (28.6)	<0. 01*
	2	370 (40.2)	567 (77.1)	<0.001*
	3	565 (61.4)	558 (75.9)	<0.001*
	4	512 (55.7)	463 (63.0)	<0.01*
	5	820 (89.1)	665 (90.5)	0.37
	6	570 (62.0)	517 (70.3)	<0.001*
	7	111 (12.1)	188 (25.6)	<0.001*
	8	144 (15.7)	215 (29.3)	<0.001*
Attitude	9	311 (33.8)	267 (36.3)	0.29
	10	489 (53.2)	502 (68.3)	<0.001*
	11	378 (41.1)	398 (54.1)	<0.001*
	12	506 (55.0)	455 (61.9)	<0.01*
	13	254 (27.6)	298 (40.5)	<0.01*
Practice	14	268 (29.1)	355 (48.3)	<0.001*
	15	217 (23.6)	245 (33.3)	<0.001*
	16	403 (43.8)	371 (50.5)	<0.01*
	17	606 (65.9)	654 (89)	<0.001*
	18	161 (17.5)	297 (40.4)	<0.001*

Data presented as frequency (%), *p-value<0.05 is significant

Intervention: After all the pretest questionnaires were collected, an educational campaign was commenced. This educational campaign, which was aimed to correct public knowledge regarding dietary oils and fats, was also designed by the same experts in East Azerbaijan Province Health Center. The campaign comprised distributing brochures, billboards, placards and posters, as well as TV programs broadcasted on daily basis for six consecutive months. After six months, the posttest investigation was carried out similarly to that in the first (pretest) stage. One thousand literate married women were randomly selected from the same region and questioned by the same questionnaire. Changes of the rate of correct answers were compared between pretest and posttest samples.

Statistical analysis: Data were analyzed with the SPSS statistical software package (version 15.0, SPSS Inc., Chicago). Contingency tables (The Chi square and Fisher's exact tests, when appropriate) and the Independent Samples t test were used. Cohen's kappa was used to test the degree of agreements, p values less than 0.05 were considered statistically significant.

RESULTS

Overall, 2000 women were selected to participate, including one thousand females in the pretest and one thousand females in the posttest phase. Finally, 920 and 735 completed questionnaires were returned in pretest and posttest stages, respectively. Demographics and general data of the participants at two phases are summarized and compared in Table 2. Accordingly, the two groups were comparable in terms of age (p = 0.24), number of child (p = 0.87), educational level (p = 0.13) and occupation (p = 0.37). The number of correct answers before and after the educational campaign is summarized and compared in Table 3.

Except for the knowledge about correct action in the cases with oil color change (p = 0.37) and attitude toward choosing between high-fat and low-fat diets (p = 0.29), all the other items showed significant increase in the rate of correct answers in the posttest phase comparing with those before the campaign (p<0.05). Percentage increases of correct answers to the questions after educational campaign comparing with that in the pretest are shown in Fig. 1. Accordingly, the highest increases were seen in responses to the questions 1, 18, 7, 2 and 8, respectively. There was not a significant agreement between preference (attitude) and practice of the participants in terms of choosing best dietary oil either before (Cohen's kappa = 0.32) or after (Cohen's kappa = 0.36) the educational campaign.

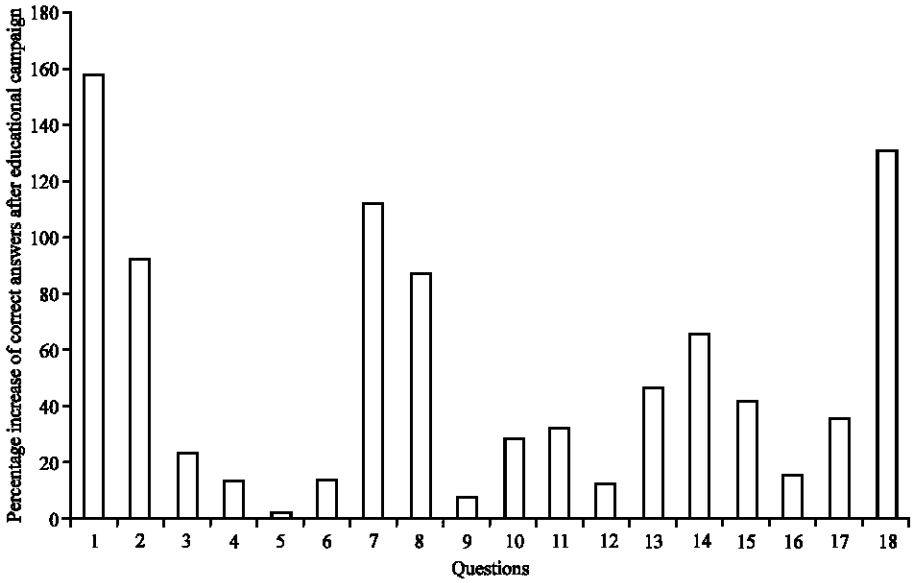

Fig. 1: Percentage increases of correct answers to the questions after educational campaign comparing with that in the pretest phase

DISCUSSION

The theoretical basis for the current study in changing a nutritional behavior was based on a model developed by Cartwright. This scientist postulated that in order to achieve mass persuasion, three types of changes must be induced: (1) Cognitive structures, i.e., what people knew or understood, (2) Affective structures, i.e., what people wanted to do and (3) Action structures, i.e., what people actually did. Cartwright further pointed out that mass media campaigns are usually effective only in influencing knowledge and attitude (Stern *et al.*, 1976). Effectiveness of mass persuasion, however, has been previously reported in correcting health problems such as smoking (Fortmann *et al.*, 1993), inactivity (Young *et al.*, 1996), obesity (Taylor *et al.*, 1991) and hypertension (Fortmann *et al.*, 1990). In the present work, a short-term public educational campaign significantly corrected knowledge, attitude and practice of the target population regarding dietary oils. This is in line with the results of the mentioned studies. Examples of successful educational campaigns in diminishing saturated fatty acid consumption and increasing unsaturated oils intake (Fortmann *et al.*, 1981; Farquhar *et al.*, 1990) through the mass media have been reported in other investigations, too. The Finish North Karelia Project (Vartiainen *et al.*, 2000) showed how behavioral changes can be made in a community setting, which resulted in major reductions in the number of coronary risk factors and subsequent coronary deaths. A cultural/community transformation with a supportive environment designed to help people to make healthier choices was also demonstrated in other studies in Denmark (Mikkelsen and Trolle, 2004) and Finland (Smith *et al.*, 1996). Even earlier, mass persuasion had been suggested as a pivotal role in improving fat-related knowledge and behavior in adults during the 1980s in the United States (Frank *et al.*, 1992). It is now known that well-designed community-based intervention programs can improve lifestyle choices and health habits. They may also markedly and quickly reduce the level of coronary risk factors in every population (Englert *et al.*, 2007). Our results also confirmed this. The target population in the present work was literate, married women. Patterson *et al.* (2003) also reported that females in Women's Health Initiative Dietary Change Intervention made substantial changes in food choices after an interventional program. In addition, the results of our study confirmed that even a low-to-medium socioeconomic status might not hinder or prevent beneficial effects of such public interventions in a given population. Similar achievements were also reported from populations with lower socioeconomic status in other studies. For example, in line with our findings favorable secular changes in fat intake, exercise knowledge, cholesterol level knowledge and cholesterol screening behavior were observed among some populations of African-Americans with lower educational level during a time period that coincided with community-wide intervention efforts and messages in a study by Smith *et al.* (1996). Likewise, Rowley *et al.* (2001) reported

improvements in circulating cholesterol, antioxidants and homocysteine after dietary intervention through mass media campaigns in an Australian Aboriginal community. There are scant reports, to the best of our knowledge, regarding the effectiveness of public educational campaigns in improving dietary habits among middle-eastern communities. As a result, the present work provides excellent data in this regard. According to these findings, a short-term public campaign in a society with low-to-intermediate educational status could effectively enhance knowledge, attitude and practice in terms of a very important health issue, which is dietary oil and fat. According to these findings, all the studied domains except for knowledge about correct action in the cases with oil color change and attitude toward choosing between high-fat and low-fat diets were significantly improved after this educational intervention. Culture, economic factors and he environment all have been proposed as the main three factors affecting the success rate of nutritional campaigns in different population (Luepker *et al.*, 1994). It should be noted that misbeliefs regarding dietary oils/fats are deeply rooted in the culture and traditions of the studied target population, making them very hard to be altered. In addition, it is possible that health behavior messages do not reach all segments of a target community (Smith *et al.*, 1996) and tougher campaigns might be necessary. Nonetheless, achievements of the current study are very important in two aspects. First, the practical behaviors of the intervened population, which are considered as ultimate goal for any behavior-change campaign, were unexceptionally improved. Second, the main index, i.e., using unhealthy dietary oils consumption (the question 14) decreased from roughly 70% at baseline to about 50% after the program ($p<0.001$). Interestingly, there was not a significant correlation between attitude and practice of the responders in terms of choosing best dietary oil either at baseline or after giving public information. It may be concluded that preference does not necessarily determine practice and the association between these two components may be complex (Verheijden *et al.*, 2003). On the other hand, it is apparent that a certain amount of caution is called for in interpreting self-reported changes in dietary behavior. For example, it is quite conceivable that our participants might have biased their responses to match what they perceived to be the expectations of our interviewers (Stern *et al.*, 1976). Anyhow, according to our results it may be claimed that the employed program was successful in achieving our main objectives. However, it should be emphasized that we are in early stages of this campaign and more orchestrated programs, as well as engaging other means are yet to be planned. It is clear that trying to change nutritional beliefs and habits of a community will not lead into favorite consequences if resources and materials are not set in accordance with the objectives. For example, Rowley *et al.* (2001) evaluated the effectiveness of a community directed intervention program to reduce coronary heart disease risk through dietary modification in Australia. Intervention processes included store management policy changes, health promotion activities and nutrition education focused on high-risk individuals. Dietary advice was planned to decrease saturated fat and sugar intake and increase fruit and vegetable consumption. This community-based dietary intervention program reduced the prevalence of coronary heart disease risk factors related to diet. Thus, close monitoring and control of dietary oil production and storing processes is essential in this regard. It is worth to mention that at the beginning of this study almost 70% of dietary oils available in the market of the target region was saturated or partially hydrogenated types. This rate of oil supply remained constant during the study period. This indicates that observed changes in oil preference and consumption was independent of market supply. Interestingly, policy of oil production and supply changed after publication of the preliminary results of this study by the local government. This indicates that public advertisement may also affect production of dietary oils; which in turn, may enhance related nutritional behavior in a population.

CONCLUSION

The current study proved effectiveness and feasibility of a short-term public campaign against unhealthy dietary oil selection and consumption.

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