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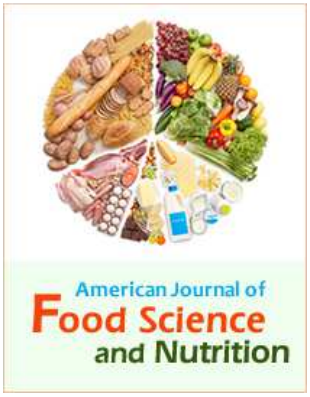

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Investigating factors associated with oil consumption based on PRECEDE model among households covered by health centers in Fasa, Iran

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Abstract
Background: Poor dietary habits such as consumption of hydrogenated oils can lead to cardiovascular diseases. The purpose of this study is to investigate factors associated with oil consumption based on the PRECEDE model among households covered by health centers in Fasa, Iran. Materials and Methods: This study is cross-sectional. 270 women who referred to the health centers in Fasa were randomly selected and studied. The data gathering instrument was a questionnaire developed based on structures of the PRECEDE model. Collected data were analyzed using SPSS16 via independent t-test and Pearson correlation coefficient. Results: The mean scores of knowledge, attitude, enabling factors, reinforcing factors and performance were 1.2±11.6, 21.4±2.69, 83.79±8.41, 9.2±0.31 and 6.74±1.12 respectively. Pearson correlation test showed no significant correlation between performance score and demographic variables of age and family dimension of the subjects ($p>0.05$). T-test results showed a significant correlation between occupation and education of the subjects and the PRECEDE model structures (predisposing factors, enabling factors, reinforcing factors and Performance) ($p <0.05$). Conclusion: The results showed that a small percentage of the household women had good nutrition. Reinforcing and enabling factors affect consumption of non-hydrogenated oils. This is related to the fact that non-hydrogenated oil is more

expensive than hydrogenated ones and housewives are not interested in foods cooked with non-hydrogenated oil. Reducing non-hydrogenated oil prices and encouraging housewives and promoting their attitude regarding consumption of non-hydrogenated oil are measures recommended to solve the issue.

1. Introduction

Hydrogenated vegetable oils are one of the most important risk factors for cardiovascular disease are considered because they contain high amounts of saturated and trans fatty acids(1). Hydrogenated oils are widely consumed by people in Iran. In a study conducted on 15 samples of hydrogenated oils in the Iranian market, the results showed that all of them contained large amounts of trans fatty acids. Total saturated and trans fatty acids in hydrogenated oils were 59.1% and over 70% in some cases (2). The amount of trans fatty acid consumption in the country was 14 grams (4.2% energy) which is about two times higher than in developed countries (4. 3).Correcting methods of edible oil hydrogenation by reducing the amount of trans fatty acids is effective in reducing cardiovascular diseases (5). Different fatty acids have different effects on consumer health (6). While the short-and medium-chain saturated fatty acids are neutral in terms of effects on lipoprotein, types of long-chain saturated fatty acids increases LDL cholesterol and the risk of coronary artery disease (CAD) (7, 8).On the other hand, consumption of unsaturated fatty acids with multi twofold bands from omega-3 family as well as unsaturated fatty acids with a twofold band reduce the risk of coronary artery disease (CAD) (6). The World Health Organization estimates that each year 16.7 million people worldwide lose their lives due to cardiovascular diseases. Cardiovascular diseases are responsible for 29 percent of all deaths and 80 percent of deaths from cardiovascular diseases occur in low-income areas (9).In Eastern Mediterranean countries including Iran, the mortality rate resulting from cardiovascular diseases has increased along with the changing economic situations and rapid population growth (10). According to the World Health Organization, chronic diseases cause 70 percent of mortality in Iran. Also, according to WHO, among the 10 leading causes of death in Iran, coronary artery disease by 21% stood first and is the most important cause of death in the country (11). Besides, increased economic power and welfare, excessive consumption of salt, fats and sweets; increased tobacco use and reduced physical activity are factors that have increased the incidence of non-communicable and degenerative diseases (12, 13, 14,15).The role of nutrition in health promotion and prevention and treatment of many chronic diseases is well recognized and it is considered the most controllable risk factor for these diseases (16,17,18). Chronic diseases resulting from poor nutrition and improper lifestyle are the cause of 70% of deaths in developed and developing countries. (20, 19). Unfortunately, today, type of diet have led to improper intake of fats as underlying cause of cardiovascular, liver and kidney diseases; diabetes and obesity (20).The best way to prevent these diseases is lifestyle modification in which proper nutrition plays an important role (21).

Therefore, carrying out studies to identify factors associated with consumption of edible oils seems necessary.

Given the importance of the issue, proper planning is needed to reduce hydrogenated oil consumption and to encourage people to use non-hydrogenated oils. One of the effective measures that can be taken in this regard is educational intervention. In order to do effective educational interventions, studying society's behavior based on educational models is very important. One of the comprehensive models in this regard is the PRECEDE model (22).

PRECEDE model is a comprehensive model for studying behavior, planning for changes in behavior and determining factors effective in decision making (23).

A very important feature of the PRECEDE model in health education is that it provides a comprehensive insight about the subjects and investigates individual behavior in three key areas. The first area includes predisposing factors needed for generating motivation and behavior. Knowledge, beliefs, attitudes, values and customs are predisposing factors that can lead to behavior. The second area includes reinforcing factors that provide reinforcement as feedback after taking behavior. These factors include social support and the influence of peers, parents and friends which increase the likelihood of repeating the recommended behavior in future. The third area is called enabling factors that include providing facilities and services and creating skills to change behavior (24).

Charkazi et al studied factors affecting oil consumption based on the PRECEDE model. The majority of subjects were women with poor nutritional performance. The results showed that reinforcing factors and enabling factors influenced oil consumption (25).Other studies about feeding behavior based on PRECEDE model include studies by Sun Wei Yue et al (26), Cuy Castellanos (27), Jimba (28) and Cole and Horace (29).

Given the importance of the issue, the purpose of this study is to investigate factors associated with oil consumption based on the PRECEDE model among the households covered by health centers in Fasa, Iran in 2013.

2. Materials and Methods

This study is cross sectional and descriptive – analytical. The sample included 270 women who referred to health centers in Fasa in 2013. Among all active treatment cases in the health centers, 270 cases were selected via systematic random sampling. Inclusion criteria for the study confined the sample to married women with active treatment case

who referred to the health centers at least once a month. A questionnaire based on the PRECEDE model was used for data collection. The questionnaire included 26 questions related to risk factors (16 knowledge questions and 11 attitude questions).

Questions on knowledge are multiple-choice (1 for correct answer and 0 for wrong answers). Attitude questions use a Likert scale from completely agree to completely disagree. There were 8 questions on enabling factors (such as expensive oil, low access to educational resources and materials, and cost of replacing hydrogenated oils with non-hydrogenated oils) with answers including yes, somewhat and no. Reinforcing factors (such as encouragement by spouses and friends to use non-hydrogenated oils and families' interest in foods cooked with non-hydrogenated oil, etc.) included 5 questions with answers including yes, somewhat and no. There were 9 performance questions (factors such as not using hydrogenated oils, using frying non-hydrogenated oil for frying and regular non-hydrogenated oil for other cooking, observing principles of proper maintenance, avoiding pouring used oil back to the main dish of oil, carefully reading labels when shopping oil, making foods that require less oil, using alternative cooking methods such as steaming, boiling and roasting) with answer choices on a Likert scale formal ways to never. The final score of all factors of the PRECEDE model are weighted by 100. Data were collected by trained interviewers.

To determine the questionnaire content and face validity, the questions developed based on reliable scientific sources were sent to health education, nutrition, statistics and epidemiology professionals and their comments were applied to the questionnaire. The questionnaire reliability was determined by examining the internal consistency of the questionnaire via piloting it to 25 cases (α=0.9for knowledge questions, α=0.83 for attitude questions, α=0.8 for enabling questions, α=0.88 for reinforcing questions and α=0.93 for performance questions).

After sampling the qualified women were contacted via phone call. On the appointed day, they gathered in a hall in a health center. The aims of the study were explained to them and oral consent was obtained. Next, they answered the questions in writing. The collected data were entered into statistical software, version 16. Quantitative variables were presented as mean and SD and qualitative variables were presented as frequencies and percentages. The significance level was set at 95 percent.

3. Results

The sample's mean age was 39 years and the mean family members were 3.76. 93.70 percent of subjects were housewives and 6.30 percent were employees. In terms of education, 65.18 percent were below school diploma, and 34.82 percent were diploma or higher (Table 1 and 2).

Table 1. *Frequency distribution of subjects' age and family members*

Variable	Mean
Age	39
Household members	3.76

Table 2. *Frequency distribution of the study population in terms of occupation and education*

Variable		number (percent)
Job	housewife	253 (93.70)
	employee	17 (6.30)
Education	Below diploma	176 (65.18)
	Diploma and above	94 (34.82)

The results showed that women under study had a relatively high knowledge about consumption of edible oils. Mean scores of enabling factors, reinforcing factors and performance (behavioral factors) were at a low level (Table 3).

Table 3. *Mean scores of knowledge, attitude, enabling and reinforcing factors and the women's performance on oil consumption.*

Variables	Mean score
Knowledge	69.2±11.6
Attitude	21.4±2.01
Enabling factors	9.2±0.83
Reinforcing factors	31.79±8.41
Performance	6.74±1.12

Pearson correlation between test performance scores with demographic variables of age, family members showed no significant correlation ($p>0.05$). T-test results showed a significant correlation between occupation and education of subjects and the structures of PRECEDE model (predisposing factors, enabling factors, reinforcing factors and performance) ($p <0.05$).

4. Discussion

The present study showed that the women studied were underperforming in the use of appropriate oil. However they had a relatively high knowledge about use of proper edible oils. This is consistent with studies by Charkazi (25) and Xiang (30).According to the PRECEDE model, knowledge and attitudes as predisposing factors can lead to appropriate health behavior, but formation of appropriate behavior needs other factors such as enabling factors and reinforcing factors which are influential and decisive. Also, not only should we consider individual behavior changes, but also we should take into account environmental and individual factors (31).In studies carried out by Charkazi (25) and Salehi (32) a high percentage of people had a good attitude. Salehi's findings showed a significant relationship between knowledge and behavior which is not consistent with our results (32).

Enabling factors such as lack of access to educational resources, higher price of non-hydrogenated oil compared to hydrogenated oils, lack of distribution of hydrogenated oils in customer cooperatives have acted as barriers that prevent the formation of appropriate feeding behavior. In

this study, the mean scores of these factors were low. Kelishadi and colleagues in a study entitled "Status of dietary fat and blood lipids in adolescents" purported higher use of hydrogenated oils to their lower prices (33). Studies by Sun Wei Yue (26) and Charkazi (25) showed that enabling factors are effective in promoting feeding behaviors such as consumption of non-hydrogenated oil.

Results of this study showed that mean score of reinforcing factors is low and foods cooked with non-hydrogenated oils by wives are not welcomed by other family members. Thus as a result of lack of positive reinforcement and feedback, this behavior is discontinued. The study by Azadbakht et al showed that peers, mass media and parents affect dietary decisions (34). Studies by Sun Wei Yue (26) and Cuy Castellanos (27) showed that reinforcing factors lead to appropriate feeding behaviors.

The women in this study had a poor performance in the area of oil consumption. This finding is not unexpected, because hydrogenated oils are widely used in our country and the non-hydrogenated oils available do not have a good quality in terms of sanitary standards and amounts of fatty acids (3, 35). The results of Charkazi showed that 28% of the sample used non-hydrogenated oil for cooking (25).

Modification of rules and policies in this area and their appropriate organization is essential to address current deficiencies and promote use of non-hydrogenated oils. In recent years, in some parts of the developed world limitations have been imposed on oil-producing plants to reduce the content of saturated and trans fatty acids and increase consumer knowledge. These have reduced hydrogenated oil consumption sharply. In 2006, oil production factories in the United States were required to declare trans fatty acids values in the nutrition label of their products (36).In Costa Rica over a 10-year period, the amount of trans fatty acids in soybean oil reduced from 20 percent to 1.5 percent. Moreover, during the same period the oils containing linoleic acid increased from 1.87% to 6.06% (37).

All these changes were due to changes in policies, regulations and increased knowledge of consumers.

To improve eating behaviors full participation of all people is necessary. Holding educational programs and publishing books and pamphlets on the issue, taking advantage of educational media and revisiting TV and radio programs are important and effective steps for modification of public lifestyle and dietary habits, particularly regarding non-hydrogenated oil consumption.

5. Conclusions

This study showed that women covered by health centers in Fasa did not have good feeding behavior. Reinforcing and enabling factors affect the use of non-hydrogenated oils. Higher price of non-hydrogenated oils than hydrogenated ones and lack of family members' interest in foods cooked with non-hydrogenated oils are two factors that are important in this area. Reducing non-hydrogenated oil prices and encouraging and promoting family members' attitudes toward use of non-hydrogenated oil is recommended.

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References

[1] Hazavehei MS, Oruogi MA, Charkazi A, Hassanzadeh. The effect of health education intervention based on PRECEDE framework on modification of vegetable oils consumption habits in families under the cover of health centers in Mani Shahr of Khomein .Arak Medical University Journal (RahavardDanesh) 2011; 13(4): 133-142.

[2] BahramiGh.R, MirzaeiSh, Kiani A, AtefiGAssessment of profile of fatty acids and Transfats in hydrogenated oils in Iran.Behbood, The Scientific Quarterly 2003; 16(7): 1-10.

[3] Esmaillzadeh A, Azadbakht L. Consumption of hydrogenated versus nonhydrogenated vegetable oils and risk of insulin resistance and the metabolic syndrome among Iranian adult women. Diabetes care. 2008; 31(2): 223-6.

[4] Mozaffarian D, Abdollahi M, Campos H, Houshiarrad A, Willett WC. Consumption of trans fats and estimated effects on coronary heart disease in Iran. European Journal of Clinical Nutrition 2007; 61(8): 1004-10.

[5] BahramiGh, Rahi H .The removal effect of hydrogenated shortening on serum levels of Triglycerids, total Cholesterol and HDL-Cholesterol in normal subjects. Journal of Kerman University of Medical Sciences 2000; 7(3): 109-103.

[6] BahramiGh.R, MirzaeiSh, Kiani A, Atefi G.Assessment of profile of fatty acids and Trans fats in hydrogenated oils in Iran. Behbood, The Scientific Quarterly 2003; 7(16): 10-1.

[7] NajafiKaliani M. [Assessment situation obesity and lipidemia in caught patients to 3-coronary vascular stenosis that is coronary artery bypass graft candidate].The Journal of Army University 2008; 8(1): 8-14.

[8] Chi HJ. Zhang DP. Yang XC. Yang ZS. Xu Y. Hyperglycemia at admission and outcome in elderly patients with acute ST segment elevation myocardial infarction underwent primary percutaneous coronary intervention. Chinese Journal of Cardiovascular Diseases 2009; 37(7): 595-8.

[9] http://www.who.int/cardiovascular_diseases/en/index.html (online).

[10] Fakhrzadeh H, Bandarian F, Adibi H, Samavat T, Malekafzali H, Hodjatzadeh E, et al. Coronary heart diseasend associated risk factors in Qazvin: a population-based study. East Mediterr Health J 2008; 14(1): 33- 41.

[11] 11- Global atlas on cardiovascular disease prevention and control. Geneva, World Health Organization, 2011.

[12] Marandi S, Azizi F, Jamshidi H, Larijani B. HealthinIran. Iranian Journal of Endocrinology and Metabolism, martyr Beheshti University of Medical Sciences1998: 1097-1094.

[13] National Plan of Action ForNutorition. A multisectoral activity coordinated by the National Nutrition and food Technology Research Institute. Shahid Beheshti University of Medical Sciences and Health services. Health Ministry of Islamic Republic of Iran 1995: 38-42.

[14] Ghassmi H, Harrison G, Mohammad K.An accelerated nutrition in Iran. Public Health Nutro 2002; 5: 149-155.

[15] Aulikki N, Ximena B, Pekka P. Community-based noncommunicable disease interventions: Lessons From developed Countries for developing ones. Bulletin of the world Health organization 2001; 79: 963-70.

[16] Hu SP, Wu MY, Liu JF. Nutrition knowledge, attitute and practice among primary carephysiciansinTaiwan. J Am CollNutr 1997; 16(5): 439-42.

[17] Schaller C, James EL. The nutritional knowledge of Australian nurses. Nurse Edu Today 2005; 25(5): 405-12.

[18] 18- Warber JI, Warber JP, Simone KA. Assessment of general nutrition knowledge of nurse practitioners inNew England. J Am Dietetic Assoc 2000; 100(3): 368-70.

[19] Kiss C, et al. Prevalence of obesity in an elderly Hungarian population . Eur J Epidemiol 2003; 18:653-7.

[20] Sarvghadi F, Rambod M, Hosseinpanah F, Hedayati M, Tohidi M, Azizi F. Prevalence of obesity in subjects aged 50 years and over in Tehran. Iranian Journal of Endocrinology & Metabolism 2007; 9(1): 99-104.

[21] Sajjadi F, MohammadiFard N, Khosravi A, Bahonar A, Maghroon M, FathiM,et al. Nutritional knowledge attitude and practice of health professionals about cardiovascular diseases. (Results of Isfahan Healthy Heart Program). Journal of Birjand University of Medical Sciences 2008; 15(2): 65-72.

[22] Saffari M, Shojaeizadeh D, Heydania A, Pakpour A. Health Education & Promotion. Sobhan Press. Tehran.2009: 9 -38.

[23] Glanz K, Rimer BK, Lewis FM. Health Behavior and Health Education: Theory, Research, and Practice. 4th ed. San Francisco: Jossey-bass 2008; 408.

[24] Green LW, Kreuter MW. Health promotion planning: An educational and ecological approach 4thed. New York: McGraw-Hill 2005: 1-22.

[25] Charkazi A, Oruoji M A, Hazavehei M M. Investigating of Hydrogenated Vegetable Oils Consumption Based on Precede Model Among Families in Khomein and Mahallat. Journal of Gorgan University of Medical Sciences2012; 8(1): 67-73.

[26] Sun Wei Yue, Sangweni Beatrice, Chen Jiang, Cheung Smith. Effects of a community-based nutrition education program on the dietary behavior of Chinese-American college students. Health Promot. Int 1999; 14 (3): 241-250.

[27] Cuy Castellanos D, Downey L, Graham-Kresge S, Yadrick K, Zoellner J, Connell CL. Examining the diet of post-migrant Hispanic males using the precede-proceed model: predisposing, reinforcing, and enabling dietary factors. Nutr Educ Behav 2013; 45(2): 109-18.

[28] Jimba M, Murakami I. Eliminating iodine deficiency disorders in Nepal through PRECEDE- PROCEED. Nippon Koshu Eisei Zasshi 2001; 48(8): 822- 45.

[29] Cole RE, Horacek T. Applying PRECEDE-PROCEED to Develop an Intuitive Eating Nondieting Approach to Weight Management Pilot Program. J Nutr Educ Behav 2009; 41: 120-6.

[30] 30-Chiang LC, Huang JL, Lu CM. Educational diagnosis of self management behaviors of parents with asthmatic children by triangulation based on PRECEDE-PROCEED model in Taiwan. Patient Educ Couns. 2003; 49: 19-25.

[31] Jackson C. Behavioral science theory and principles for practice in health education. Health Education Research-1997; 12(1):143-50.

[32] Salehi L, Haidari F. Efficacy of PRECEDE Model in Promoting Nutritional Behaviors in a Rural Society. Iranian Journal of Epidemiology 2011; 6(4): 21-7.

[33] Kelishadi R, Sadry GH, Hashemi Pour M, Sarraf Zadegan N, Ansari R, AlikhassyH, et al. Lipid profile and fat intake of adolescents: Isfahan healthy heart program - Heart health promotion from children. Koomesh. Journal of Semnan University of Medical Sciences 2003; 43(4): 167-76.

[34] Azad Bakht L, Mirmiran P, Momenan AA, Azizi F. Knowledge, attitude and practice of guidance school and high school students indistrict-13 of Tehran about healthy diet Persian. Iranian Journal of Endocrinology And Metabolism (IJEM) 2004; 5(4): 409-416.

[35] Mozaffarian D, Abdollahi M, Campos H, Houshiarrad A, Willett WC. Consumption of trans fats and estimated effects on coronary heart disease in Iran. European Journal of Clinical Nutrition 2007; 61(8): 1004-10.

[36] Hunter JE. Dietary levels of trans-fatty acids: basis for health concerns and industry efforts to limit use. Nutrition Research 2005; 25(5): 499-513.

[37] Baylin A, Siles X, Donovan-Palmer A,Fernandez X, Campos H. Fatty acid composition of Costa Rican foods including trans fatty acid content. Journal of Food Composition and Analysis 2007; 20(3-4): 182-92.