CARDIOVASCULAR HEALTH EDUCATION OF FAMILIES: THE IMPORTANCE OF SCHOOL-BASED PREVENTION STRATEGIES

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Abstract

INTRODUCTION: Many people do not have sufficient knowledge about cardiovascular risk factors in Iran. We used a school-based educational intervention program to promote the health knowledge in all participating families.

METHODS: A total of 1100 fifth-grade school children and their parents were invited; 603 families were included in the study. The children attended a single session and were supplied with family information packages. Pre- and post-test questionnaires were completed by these families before and after the session.

RESULTS: There was a significant increase in the overall cardiovascular risk factor knowledge of families ($P<0.001$). The parents of boys achieved a greater level of health knowledge in comparison to the parents of girls ($P<0.005$).

CONCLUSIONS: This school-based educational intervention was effective in improving cardiovascular risk factor knowledge of families. Similar programs with more comprehensive methodology could be more effective in promoting healthy behaviors.

Keywords: Education, Cardiovascular Disease, Risk Factor, School-based Interventions.

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Introduction

The Middle East Crescent is on escalating trend of morbidity and mortality due to cardiovascular diseases (CVD), with economic growth and urbanization with subsequent lifestyle and behavioral changes playing critical roles. It is evident that prevention of risk factors is an effective strategy in primary prevention of CVD.[1] Unhealthy diet and physical inactivity contribute significantly to progression of CVD.[2] The goal of prevention programs is to reduce population exposure to environmental risk factors. Cardiovascular health promotion in families has the potential to reduce the risk of atherosclerosis in both pupils and their parents. Schools provide an appropriate setting to introduce comprehensive health education and promotion as a public health approach to the population. On the other hand, involvement of families in school-based programs is feasible and effective.[3,4]

Coronary Heart Disease (CHD) is the leading cause of death in Iran.[5] Currently, around 9% of GDP (gross domestic product) in Iran is spent on the management of CVD.[5] The relatively young Iranian population on the other hand, provides an opportunity for more effective prevention of CVD from childhood, since health-related behaviors usually take form in childhood and consolidate during adolescence.[6] Interventions carried out through school children have been shown to increase whole family awareness. We performed this study to investigate the effect of school-based education on improvement of cardiovascular health knowledge of targeted families.

Materials and methods

This interventional study was performed in 2004 in schools of the 6th municipal district of Tehran, Iran. The study sample consisted of ordinary households of 500 fifth-grade boys and 500 fifth-grade girls selected at random from primary schools within a single educational district of Tehran. A further 50 schoolboys and 50 schoolgirls were selected in the same manner to fill in as substitutes in case a household withheld consent.

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At the beginning of the study, all of the participants were put into the intervention group in contrast to previously approved proposal. The 1100 schoolchildren (1000 main + 100 substitute) underwent a one-day briefing session that clarified the outline, goals and methods of the study; 603 pupils agreed to attend this session. In the beginning, each pupil was given a consent form with the relevant explanation for their parent(s) or guardian(s). After the signed consent forms were returned by the children, the pre-test questionnaires were given to the children to obtain basic information on the households and to evaluate the relevant variables and to determine appropriate education materials. The reliability of the questionnaire was assessed with a pilot study of 30 randomly selected households in the same education district as the study. The children were considered as conduits of information and they were asked during the briefing session to engage every member of their household and interest them in the study and the educational material supplied. Then the children received the educational materials.

All of the children were also supplied with a trigger object (T-shirt) which they were told to wear for as much as possible of the survey time that they spent with at least one member of their household. All members of the families were encouraged by their fifth-grader to study the material individually or together in proper time and to concentrate whilst doing so. The study lasted 7 days from the date when the material was handed to each child. At the end of the 7-day period, each child received a post-test questionnaire, which sought the same information qualitatively, like the pre-test questionnaires. Children took the questionnaires home and asked the household to help complete it.

The questionnaires aimed to assess collective and not individual knowledge. The completed post-test questionnaires were returned to the same person who had received the pre-test questionnaires (e.g. the school principal). After the research team had received all the pre- and post-test questionnaires, the data were analyzed using SPSS, version 11. Differences before and after the intervention were investigated using paired-sample t-test and chi-square test. P values below 0.05 were considered as significant.

Results

A total of 1100 fifth graders were invited, of whom 603 (396 boys and 307 girls) agreed to participate in the study. There were 48 questions, each with one score, so the minimum and maximum scores were 1 and 47, respectively.

There was a significant improvement in cardiovascular knowledge scores of parents after intervention (P=0.001). The before and after intervention knowledge levels of parents are presented in Table 1. The distribution of correct answers about risk factors of coronary artery disease (CAD) is presented in Table 2.

There was a greater rise in the health knowledge scores of the families of the boys compared to families of the girls (P=0.004). In boys' families, the mean score of knowledge in pre-test was 33.9±6.9, which rose to 40±6.4 after the intervention.

TABLE 1. Knowledge levels in parents of boys and girls before and after intervention

Knowledge level	Before intervention				After intervention			
	boys		girls		boys		girls	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Low	4	%1	7	%23	3	% 0.8		
Moderate	139	% 35.3	115	% 37.5	42	% 10.9	54	%18.1
High	251	% 63.7	185	% 60.3	340	%88.3	245	% 81.9

TABLE 2. Distribution of correct answers about risk factors of CAD among families of studied pupils

Which of these are risk factors of cardiovascular diseases?	Boys		Girls	
	Post-test%	Pre-test %	Post-test%	Pre-test %
High cholesterol level	85.5	92.6	84.7	90.2
High blood pressure	88	93.7	86	91.5
Overweight and obesity	93.7	95.7	89.9	92.5
Cigarette smoking	94.2	95.2	94.8	95.8
Low physical activity	73.6	85.3	80	74.6
Alcohol drinking	70.6	88.8	80.1	83.4
Male gender	12.4	64	14.7	33.2
Old age	39.3	76.9	39.7	57.7
OCP consumption	13.7	66.2	17.3	46.9
Depression	60.4	82	59	71.7
Genetic factors	92.6	88	90.2	81

In girls' families the mean score in pretest was 33.2±7.8, which rose to 38.2±6.5 after the intervention.

The parents' level of education was primary school in 22 families, secondary school in 35, high school in 39, diploma in 370, and BS or higher in 208 families. The families' level of educational had no significant effect on the increase in their knowledge after the intervention (P=0.28). In addition, no difference was observed between the families with and those without university education (P=0.65).

In the families under study, the parent(s) had jobs in 303, and were unemployed in 373 families. There was no difference in the increase of cardiovascular knowledge levels between employed and unemployed parents (P=0.53).

The percentages of correct answers about the role of nutrition in CVD are presented in Table 3. Eighty-five percent of the families gave correct answers in the pre-test. This figure rose to 92.1 percent after the intervention.

In pre-test, %79.5 of the subjects agreed to the sentence: "Complete occlusion of an artery leads to damage to the part of the body which is supplied by that artery and may lead to heart attack and stroke."; the figure increased to %88.3 after intervention.

94.8 percent of the subjects believed that overweight and obesity were caused by overeating and low physical activity levels before intervention; after intervention this rate increased to %95.2. The knowledge levels of family participants about complications of overweight and obesity before and after intervention are presented in Table 6. In pre-test, %95.2 believed that regular diet and exercise are the best ways to control body weight. In the post-test this rate increased to 98.6 percent.

Discussion

Most of the behavioral risk factors have their roots in childhood.[7,8] The effects of these risk factors on progression of atherosclerosis in adults are cumulative; the greater the number of risk factors, the greater the risk of cardiovascular disease. Primary prevention through risk factor modification would be much more effective if the entire family, i.e. both children and their parents become involved in the program.[4,9]

School-based health education programs have been implemented in the United States for many years; while a few local projects have been documented and published in different European countries.[10-12] Most school-based health programs are not only targeted to children but also to all family members. There are several reports of school-based programs which aim to improve traditional lifestyle behaviors.[13-16]

In the present study, we attempted to gauge the increase in the knowledge of families about CVD via a school-based approach. To assess the effectiveness of intervention components, first we needed to increase health knowledge of families about high-fat foods and other classic CVD risk factors. We used family educational packages and trigger objects (T-shirts) to motivate the household members. Several studies have shown that family educational packages are efficient in promoting the knowledge of both children and their parents.[17]

TABLE 3. Distribution of correct answers about nutrition and its role in causing coronary artery disease (CAD) in families of studied children

Questions	Boys		Girls	
	Pre test (%)	Post test (%)	Pre test (%)	Post test (%)
Are fried foods risk factors for CAD?	85.8	93.1	87.9	91.5
Are high-fat foods risk factors for CAD?	95.7	94.9	94.5	94.5
Are salty foods risk factors for CAD?	93	93.7	92	93.2
Are sea foods risk factors for CAD?	84.3	92.4	89.3	90.2
Does meat consumption predispose a person to CAD?	73	84.3	71.7	82.7
Does chicken consumption predispose a person to CAD?	81.5	90.6	83.7	85.3
Does consumption of grains predispose a person to CAD?	68	86	67.4	81
Does consumption of cereals predispose a person to CAD?	69.3	86.5	69.1	83.1
Are sweets risk factors of CAD?	61.2	85.3	61.6	76.9
Are foods such as margarine, butter, mayonnaise and oil conducive to cardiovascular health?	75.6	85.5	69.4	80.5
Are olive oil, corn oil and soy oil conducive to cardiac health?	79.2	90.1	67.8	82.1
Are grains, cereals, bran and beans conducive to cardiovascular health?	70.6	87.8	68.1	80.1
Does the style of cooking affect cardiovascular health?	75.1	91.6	75.9	84

TABLE 4. Distribution of correct answers about the complications of overweight and obesity in families of studied children

Which of these risks are increased by overweight and obesity?	Girls		Boys	
	Pre-test %	Post-test%	Pre-test %	Post-test%
High blood pressure	83.5	92.6	81.1	87.9
High cholesterol level	79.2	89.8	80.5	86.6
Heart attack	91.9	93.4	91.9	91.9
Cerebrovascular attack	58.9	82.7	58	75.9
Diabetes	68.8	86.5	68.7	82.1

The Fleurbaix-Laventie-Ville-Sante Study showed that nutritional education through school children has the potential to influence the dietary habits of the whole family.[18] Given the results of our study, we also propose that a school-based approach be adopted to promote healthy lifestyle in the general population.

One of the limitations of our study was that we did not divide the children into the intervention and control groups in contrast to the approved proposal. The reason was that we needed a strong incentive for children to participate in the study in a limited period. As the trigger objects were only given to the intervention group, we were faced with some problems in assigning children to the control group.

The difference between the boys' and girls' families in respect of health knowledge gains is not similar to the results of previous studies.[19] This may be due to the Iranian culture in which families tend to pay greater attention to boys.

Parental level of education did not affect cardiovascular health knowledge is in contrast to similar studies, which have shown that some cardiovascular risk factors are seen more frequently in families with high level of education.[20] Our results suggest that in Iran, health education programs are successful in all families regardless of the difference between levels of education and cultural background.

In contrast to other studies showing that cardiovascular risk factors are more common in families with moderate rather than high income in developing countries, there was no correlation between socioeconomic status and cardiovascular diseases in our study.[21,22]

Our results also showed that all those involved in educational programs could draw some benefit regardless of their academic level and occupational status.

This school-based educational intervention program was effective in improving knowledge of cardiovascular risk factors in both the children and their families. However the long-term effects remain to be evaluated. Further studies are warranted to assess the impact of such a program on cardiovascular health attitudes and behaviors.

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References

1. Zipes, Libby, Bonow, Braunwald. Braunwald's Heart Disease: a textbook of cardiovascular medicine. Philadelphia, Elsevier Saunders, 2005.
2. Norton DE et al. Parental influence on models of primary prevention of cardiovascular disease in children. Eur j cardiovas nurs 2003; 2(4): 311-22.
3. Nabipour I et al. A school-based intervention to teach 3-4 grades children about healthy heart; the Persian Gulf Healthy Heart Project. Ind J Med Sci 2004; 58(7): 289-96.
4. Porebrahim R, Fakhrzadeh H, Bandarian F, et al. Household cardiovascular screening of high-risk families : a school-based approach. Eur j cardiovas prev rehab 2006; 13: 229-235.
5. Naghavi M. The feature of death in Iran in 2001 [in Farsi]. Department of health, Iran Ministry of Health; July 2003.
6. Oliviera SA, Ellison RC, Moore LL, et al. Parent-child relationships in nutrient intake: The Framingham Children's study. Am J Clin Nutr 1992; 56: 593-598.
7. Ashington RL. The origion of atherosclerosis and hypertension in childhood. Cardiology in review 1993; 1: 263-70.
8. Kaplan NM, Stamler J. Prevention of coronary heart disease. Philadelphia, Saunders, 1983.
9. National Cholesterol Education Program, Expert Panel on Blood Cholesterol Levels in Children and Adolescents. Bethesda, U. S, National Institutes of Health, 1991.
10. Reginald L. Washington. Intervention to reduce cardiovascular risk factors in children and adolescents. Am family phys1999; 1: 1-11.
11. Davis K, Kristoffel KK. Obesity in preschool and school age children: treatment early and often may be best. Arch Pediatr Adolesc Med 1994; 148: 1257-1261.
12. Resnicow K. School based obesity prevention. population versus high risk intervention. Ann NY Acad Sci 1993; 699: 154-166.

13. Figueroa-Colon R, et al. Feasibility of a clinic based hypocaloric dietary intervention implemented in a school setting for obese children. Obesity Research, 1996; 4: 419-29.
14. Angelico F, et al. Management of childhood obesity through a school-based program of general health and nutrition education. Public Health 1991; 105: 393-8.
15. Muhlemann R, et al. Gesundheitserzeihung als ein neuer schularztlicher Schwerpunkt. Soz Praventivme 1983; 28: 28-32.
16. Woringer V et al. Equilibre nutritionnel du petit-dejeuner d'enfants de 7 a 11 ans: comparaison entre une action de sante a l'ecole et l'alimention au domicile. Soz Praventivmed 1998; 43: 59-66.
17. Nicolette I Teufel, et al. Pathway family intervention for third -grade American Indian children. American journal of clinical nutrition 1999; 69: 803S-9S.
18. Basdevant A, Boute D, Borys J M. Who should be educated? Education strategies: could children educate their parents? Int J Obes 1999; 23(4): S10-S14.
19. Peter Schwandt et al. The Prevention Education Program (PEP). A prospective study of efficacy of family-oriented life style modification in the reduction of cardiovascular risk and disease: design and baseline data. J clin epidem 1999; 52(8): 791-800.
20. Rodolfo Giuglano et al. Factors associated with obesity in children. Journal de pediatria 2004; 80(1): 17-22.
21. Kelishadi R et al. Obesity and associated modifiable environmental factors in Iranian adolescents: Isfahan healthy heart program-Heart health promotion from childhood. Pediatrics International 2003; 45: 435-42.
22. Yannis Manios et al. Cardiovascular disease risk factors among children of different socioeconomic status in Istanbul, Turkey: Direction for public health and nutrition policy. Lipid in health and disease 2004; 3: 1-7.