



Effectiveness of School-Based Education Programs on Health Risk Behaviors in Adolescents: South-East of Iran

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Received 2017 September 21; Revised 2017 December 11; Accepted 2018 January 23.

Abstract

Background: Improving and providing community health is one of the main pillars of community development.

Objectives: The present study aimed at investigating the effect of school-based interventions on health-risk behaviors among adolescents in the South-East of Iran.

Methods: This interventional quasi-experimental study recruited a total of 420 adolescent females in the 10th grade of public schools, selected by the census in Zahedan, Iran. The study tool was a questionnaire of high-risk health behaviors with a Content Validity Ratio (CVR) of 0.80, a Content Validity Index (CVI) of 0.88, and reliability (α) of 0.70. After the pre-test, multidimensional interventions (individual education, group education, individual counseling, modern education, and parents' educational packages) were provided for the intervention group from October 2015 to June 2016. After a three-month interval, the post-test was conducted during October 2016.

Results: The mean score changes in interventional and control group were -0.7 (2.3) and 0.1 (2.7) for high-risk behaviors; 0.8 (5.5) and -0.4 (5.2) for healthy nutritional behaviors, and physical activity behaviors with 1.4 (4.5) and 0.3 (5.1). Also, there was a positive significant relationship between score changes of high-risk behaviors ($P < 0.001$), healthy nutritional behaviors, and physical activity ($P < 0.05$) of students with study group (interventional and control) in univariate linear regression, yet in the multivariate linear model, only high-risk behaviors remained ($P < 0.001$). Furthermore, after the intervention, three simultaneous behaviors decreased among the students in the intervention group by 8.4% compared to 1.6% in the control group. The individual consultations among adolescents, who smoked cigarettes or hookahs, drank alcohol, abused drugs or had unprotected sex resulted in high-risk behaviors.

Conclusions: To sum up, school-based interventions can improve health behaviors if they target multiple environmental and behavioral dimensions with a complementary strategy in the target society. Therefore, it is recommended for interventions to be designed and tailored to the needs of students and employed continuously to maintain the effect of education.

Keywords: Adolescent, Behavior, Complementary, Education, Health Risk, Intervention, School Health Services

1. Background

Adolescence, a complex, challenging, and multidimensional period in the process of growth and development is accompanied by rapid, dramatic physical, psychological, cognitive, and social changes. These changes significantly impact health-related behaviors (1). During the early years of adolescence, people experience biological, cognitive, social, and emotional changes that influence their behavioral choices (2). In fact, adolescence is a critical period of growth, during which adolescents are at risk of doing a lot of health-threatening behaviors (3, 4). This, in turn,

may lead to an increased risk of chronic diseases and early death during adulthood (5, 6).

Currently, half of the world's population is under the age of 25 years old (7). Evidence indicates that lifestyle and unhealthy behaviors comprise 53% of the causes of death. Similarly, 51% of Iranian teenagers also have inappropriate healthy behaviors (8). A study by Tavaffian and Molaei demonstrated unfavorable health-promoting behaviors, and a consistently sedentary lifestyle amongst students as well (9). On the other hand, consultations and health-promoting behaviors of adolescents can improve

various aspects of their health, including mental and physical health (10-12).

Accordingly, schools, as one of the most important human societies, along with families, play a key role in preventing adolescents' behavioral problems and improving their social skills, even beyond the school environment (12, 13). The impact of school health interventions within schools in different countries has been shown on reduction and prevention of smoking, drinking, drug abuse, weight control, and sexually transmitted diseases, as well as promoting cognitive and behavioral awareness and perception, and development of a healthy lifestyle in adolescents of certain countries, including Iran (14-19). In summary, it seems that interventions, including providing information, counseling, promoting motivation, and behavior change skills, could have significant effects on the behavioral outcomes of the subjects (20-24).

2. Objectives

Hence, this study aimed at reducing high-risk behaviors in high school adolescent females in the South-East of Iran through school-based short-term interventions.

3. Methods

3.1. Study Setting

Sistan and Baluchestan is one of the largest provinces of Iran with an area of 180000 km², bordering Khorasan province from the North, Kerman and Hormozgan provinces from the West, Afghanistan and Pakistan from the East, and Oman Sea from the South. Zahedan is the capital of this province with a hot and dry climate and a population of about 700,000 (51% male). Based on these statistics, a total of 63727 individuals (32597 males and 31130 females) are adolescents (15 to 19). From an ethnic point of view, its inhabitants are largely Baluch and Sistani.

3.2. Study Design

This interventional quasi-experimental study purposefully included four public high schools, which were similar in terms of social, economic, and environmental factors, from amongst public girl high schools of Zahedan, Iran. Accordingly, selected schools were divided into experimental (n=2) and control groups (n=2). Using the census method, 457 tenth-grade students (329 in the experimental and 128 in the control groups) were initially included in the study. Based on the early results of the study and the below formula, in each group, the sample size of 90 to 171 individuals (total of 342 students) was estimated.

$$N = \frac{\left(Z_{1-\frac{\alpha}{2}} + Z_{1-\beta} \right)^2 (s_1^2 + s_2^2)}{(\bar{x}_1 - \bar{x}_2)} \quad (1)$$

$$\alpha = 0.05, \beta = 0.05$$

All 10th-grade students, attending school, were enrolled in the study, and only students, who moved from these schools or had long absences from school were excluded from the post-test phase. Using this, a total of 420 students (300 in the experimental and 120 in the control group) participated in the study at the end.

3.3. Instrument

The study tool was a questionnaire, designed based on Youth Risk Behavior Surveillance (YRBS), 2015 (25). The YRBS yields valid and reliable scores that measure adolescent risk behaviors. First, the original questionnaire was translated to Persian, and again the translation was back-translated to English. The items of the final questionnaire were modified in accordance with the conditions and culture of Iran.

The final questionnaire had a Content Validity Ratio (CVR) of 0.80, a Content Validity Index (CVI) of 0.88, and reliability (α) of 0.70. It contained 80 items, including demographic data (11 items), family relationships (eight items), safety behaviors (two items), violent behaviors (seven items), bullying and harassment (two items), smoking and tobacco use (eight items), alcohol consumption (two items), drug abuse (four items), relationship with the opposite sex (three items), weight loss (three items), healthy nutrition (14 items), physical activity (10 items), and health issues (six items). It was completed by the students.

The answers to multi-choice items and the scores of responses were calculated. Among them, 14 questions were directly related to high-risk behaviors of their students, with a total score of 78, for which higher scores meant higher risk behaviors; 16 questions were related to healthy nutrition behaviors with a total score of 64, for which a higher score meant a healthier nutritional behavior; and seven items were related to physical activity behavior with a total score of 47, for which a higher score meant a more desirable physical activity behavior.

3.4. Ethical Consideration

The subjects were recruited with respect to the ethical codes, approved by the Ethics Committee of Zahedan University of Medical Sciences (17.10.2015 and approval code IR.ZAUMS.REC.1394.251, including informed consent of the students and their parents). The aims and scope of the study were explained to all participants. A code was assigned to each subject for the confidentiality of the information. In addition, participants were guaranteed that

the findings of the study would be reported and published anonymously.

In the first step, a pre-test was held. After analyzing the primary results, the program of educational interventions, strategies, and timing of interventions was designed and arranged by a team of researchers, school principals, health workers at schools, health educators, physical educators, and counselors, based on the students' needs and problems.

3.5. Intervention

Educational interventions in the intervention group included:

(1) A health website, with a content (educational materials on cigarettes, alcohol, drugs, violence, safety, relationships with the opposite sex, nutrition, physical activity, oral care, etc., as well as health games, health education videos, project plans and illustrations, and educational slides) updated with the approval of various field experts during the study period.

(2) Distribution of educational packages for parents, including four booklets about healthy nutrition at home, prevention of high-risk behaviors, communication between parents and adolescents, and physical activity at home.

(3) Installing posters at schools, including a poster of eight approaches for having a healthy life, best health habits, facts about achieving behavioral change goals, and stress management strategies.

(4) Holding two-hour workshops by specialized instructors in each field, including healthy nutrition and food substitutes, physical activity and fitness, high-risk behaviors, relationships with the opposite sex, communication with parents and others, and oral and dental health. In order to encourage and motivate attendance at events, some incentive gifts (pens, notepads, and glasses) and healthy food (cheese sandwich, fresh fruits, and nuts) were provided at each workshop.

(5) Four individual counseling sessions were conducted for students, who smoked cigarettes or hookahs, drank alcohol, abused drugs or had unprotected sex.

Interventions were implemented during one Iranian school year in the intervention schools. In addition, a health record was issued and delivered about the student's participation in the intervention group to inform the parents about their child's conditions and problems. After a three-month interval (summer holidays), the post-test was performed at the beginning of the next school year in both groups.

3.6. Statistical Analysis

Data were analyzed by the SPSS Statistics for Windows, version 15.0 (SPSS Inc., Chicago, Ill, USA). Central and distribution indices were used to describe the quantitative data; frequency distribution was used to describe the qualitative data, and Linear Regression was used for data analysis. Normality test was checked, the variables of which had a normal distribution.

4. Results

The study was carried out on 420 tenth grade students. Half of their fathers were employees, mothers were housewives, and had high school diploma. According to the results of Table 1, the majority of students in both groups had a one to three birth order and described their social-economic status as modest to good.

Table 1. Demographic Characteristics of the Subjects in the Intervention and Control Groups^a

Variable	Intervention Group	Control Group
Participants	300 (71.4)	120 (28.6)
Age, mean \pm SD	15.4 \pm 0.5	15.8 \pm 0.6
Birth order		
1-3	244 (81.6)	99 (82.5)
4-7	51 (17.1)	20 (16.7)
\geq 8	4 (1.3)	1 (0.8)
Economic conditions of the family		
Poor	18 (6.0)	16 (13.3)
Fair	131 (43.7)	49 (40.8)
Good	136 (45.3)	49 (40.8)
Excellent	15 (5.0)	6 (5.1)
Family behavior		
Fun and gambling	8 (2.7)	13 (10.8)
Cigarette	10 (3.3)	5 (4.2)
Drug abuse	5 (1.7)	7 (1.7)
None	277 (92.3)	100 (83.3)
Get pocket money		
Yes	250 (83.3)	96 (80.0)
No	50 (16.7)	24 (20.0)

^aValues are expressed as frequency (%) unless otherwise indicated.

The mean of score changes in interventional and control group were -0.7 (2.3) and 0.1 (2.7) for high-risk behaviors, 0.8 (5.5) and -0.4 (5.2) for healthy nutritional behaviors, and 1.4 (4.5) and 0.3 (5.1) for physical activity behaviors (Table 2).

Table 2. The Mean and Standard Deviation of High-Risk Behaviors of Health, Healthy Nutritional Behaviors, and Physical Activity of Students in the Control and Intervention Groups^a

Variable (Score Range)/Group	Time		
	Pre-Test	Post-Test	Score Changes
High-risk behaviors (14 - 78)			
Intervention	17.5 ± 2.4	16.7 ± 1.9	-0.7 ± 2.3
Control	18.6 ± 3.2	18.7 ± 3.3	0.1 ± 2.7
Healthy nutritional behaviors (16 - 64)			
Intervention	44.5 ± 5.6	45.3 ± 5.2	0.8 ± 5.5
Control	42.0 ± 6.5	41.2 ± 7.7	-0.4 ± 5.2
Physical activity behavior (7 - 47)			
Intervention	21.6 ± 4.1	23.1 ± 4.1	1.4 ± 4.5
Control	19.1 ± 5.2	19.3 ± 5.2	0.3 ± 5.1

^aValues are expressed a mean ± SD.

The results (Table 3) showed a positive significant relationship between score changes of high-risk behaviors ($P < 0.001$), healthy nutritional behaviors, and physical activity ($P < 0.05$) of students in the study group in univariate linear regression, yet in a multivariate linear model, only high-risk behaviors remained ($P < 0.001$).

After the intervention, three simultaneous behaviors decreased among the students in the intervention group by 8.4% and in the control group by 1.6% (Table 4).

Among the students with high-risk behaviors, after receiving individual counseling, one managed to quit alcohol, and one managed to quit smoking, two changed their sexual relationship to only physical relationship, and one changed from unprotected sex to protected sex. One person reduced the use of hookah from every day to less than six days a month. Students with weight gain or weight loss were placed in the intervention group for weight control. Finally, weight loss in the intervention group decreased by 0.6% yet weight gain and obesity increased by 3.3% and 1.4%, respectively.

5. Discussion

Community-based health education programs have a key role in achieving objective health goals. In these programs, people can work together to improve individual health and create more healthy communities (26). On the other hand, the choice of appropriate instructional methods has an obviously important role in learning and willingness to change health behaviors (27). For example, numerous studies indicated that educational packages increased the awareness and self-management skills of the family of children, who were involved with health problems (28, 29). Moreover, the results of a number of stud-

ies emphasize on direct (individual) educational methods and some on indirect (group) educational methods. According to this evidence, individual education and counseling were positive and had a great impact on the behavior of individuals, who were subject to acute or chronic conditions (26).

Generally speaking, education can leave a positive impact on knowledge, attitude, and performance of individuals. The use of tools in education is crucial, and tools can facilitate the learning process by focusing on promoting health and empowering the community (29). In line with previous results, the education provided in this study was effective in the intervention group.

The effectiveness of obesity prevention interventions, promotion of healthy nutrition and physical activity in adolescents have been reported by various studies (30-32). A systematic study of school-based nutritional interventions showed that an intervention of six weeks to one month, and interventions presented individually, and within groups had a greater impact on the students' healthy nutritional behaviors. Active parental involvement in intervention programs led to the better achievement of goals and greater effect on students. It was also concluded that the design of interventions tailored to the needs of students and the provision of healthy food at schools are considered as encouraging factors (33). Educating parents and implementing behavioral models are also suggested for weight gain in some reports (34). In general, various studies indicated the impact of school-based multidimensional interventions on students' nutritional behavior and body mass (35-37).

In line with the results of other studies, interventions were effective on changing physical activity behaviors and the adoption of healthy nutrition behaviors in the present

Table 3. Linear Regression for Score Change in High-Risk Behaviors, Healthy Nutritional Behaviors and Physical Activity of Students in the Interventional and Control Group

Variables	Univariate				Multivariate					
	Unstandardized Coefficients		Standardized Coefficients	t	P Value	Unstandardized Coefficients		Standardized Coefficients	t	P Value
	B	Std. Error				B	Std. Error			
High-risk behaviors	0.029	0.009	0.158	3.278	0.001	0.028	0.009	0.154	3.207	0.001
Healthy nutritional behaviors	0.009	0.004	0.104	2.143	0.033	0.006	0.004	0.078	1.592	0.112
Physical activity behavior	0.010	0.005	0.106	2.172	0.030	0.008	0.005	0.089	1.820	0.069

Table 4. Frequency Distribution of Simultaneous Health-Risk Behaviors of Students in the Intervention and Control Groups

Number	Intervention Group		Control Group	
	Pre-Test	Post-Test	Pre-Test	Post-Test
No high-risk behaviors ^a	6 (2.0)	6 (2.0)	-	2 (1.7)
One behavior	35 (11.7)	63 (21.0)	13 (10.8)	13 (10.8)
Two simultaneous behaviors	117 (39.0)	128 (42.7)	33 (27.5)	36 (30.0)
Three simultaneous behaviors	97 (32.3)	83 (27.7)	29 (24.2)	26 (21.7)
Four simultaneous behaviors	42 (14.0)	19 (6.3)	33 (27.5)	31 (25.8)
Five simultaneous behaviors	2 (0.7)	1 (0.3)	10 (8.3)	10 (8.3)
Six simultaneous behavior	-	-	1 (0.8)	2 (1.7)
Seven simultaneous behavior	1 (0.3)	-	1 (0.8)	-

^aRisky behaviors include: (1) smoking at least once during the last month, (2) drinking alcohol once during the past year, (3) drug abuse once or more during the past year, (4) having sex, (5) physical fights inside or outside school once or more during the past year, (6) planning for suicide during the past year, (7) rarely using seatbelt as a passenger or never during the past year, (8) participation in physical activity or stretching exercises less than three days during the past week, (9) not consuming fruits and vegetables during the last week, and (10) reported overweight by the subject.

study, such that there was a significant difference between the mean scores of the groups. The changes in nutrition and physical activity scores in the intervention group were 0.8 points and 1.4 points, respectively; and in the control group, the physical activity score improved by 0.3 points, yet the healthy nutrition score decreased by 0.4 points. In terms of maintaining a balanced weight in the intervention group, after education and receiving a nutrition program from a nutrition counselor, reduced weight loss and balanced weight increased by 7.3%, yet weight gain and obesity increased by 4.7%. Among the reasons for failure in the weight loss program can be the lack of parents' cooperation in changing the diet and lack of environmental changes in the school canteen.

Chapman et al. defined school as a protective factor against high-risk behaviors beyond the school environment (13). In this regard, the meta-analysis of studies with school-based violence prevention programs indicated a significant decrease in violent behaviors of the intervention group compared to the control group. It was also suggested that interventions should be designed to improve communication and social skills (38).

A systematic study of school-based research on bullying prevention also showed that in most studies, bullying

decreased up to 45%. Meanwhile, the results of a number of studies indicated that interventions did not reduce bullying and the programs had no effects on crime (39). Family-centered studies targeted at interventions on adolescent drug users with high-risk sexual behaviors reported a significant decrease in drug abuse among adolescents after 12 months of intervention (40).

In the present study, students' high-risk behaviors in the intervention group decreased by 0.7 points yet increased by 0.1 points in the control group. Also, after the interventions, students, who had more than three high-risk behaviors had a mean decrease of 7.8% in the intervention group and only 0.8% decrease in the control group.

The results of the meta-analysis study of school-based interventions for sex education and AIDS prevention in low and middle-income countries showed that interventions had a significant impact. The odds ratio of using a condom increased by 1.34 times, the odds ratio of having sex with fewer sexual partners increased by 0.75 times, and having a fewer number of sexual relationships during the intervention increased by 0.66 (41). In the present study, after providing individual counseling to students with the experience of sex, changing of sexual relationship to a physical relationship, and unprotected sex to protected sex oc-

curred.

Generally, the results indicated the effect of educational interventions and improvement of health behaviors among students. However, in spite of short-term improvements in adolescents, attitude and performance changes will not last if the educational programs do not continue. Since health promotion programs for young people are the most cost-effective programs, continuing them is essential.

5.1. The Innovation of the Current Study

Previous studies have focused on one health dimension. However, the present study was conducted with an emphasis on preliminary prevention and implementation of a combination of interventions and the capacity for health promotion through the use of various educational methods and the presentation of the comprehensive curriculum with minor variations of usability and application in other schools.

5.2. Weak and Strong Points of the Study

Time management: Strong: Plans and adequate time to complete assignments and study. Weak: Restrictions on making sustainable behavioral changes in students in this limited time.

Collaboration: Strong: Good cooperation of the education organization, directors, teachers and students. Weak: Poor parenting follow-up.

Potential bias: Missing value; only 8% of the participants were excluded from the study, which, after assessing these individuals, did not differ significantly from other participants in the study based on demographic information, a score of high-risk behaviors, physical activity, and nutrition.

Acknowledgments

This article was part of a Ph.D. thesis with the code: 2772 from Zahedan University of Medical Science. The authors would like to express their gratitude to the Zahedan University of Medical Sciences, the Health Promotion Research Center, the District Department of Education and the school heads, teachers, and students, who helped conduct this study.

Footnotes

Conflict of Interests: It not declared by the authors.

Funding/Support: It not declared by the authors.

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