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The effect of educational intervention based on the self-efficacy theory of high school students in adopting preventive behaviors of COVID-19

Zahra Rezaie, Vahid Kohpeima Jahromi, Vahid Rahmanian, Nader Sharifi¹

Abstract:

BACKGROUND: The COVID-19 pandemic has become a major problem for education systems. This study was conducted to investigate the effect of educational intervention based on the self-efficacy theory of high-school students in adopting preventive behaviors of COVID-19.

MATERIAL AND METHODS: This quasi-experimental study was performed on Hazrat Zahra and Shahed high-school students in Jahrom (southern Iran) in 2021. In total, 160 students (80 each in the intervention group and the control group) were selected by multistage random sampling. Data collection tools included a demographic information questionnaire and self-efficacy in adopting preventive behaviors from COVID-19 researcher-made questionnaire. Questionnaires were completed by all participants before and 3 months after the educational intervention. The educational intervention was performed for 6 weeks by using an educational program based on Bandura self-efficacy theory. The intervention was performed during 12 sessions of face-to-face training in the classroom (two 1-h sessions per week), distributing educational packages and sending educational videos through cyberspace. Data were analyzed using Chi-square test, independent *t* test, paired *t* test, and linear regression.

RESULTS: After the educational intervention, a significant difference was observed in the intervention group before and after the educational intervention ($P = 0.018$) and between the intervention and the control groups ($P = 0.001$) in the self-efficacy in adopting preventive behaviors from COVID-19 score. Also, the average self-efficacy score of students increased with an increase in parental education level and a history of COVID-19 in family members.

CONCLUSION: Educational intervention based on self-efficacy theory was shown as an effective method to improve students' self-efficacy in adopting preventive behaviors from COVID-19.

Keywords:

Behavior, COVID-19, education, self-efficacy, students

Research Center for
Social Determinants of
Health, Jahrom University
of Medical Sciences,
Jahrom, Iran, ¹Department
of Public Health, Khomein
University of Medical
Sciences, Khomein, Iran

Address for correspondence:

Dr. Nader Sharifi,
Department of Public
Health, Khomein
University of Medical
Sciences, Postal code/
P.O.Box: 38817-43364,
Khomein, Iran.
E-mail: nadersharifi81@
yahoo.com

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Background

The latest threat to world health is the COVID-19 pandemic.^[1,2] This pandemic has become a major problem for education systems.^[3] As a result of the pandemic, more than 1.9 billion students from 190 countries were forced to use virtual education instead of face-to-face schooling.^[4] In addition to educational problems and potential

inequalities due to distance learning practices, school closures can disrupt students' social interaction, mental health, and physical activity.^[5,6] The importance of face-to-face education in schools is very clear.^[7] According to Pattison's study, the physical challenges of reopening schools cause school staff to not pay enough attention to the effects of COVID-19 on students' health.^[8] Promoting school health and maintaining the health of students and

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teachers is essential for reopening schools.^[9] One study found that high-school students had poor knowledge and preventive behavior about COVID-19.^[10]

Theoretical frameworks should be used to make behavior change interventions effective.^[11] Fathian-Dastgerdi's study identified self-efficacy as the strongest predictor in explaining preventive behaviors of COVID-19 in adolescents.^[12] Self-efficacy is a central construct in many theories of health behavior and refers to an individual's perceived ability to do a task.^[13-16] According to Bandura, self-efficacy can be improved through four principles: mastery experiences (gaining experience by the individual by facing a new challenge and succeeding in it); social role models (modeling by one person by observing the successful performance of a task by similar people); social persuasion (convincing one to have the skills and abilities to succeed through encouragement); and emotional and physiological states (improve individual self-efficacy by learning how to manage anxiety when experiencing challenging situations).^[17-19]

With the gradual reopening of schools, we should identify ways to ensure the health of students, school parents, their families, and the community. Adopting correct behaviors and following health protocols by students will be very effective in achieving this goal. So far, most interventions have focused on improving people's knowledge and motivation to adopt preventive behaviors; thus, there is a need to improve adolescents' perception of their ability to take action, leading to success in adopting preventive behaviors from COVID-19. Therefore, this study was conducted to investigate the effect of educational intervention based on the self-efficacy theory of high school students in adopting preventive behaviors of COVID-19.

Material and Methods

Study design and setting

This quasi-experimental study was performed on high-school students in Jahrom (southern Iran) in 2021.

Study participants and sampling

A total of 160 students (80 each in the intervention group and control group) were considered for the sample according to Tavafi *et al.*,^[20] power 90%, type I error (α) 5%, effect size 0.554, and considering the 15% probability of samples falling. From all high schools in Jahrom, two girls' high schools, Hazrat Zahra and Shahed, were selected by lottery random sampling. Then, Hazrat Zahra High School was randomly selected for the intervention group and Shahed High School was selected for the control group. Four classes were randomly selected from each high school to reach a sample size (at least 80 students). The inclusion criteria were high-school

students who are in school for at least the next two semesters, and the exclusion criteria included not completing a written consent form and not attending regular training courses in the intervention group.

Data collection tool and technique

Data collection tools included demographic information questionnaire (age, field of study, degree, family economic status, father's education, mother's education, place of residence, history of personal or family infection with COVID-19, and vaccination status of COVID-19) and self-efficacy in adopting preventive behaviors from COVID-19 questionnaire. This researcher-made questionnaire has been designed based on a careful study of scientific texts and related questionnaires. To design the questionnaire, an extensive search was performed using the keywords "COVID-19 prevention," "COVID-19 prevention behavior," and "self-efficacy." Seven articles were selected from 30 articles published between 2010 and 2021. Various aspects of individual behaviors affecting the prevention of COVID-19 were extracted from the articles, and the questions were designed based on the theory of self-efficacy. Then, the necessary changes were made in writing and arranging the questions and appropriate scoring. To improve the face validity of the questionnaire, by taking into account the opinions of experts, the necessary corrections were made and the questions were designed based on rationality and appropriateness to the characteristics of the respondents and were placed in the questionnaire in an appropriate order. Then, the questionnaire was evaluated by 10 experts in related fields, and the content validity ratio (CVR) and content validity index (CVI) were calculated. The calculated ratios for each item were compared with the table numbers provided by Lawsche, and CVR values above 0.62 were confirmed. Moreover, items with CVI values greater than 0.70 were approved for retention in the questionnaire. To assess the reliability, the questionnaire was randomly completed by 20 high-school students in Jahrom. Sample participants in this phase of the study did not participate in the next phases. The collected data were analyzed using SPSS21, and Cronbach's alpha value of the questionnaire was calculated to be 0.73. Considering that Cronbach's alpha value above 0.7 is acceptable as internal consistency, the reliability of the questionnaire was confirmed.

Participants were reassured about the confidentiality of information and the optionality of participating in the study, and they completed a written consent form. Demographic information and self-efficacy in adopting preventive behaviors from COVID-19 questionnaires were completed by the intervention and control groups.

Educational Intervention Program

The educational intervention was performed for 6 weeks by using an educational program based on Bandura

self-efficacy theory. The intervention was performed during 12 sessions of face-to-face training in the classroom (two 1-h sessions per week) by distributing educational packages and sending educational videos through the Internet [Table 1].

Ethical consideration

Participants were briefed on the objectives of the research and assured that their information would be confidential. Then, the written consent form was completed by all participants. At the end of this study, an educational

Table 1: The educational program for the intervention group

Sessions	Objectives and Strategies	Educational content and methods
First-week sessions (Two 1-h sessions)	Increase students' knowledge of COVID-19 and its prevention strategies	<p>Topics:</p> <p>Information on how to create and spread COVID-19</p> <p>The prevalence of the disease in the community, its complications and mortality rate</p> <p>Familiarity with COVID-19 prevention strategies and the use of video to objectively demonstrate the stages of virus transmission, its effect on the body and the effectiveness of prevention methods</p> <p>Training method: lectures, questions and answers, and playing video</p>
Second-week sessions (Two 1-h sessions)	Increase the perceived susceptibility and severity of COVID-19 and to create a sense of ability in the individual to cope with the disease. Strategies used to improve self-efficacy included mastery experiences and social persuasion.	<p>Topics:</p> <p>First, information was provided about the severity of the disease, its complications, the degree of disability and its mortality; Moreover, the risk of infection at different ages and in places such as schools and the possibility of transmission to family members were also discussed.</p> <p>Then, materials were presented with the aim of creating positive thinking in students about being able to maintain their health against COVID-19, and practice to acquire skills was introduced as a way to achieve it.</p> <p>Students were asked to share their experiences and skills in preventing the disease and were encouraged and praised by the health educator and school parents.</p> <p>Training method: lectures, expressing students' experiences, playing video and pamphlet distribution</p>
Third-week sessions (Two 1-h sessions)	Improving students' perception of their ability to adopt COVID-19 preventive social behaviors. Strategies used in these sessions included social role models and emotional and physiological states	<p>Topics:</p> <p>At the beginning of the session, a film of social models adopting the right behaviors was shown.</p> <p>Then, the lecture was given on improving self-efficacy to adopt social behaviors that help prevent the spread of the disease.</p> <p>Role-playing was performed by students to practice and learn how to manage anxiety and stress while experiencing challenging situations when adopting healthy behaviors.</p> <p>Training method: Lectures, role-playing by students, and playing video</p>
Fourth-week sessions (Two 1-h sessions)	Increasing students' perceived behavioral control in preventing COVID-19 and teaching prevention behaviors. Strategies used included mastery experiences and social role models	<p>Topics:</p> <p>Success experiences of similar people were conducted to improve students' belief in the ability to master similar activities for success (by playing videos and lectures by school teachers).</p> <p>After practical training in COVID-19 prevention behaviors, students were encouraged to practice and acquire skills in this field.</p> <p>Training method: Lectures, practical demonstration, and playing video</p>
Fifth-week sessions (Two 1-h sessions)	Recognizing social misconceptions about COVID-19 preventive behaviors and gaining skills. Strategies used included mastery experiences, social persuasion, and emotional and physiological states.	<p>Topics:</p> <p>Students were introduced to misconceptions and social pressures about adopting COVID-19 preventive behaviors.</p> <p>Then, they practiced how to deal with these pressures and perform healthy behaviors with the least stress. Acquisition of correct and effective skills was encouraged.</p> <p>Training method: Lectures, questions and answers, playing video, and role-playing</p>
Sixth-week sessions (Two 1-h sessions)	Remind and strengthen previous training to improve self-efficacy in adopting COVID-19 preventive behaviors. Intervention strategies included mastery experiences, social role models, social persuasion, and emotional and physiological states.	<p>Topics:</p> <p>The types of COVID-19 preventive behaviors and their importance were reminded. Students were encouraged to practice more skills.</p> <p>Successful experiences were encouraged and supported. Reminders of similar social models were used to enhance self-efficacy.</p> <p>Ways to deal with the problems and difficulties of performing healthy behaviors were discussed.</p> <p>Training method: Group discussion, playing video, and pamphlet distribution</p>

package to improve self-efficacy in adopting COVID-19 preventive behaviors was provided to the controls. This research was approved by the Research Ethics Committees of Jahrom University of Medical Sciences with code IR.JUMS.REC.1400.046.

Three months after the educational intervention, the questionnaires were completed by intervention and control groups. Data were entered into SPSS 17.0. (SPSS Inc., Chicago, IL, USA), and the normality of data was initially investigated using the Kolmogorov–Smirnov test. Data were then analyzed using Chi-square, independent *t* test, and paired *t* test. Also, linear regression (ENTER method) was used to investigate the relationship between variables studied with self-efficacy scores. The significant level for all tests was less than 0.05.

Results

The mean age of students in the intervention and control groups was 13.84 ± 1.10 and $13.50 + 1.06$, respectively ($P = 0.051$). All subjects in the control group and 68 (85%) of the intervention group had received at least one dose of the COVID-19 vaccine ($P = 0.001$). On the contrary, the variables of the parents' education, area of residence, self-assessment of the economic situation,

and history of COVID-19 in students and their families were not significantly different in the intervention and control groups ($P > 0.05$) [Table 2].

Before the educational intervention, there was no significant difference between the self-efficacy in adopting preventive behaviors from the COVID-19 score in the intervention and the control groups ($P = 0.428$). However, after the educational intervention, a significant difference was observed in the intervention group before and after the educational intervention ($P = 0.018$) and between the intervention and the control groups ($P = 0.001$) [Table 3].

After analyzing the results by using linear regression, only the education of the parents and a history of family members with COVID-19 showed a significant relationship with the self-efficacy in adopting preventive behaviors from COVID-19 score in students. In fact, the average self-efficacy score of students increased with an increase in parental education level and a history of COVID-19 in family members [Table 4].

Discussion

This study was conducted to investigate the effect of educational intervention on the self-efficacy of

Table 2: Comparison of frequency distribution of demographic characteristics of experimental and control groups

Variable	Grouping	Intervention group n (%)	Control group n (%)	P
History of COVID-19	Yes	21 (26.3)	12 (15)	0.079
	NO	59 (73.7)	68 (85)	
Family history of COVID-19	Yes	45 (56.3)	45 (56.3)	0.999
	NO	35 (43.7)	35 (43.7)	
Area of residence	Urban	75 (93.7)	78 (97.5)	0.246
	Rural	5 (6.3)	2 (2.5)	
Self-assessment of the economic situation	weak	2 (2.5)	2 (2.5)	0.416
	Medium	33 (41.3)	25 (31.3)	
	Good	45 (56.3)	53 (66.3)	
Father's education	undergraduate	13 (16.3)	8 (10)	0.111
	Diploma	40 (50)	30 (37.5)	
	Master Diploma	4 (5)	5 (6.3)	
	Bachelor	20 (25)	27 (33.8)	
	Masters	3 (3.8)	10 (12.5)	
Mother's education	undergraduate	16 (20)	10 (12.5)	0.105
	Diploma	28 (35)	31 (33.8)	
	Master Diploma	12 (15)	4 (5)	
	Bachelor	20 (25)	30 (37.5)	
	Masters	4 (5)	5 (6.3)	

Table 3: Comparison of self-efficacy in adopting preventive behaviors from COVID-19 score in intervention and control groups (before and after intervention)

Variable	Before Intervention Mean (SD)	After Intervention Mean (SD)	Difference Mean (SD)	P*
Self-efficacy				
Intervention group	75.60 (10.51)	79.05 (6.78)	3.45 (12.78)	0.018
Control group	74.36 (9.15)	75.08 (8.23)	0.71 (10.33)	0.624
P**	0.428	0.001	0.007	-

*Paired *t*-test. **Independent *t*-test. "-"Not applicable

Table 4: Factors affecting of self-efficacy using linear regression model

Variable	Category	B	SE	Standardized Coefficients Beta	P
Age	-	0.096	0.564	0.013	0.866
Father's education	Undergraduate	0	-	-	-
	Diploma	0.829	1.95	0.053	0.213
	Master Diploma	1.587	3.131	0.047	0.004
	Bachelor	1.71	2.063	0.101	0.002
	Masters	1.527	2.773	0.054	0.040
Mother's education	Undergraduate	0	-	-	-
	Diploma	0.929	1.839	0.058	0.112
	Master Diploma	0.365	2.482	0.014	0.321
	Bachelor	1.345	1.889	0.080	0.035
	Masters	1.671	3.021	0.091	0.002
History of COVID-19	Yes	-0.461	1.525	-0.024	0.36
	No	0	-	-	-
Family history of COVID-19	Yes	1.819	1.235	0.716	0.045
	No	0	-	-	-
Area of residence	Urban	0	-	-	-
	Rural	-4.566	2.995	-0.120	0.129
Self-assessment of the economic situation	weak	0	-	-	-
	Medium	2.871	4.038	0.178	0.478
	Good	2.077	3.985	0.130	0.603
COVID-19 vaccination	Yes	-2.275	2.336	0.077	0.332
	No	0	-	-	-

high-school students in adopting preventive behaviors of COVID-19. The results showed that the educational intervention based on the theory of self-efficacy was effective in improving students' behaviors to prevent the spread of COVID-19. In Elgzar's study of nursing students, the educational intervention increased their self-efficacy in overcoming perceived barriers to COVID-19 preventive behaviors.^[21] The Solhi study showed that educational intervention improves students' self-esteem and self-efficacy in adopting smoking prevention behavior.^[22] Rakhshani's study also showed the effect of educational intervention on improving self-efficacy and health-promoting behaviors in high-school students.^[23] Karimy study showed self-efficacy as an important predictor of preventive behaviors.^[24] However, in Evenson's study to modify dietary behaviors in young adults, educational intervention was not successful in improving self-efficacy.^[25] Self-efficacy can affect people's motivation to adopt health-oriented behaviors. People with high self-efficacy are more responsible for their own health and of others and are more willing to adopt health-oriented behaviors. Therefore, in the present study, the implementation of an educational intervention based on the theory of self-efficacy improved the readiness of individuals to adopt COVID-19 preventive behaviors. Of course, it seems that the success of educational interventions in improving people's self-efficacy depends on the time allotted for training, its quality, and repetition.

According to the findings of the present study, parental education and the history of other family members

with COVID-19 were associated with self-efficacy in adopting COVID-19 preventive behaviors in students. The findings of Hatef's study showed variables of age, level of education, and level of income as predictors of self-efficacy in patients with chronic diseases.^[26] Reisi's findings identified health literacy as an important predictor of self-efficacy for self-care behaviors in diabetics.^[27] Based on these results, more attention should be paid to students belonging to the lower socioeconomic strata, marginal and rural schools, and whose parents do not have a high level of education and literacy. Self-efficacy and behavior improvement programs in the context of the COVID-19 crisis should pay special attention to these groups. Furthermore, higher self-efficacy in students who have a history of exposure to the disease in the family emphasizes the need to the perceived susceptibility and severity of COVID-19. Therefore, purposeful and theory-based educational interventions can provide safer conditions for students to attend schools.

Limitation and recommendation

One of the limitations of the study was the problems of access to students and the possibility of closing schools due to the prevalence of a new variant of the coronavirus. In addition, due to the novelty of the research and the lack of similar interventions, it was difficult to compare our results with other scientific evidence.

Suggestions

It is suggested that future studies investigate the application of other models of health education and

health promotion in adopting preventive behaviors of COVID-19.

Conclusion

Educational intervention based on self-efficacy theory was shown as an effective method to improve students' self-efficacy in adopting preventive behaviors against COVID-19. The reopening of schools poses a serious challenge to the health of students, teachers, and their families in the context of the COVID-19 pandemic. Effective educational programs are essential to engage students in self-care along with other protective measures. Improving students' perceived self-efficacy in adopting disease-preventing behaviors will be very useful and effective. In addition, the results can be used as a useful guide for all people who are at high risk of transmitting the disease, such as university students, residents of dormitories, and other gathering places.

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Conflicts of interest

There are no conflicts of interest.

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