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Effectiveness School-based Educational Interventions in Preventing Smoking in Iranian Adolescents: A Systematic Review

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Abstract

Background: Adolescence is considered as a momentous period for initiating risky behaviors. Adolescents do not have an accurate understanding of the perilous consequences of their behavior due to being self-centered. They are likely to discover risky situations, which increases their capacity for danger. The purpose of this systematic review study is to evaluate the school-based educational interventions to increase self-efficacy in preventing smoking in Iranian adolescents.

Materials and Methods: In this systematic review, all experimental and quasi-experimental studies from January 2000 to April 2019 in Iran, were searched from Web of Science, Scopus, ProQuest, Cochrane Library, and Medline (via PubMed) as English databases and SID, IRCT, Magiran and Irondoc as Iranian databases. Keywords were selected based on the Mesh and include: "adolescent, teenager, student, smoking, cigarette, education and Iran" combined with the Boolean OR and AND operators. Two reviewers studied the full text of the articles and their main findings were extracted and categorized. Quality assessment of studies was checked and verified by two authors independently based on Cochrane tool.

Results: In this systematic review, 6 studies with 964 adolescents that met the inclusion criteria were included in the study; 5 of them were published in English and 1 in Persian. Different methods of school education, including lectures, film presentations, group discussions, question and answer sessions and role playing were used in these studies.

Conclusion: According to the results of this study, education of adolescents in the school environment is effective in increasing self-efficacy skills as a preventive measure of smoking in adolescents.

Key Words: Adolescent, Education, Iran, Self- efficacy, Smoking.

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1- INTRODUCTION

Adolescence is considered as a momentous period for initiating risky behaviors. Adolescents do not have an accurate understanding of the perilous consequences of their behavior due to being self-centered. They are likely to discover risky situations, which increases their capacity for danger (1). In accordance with the World Health Organization (WHO), one in 10 adolescents aged 13-15 is a cigarette smoker (2). In a meta-analysis study, the prevalence of cigarette smoking in Iran was reported as 13.9%, with a significant proportion of adolescents over 15 years old (3). The commencement of smoking in adolescence is prompted by many factors, chief among which are personal, family, environment, friends and peers (4). Starting smoking before the age of 18 is correlated with lasting smoking in adulthood. Also, these individuals are less likely to quit smoking and find it more difficult to do so (5). Evidence suggests that cigarette smoking in adolescence is associated with increasing cardiovascular disease, cancer, and health care costs (6).

In addition, tobacco use in adolescence is associated with social and educational problems such as lower levels of education (7). Consequently, helping teenagers prevent smoking can be considered as an important health policy (8). One of the approaches to control smoking is to enhance individual skills in adolescents (9). Self-efficacy has been reported as one of the individual factors predicting the onset of smoking in adolescents (10). Adolescent self-efficacy means refusing to smoke in possible situations. It is more common for adolescents to start smoking in stressful conditions if self-efficacy is low (11). On the other hand, school is a key place for health promoting interventions in children and adolescents and also it is expected to have a significant influence on the health and well-being of adults as well (12). Adolescents spend a great proportion of their time at school, so school can play a crucial role in promoting adolescent health. There is also a strong relationship between adolescent health promotion and their learning capacity (13). So far numerous systematic studies have been carried out on school-based interventions with different outcomes. A systematic review and meta-analysis study by Cochrane aimed to evaluate educational interventions to prevent smoking in adolescence and determine the most effective interventions. The results showed that a 12% reduction in smoking prevalence was observed in intervention programs and had the longest effect among interventions, social interventions and social skills (14). In many societies such as Iran, adolescents have difficulty accessing appropriate information because their parents not only lack the skills to educate them, but also feel shy about raising sensitive issues with adolescents (15, 16).

On the other hand, at this stage, teenagers tend to separate from their families and spend more time with their friends (17). According to a qualitative study conducted in Iran, personal, social, and attitudinal factors are the three main factors influencing smoking in Iranian adolescents, while the individual factors are the powerlessness of social skills and lack of self-efficacy to start smoking (18). Considering the importance of adolescent health, lack of awareness among Iranian adolescents about sensitive issues during adolescence, high level of acceptance, access to education in school environments, and the lack of a systematic study on the impact of this approach on adolescent health in Iran, this study aimed to accomplish a systematic review of the effect of school-based education on smoking prevention in Iranian adolescents.

2- MATERIALS AND METHODS

2-1. Data sources

The purpose of this study was to conduct a systematic review to evaluate the effectiveness of school-based educational interventions to prevent smoking in Iranian adolescents. The method used in this study is systematic review and the flowchart is based on the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) checklist (19). The following resources were searched in order to find studies that were similar to the purpose of this study. Searching period was from January 2000 to April 2019. During searching, there was no language restriction. Systemic research of electronic databases: Medline (via PubMed), SCOPUS, Web of Sciences, ProQuest, Cochrane Library as English databases, SID, IRCT, Magiran and Irondoc as Iranian databases and search engine of Google Scholar were searched in Persian and English languages. The search was done independently in duplicate by 2 reviewers, and any disagreement between the reviews was solved by the supervisor.

2-2. Search strategy

At the beginning using Mesh in PubMed, EMTREE in EMBASE and key words in preliminary studies, synonyms were excluded. Keywords and their combination method in databases have been presented in **Table.1**. Then in syntax in PubMed it was revealed that this syntax in other sources is "adopted". Details of syntax was in databanks in appendix. Evaluation of the references of the articles reviewed, references of the main journals which had been published that were more commonly related to this title was conducted, too.

Table-1: Keywords for search in Medline database (via PubMed).

Term	Search Terms
"adolescent"[Mesh]	(adolescen* OR teen* OR teenager OR youth OR (adolescent AND female) OR (female AND adolescent) OR (adolescent AND male) OR (male AND adolescent) OR "school age" OR student OR "young adults" OR "young people" OR "young women" OR "young men" OR "middle school" OR "high school" OR young).
"smoking"[Mesh]	(Smoke* OR "smoking behaviors" OR (behavior AND smoking) OR "smoking habit" OR (habit AND smoking) OR tobacco OR cigarette OR nicotine OR "prevention smoking" OR "anti-smoking campaign" OR "anti-smoking education").
"education"[Mesh]	(education OR train OR teach OR "training program" OR "educational activity" OR "literacy program" OR workshop).
"Iran" [Mesh]	Iran OR "Islamic Republic of Iran".

2-3. Study selection

Studies were selected based on survey objectives and Participants' criteria, Intervention, Comparison, and Outcome (PICO) (20). In this systematic analysis, all interventional studies of school-based education were conducted empirically and semi-empirically between January 2000 and April 2019. Studies assessing review articles, proceedings, case studies and case reports, cross sectional, case control were omitted from the survey. There were no restrictions on the language of publication in the selection of preliminary studies. Surveys include adolescents aged 11-19 years and both sexes of boys or girls. In addition, teens can either have a history of smoking or a history of smoking. These studies must be carried out in Iran. Articles can be published either in English or Persian. Intervention includes any educational program designed for adolescents in the prevention of smoking (cigarette pipes, tobacco and hookah), and presented to adolescents in the school

environment. However, this intervention may be focused solely on preventing cigarette smoking in adolescents, or cigarette smoking cessation training as a part of other alcohol and drug prevention training programs. Both individual and group education are offered in early studies, which can be provided by a teacher, a trained individual, or peer educators in the school environment. Also, training can be in-person meeting, film, pamphlet, group discussion, role playing, and lecture. Studies with educational interventions aimed at preventing other drugs except for cigarette were excluded. Executed model-based interventions were also excluded. The comparison group includes studies that can either be a group without any educational intervention in the field of cigarettes or one that receives education. The main objective of this study is to evaluate self-efficacy of smoking prevention in adolescents. Secondary outcomes included: adolescents' knowledge and attitude and adolescents' self-esteem in protecting themselves against smoking.

2-4. Quality Assessment

Cochran's tool was used to evaluate the quality of the included studies. This tool has seven sections: random sequence generation, allocation concealment, blinding of participants and personal, blinding of outcome assessment, incomplete outcome data, selective reporting and other bias which were entered the study for evaluation of any kind of orientation (21). Quality assessment of both individuals (F.Y., L.M.) was performed independently. The contradictions were resolved through discussion between two people to arrive at a single result. The quality assessment of the studies was performed using Cochran's tool and results are reported in **Table. 2**. It should be noted that due to the nature of the educational intervention, blinding was not possible in the evaluation of the quality of the included studies.

2-5. Data extraction

In order to complete searching, all the articles were inserted into Endnote software and repeated studies were omitted. Two individuals (F.S., M.B.) independently evaluated the title and abstract of the articles to assess the eligible studies for inclusion based on the objective of the study and the inclusion and exclusion criteria. If there existed enough information in the title and abstract of the article, the text of the study was completely checked. The contradictions in evaluating the title and abstracts of the articles were also resolved by discussion. Additionally, it was decided to have a third party in case of conflict on a title. Finally, 6 studies (22-27) that met the inclusion criteria were included in the study; 5 of them were published in English (23-27) and 1 in Persian (22). After evaluating the quality of the included studies, the studies were qualitatively analyzed. Summary, the full text, the purpose of the study, the intervention, the target group, and the results were independently reviewed by two individuals (F.Y., M.B.) and their results reported (**Table.3**).

3- RESULTS

In this systematic review, after electronic searching 745 studies were excluded based on searching syntaxes. (PubMed: 101, Scopus: 530, Web of Science: 94, Cochrane Library: 0, ProQuest, SID, IRCT, Irondoc, and Magiran: 20). Then repeated studies were removed and 525 studies remained. Afterwards, title and abstract of studies were considered and irrelevant studies were removed. At the end, 6 studies with 964 adolescents were entered to this review study (**Figure.1**). Shojaeifar et al., did a study in Zahedan city on 200 male adolescents aged 14-18 years to evaluate

the effect of educational intervention on awareness, attitude and self-efficacy in smoking cessation. Compared to control group, the digital education group received training, showing that digital education is effective in improving awareness, attitude and self-efficacy and preventive behaviors. There was a significant difference in self-efficacy scores of adolescents in comparison with control group (23).

A study by Alavijeh et al., in Ahvaz city on 120 adolescent girls who received a skill-based educational intervention showed that the intervention group had a higher self-efficacy and social skills score than the control group. This suggests that social skills training has been effective in improving students' self-efficacy in cigarette avoidance. Social skills training creates a sense of ability and healthy behavior in students to prevent smoking and improve self-efficacy by avoiding smoking. Social skills training and its use in drug prevention seems to empower students to successfully cope with external and internal pressure factors that increase their self-efficacy and self-esteem (24).

Rafiee et al., in a clinical trial study of 53 adolescent girls with the aim of presenting a face-to-face educational program in the school environment, showed that skill-based smoking prevention training was effective in improving adolescent self-efficacy. There was a statistically significant difference in the average score of self-efficacy between the education and control groups that received only routine school programs (28).

Solhi et al., conducted a study aimed to empower adolescents to prevent smoking by promoting problem-solving skills, self-efficacy, self-control, and self-esteem via providing training. The study included 240 adolescent boys who were provided training in lectures, role playing, practical demonstration and discussion. The results of their study showed that educational intervention promotes students' self-efficacy and skills correlated with preventive smoking (22). Karimy et al., also conducted a semi experimental educational intervention program on 160 adolescent boys with the aim of assessing awareness, attitude, confidence, self-efficacy, and preventive behaviors. The results of this training in person showed that it is effective in improving self-efficacy and other variables (26).

In a study on 191 adolescents, Allahverdipour et al., in Tehran studied the impact of educational intervention on awareness, attitude, resistance skills, self-control, self-efficacy, and perceived susceptibility to cigarette and drug use. The skill-based educational intervention was presented to the training group in the form of group discussion and role playing. The findings showed that using life-skills training improves self-control and self-efficacy skills and can be used in drug abuse prevention programs (27) (**Table.3)**.

Table-2: Risk of bias: review authors' judgments about each risk of bias item presented as table across all included studies.

Author, Year, (Reference)	Random sequence generation (Selection Bias)	Allocation concealment (Selection Bias)	Blinding of participant and personal (Performance Bias)	Blinding of outcome assessment (Detection Bias)	Incomplete outcome Data (Attrition Bias)	Selective reporting (Reporting Bias)	Other bias
Shojaeifar et al., 2017, (23)	Low risk of bias	Unclear risk of bias	Low risk of bias	Unclear risk of bias	Low risk of bias	Low risk of bias	Low risk of bias
Alavijeh et al., 2016, (24)	Low risk of bias	Unclear risk of bias	Low risk of bias	Unclear risk of bias	Low risk of bias	Low risk of bias	High risk of bias
Rafiee et al., 2018, (25)	Low risk of bias	Low risk of bias	Low risk of bias	Unclear risk of bias	Low risk of bias	Low risk of bias	High risk of bias
Solhi et al., 2014, (22)	Low risk of bias	Unclear risk of bias	Low risk of bias	Unclear risk of bias	Low risk of bias	Unclear risk of bias	Low risk of bias
Karimy et al., 2014, (26)	Unclear risk of bias	Unclear risk of bias	Low risk of bias	Low risk of bias	Low risk of bias	Unclear risk of bias	Low risk of bias
Allahverdipour et al., 2009, (27)	Unclear risk of bias	Unclear risk of bias	Low risk of bias	Low risk of bias	Low risk of bias	High risk of bias	High risk of bias

Ref.: Higgins JPT, Altman DG, Gøtzsche PC, Jüni P, Moher D, Oxman AD, et al. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. Bmj. 2011;343:d5928.

Table-3: Information about reviewed clinical trial articles included in this study.

Author, Year, Reference	Title	Type of study	The location of the study	Intervention	Target group and outcome	Main result
Shojaeifar et al., 2017, (23)	Comparison of the effect of educational methods on students' knowledge, attitude and behavior about hookah smoking	A semi-experimental study	Zahedan	Two groups - the test (educated using digital films) and the control (educated using pamphlets)	Knowledge, attitude, behavior and self-efficacy; 200 male high school students	There was a significant difference in self-efficacy scores of adolescents in comparison with control group and knowledge, attitude, efficacy, and behavior of the students who were educated by film were higher than those who were educated by pamphlet.

Alavijeh et al., 2016, (24)	Impact of training high school female students in Ahvaz, Iran in the social skills required to avoid the use of drugs	A semi-experimental study	Ahvaz	Two groups-experimental group (education on social skills to avoid drugs in eight sessions, discussion, pamphlet and role playing) and control group (no interventions)	Social skills, adolescent self-efficacy; 120 female high school students	Educational intervention can significantly enhance social skills for drug avoidance self-efficacy.
Rafiee et al., 2018, (25)	Effect of a school-based interventional program on smoking refusal self-efficacy in adolescent females	Interventional study	Mashhad	Two groups-intervention group (was provided with a smoking prevention program implemented in five sessions a week) and control group (routine interventions)	Adolescent self-efficacy; 53 adolescent females	The school-based interventional program for smoking prevention in accordance with social skills training could effectively increase the level of smoking refusal self-efficacy in adolescent females.
Solhi et al., 2014, (22)	Effect of educational intervention on empowerment of high school student in prevention of smoking	A quasi-experimental study	Hamedan	Two groups-experimental (lectures, role playing, practical demonstration and discussion) and control groups (no interventions)	Self-esteem, problem solving, self-control, self-efficacy and prevention of smoking behavior; 240 male high school students	The educational intervention improves the students' self-esteem, self-control, self-efficacy and problem solving and improves their smoking prevention behavior.
Karimy et al., 2014, (26)	The effect of an educational package on the attitude, self-efficacy and tobacco use preventive behaviors of adolescents	A quasi - experimental study	Zarandieh	Two groups-experimental (educational intervention in 6 sessions) and control groups (no interventions)	Attitude, self-efficacy and preventive behaviors; 160 high school male students	The results showed educational package had a positive impact on the prevention of smoking behavior among adolescents.
Allahverdipour et al., 2009, (27)	Effectiveness of skill-based substance abuse intervention among male adolescents in an Islamic country: Case of the Islamic Republic of Iran	A quasi - experimental study	Tehran	Two groups-experimental (group discussion and role playing) and control groups (no interventions)	Substance abuse, knowledge, attitudes, peer resistance skills, level of self-control, self-efficacy, and perceived susceptibility; 191 high school male students	Learning through discussion and role playing increased the score of self-efficacy in adolescents.

4- DISCUSSION

This systematic review study was conducted to evaluate the effectiveness of educational interventions in the school environment in preventing smoking by assessing adolescents' self-efficacy toward smoking. The results of the six studies indicate that the educational programs provided to the adolescent in the school environment improve their self-efficacy toward smoking. Given that self-efficacy is the stage before behavior change, it can be indirectly stated that this type of educational intervention also affects adolescent behavior. Worldwide studies on smoking among adolescents have also suggested that teen females are smoking as much as their male peers (29). Besides, according to the investigations performed in Iran, 66.7% of smoker's experience tobacco smoking before 14 years of age (30). Moreover, studies have shown no difference between adolescent males and females in terms of first-hand smoking experience from the age of 14 years (31).

A literature review by Tavousi et al., on preventive interventions in cigarette smoking in Iranian adolescents, demonstrates that education in different forms and in different environments is effective in preventing cigarette smoking. In some of the studies applied to their works, the objective has been to evaluate the impact of different model-based education on smoking prevention, with self-efficacy as a part of the educational model constructs being used in the outcome. Their results also showed that education is effective on adolescent self-efficacy in preventing smoking (32). This section of the results of their study is consistent with the results of the present study. A review study by Bahari et al., was conducted to evaluate the preventive interventions of smoking in Iranian society. One of the results of this study, which was related to adolescents' age group, reported that continuing education in adolescents is effective in preventing smoking (33). Undoubtedly the outcome evaluated in this study differs from the present study. In a review study conducted in Iran, Hazavehei et al., evaluated the role of interventions to reduce smoking in high school adolescents. This study on adolescent smokers has studied both model-based and non-model-based education. The results indicated that the education (which is based on health models) is more effective in reducing smoking in adolescents (34). The outcome assessed in this study and adolescent smoker entered are different from current study. A systematic review study by Talip et al., aimed at the investigating the start of smoking in Asian adolescents between 2000 and 2015, reported that adolescents exposed to smoking, peers, tobacco advertising, pocket money, lack of awareness about smoking, poor performance at school, family problems, and mental health problems are more likely to be a cigarette smoker (35).

4-1. Strengths and Limitations

The limitation of this study might be that due to heterogeneity in the tools used in evaluating self-efficacy and the way in which the curriculum was presented in the study, this systematic review was not possible for meta-analysis.

5- CONCLUSION

According to the results of this study, education in adolescence in different forms, including lectures, film presentations, group discussions, question and answer sessions and role playing are effective in increasing self-efficacy skills as a preventive measure of smoking in adolescents. Considering such points in educational policy making and planning for this age group can be effective in promoting their health.

6- CONFLICT OF INTEREST: None.

7- ACKNOWLEDGMENTS

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