

# Predictors of Smoking Preventive Behavior based on Empowerment Components among Male Students of High Schools: a cross-sectional study in Iran

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## Research article

**Keywords:** Smoking preventive behavior, Empowerment, Prevention, Adolescents

**Posted Date:** February 24th, 2022

**DOI:** <https://doi.org/10.21203/rs.3.rs-48965/v2>

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# Abstract

**Background:** Smoking among adolescents and young adults is believed to be one of the most important preventable health problems. The etiology of smoking is one of the most pivotal activities in designing prevention programs. The aim of this study is to determine the correlates between components of empowerment in the context of smoking prevention in adolescents.

**Methods:** This cross-sectional descriptive study was carried out on 422 high school male students in Spring 2020. The data collection tool of this study was a valid and reliable researcher-made questionnaire containing demographic characteristics, items related to various components of empowerment, and items related to the smoking preventive behavior (SPB). A linear regression model was used, where the "SPB" outcome variable assumed three possible values: Sensation Seeking, Problem-solving skills, Self-efficacy, Self-esteem, Dependence on group and Attitude towards smoking, while taking those variables reported in previous literature as independent variables.

**Results:** The results revealed that 10.42% of the students were active smokers and 40.75% of them had the experience of smoking. The results also showed a positive and significant relation among problem-solving skill ( $r=0.394$ ,  $P<0.001$ ), self-efficacy ( $r=0.340$ ,  $P<0.001$ ), self-esteem ( $r=0.310$ ,  $P<0.001$ ), and attitude ( $r=0.333$ ,  $P<0.001$ ) with the SPB. In addition, a negative and significant correlation was observed between group dependence ( $r=-0.313$ ,  $P<0.001$ ) and the SPB. Overall, the components of empowerment were able to explain 26.5% of the variance in SPB. Among the components, problem-solving skills solely explained 15.5% of variance of SPB.

**Conclusion:** The present study suggested that the findings could be useful for researchers and health planners for designing and implementing appropriate health interventions to prevent and control smoking in adolescents.

## Background

Smoking is a high-risk human behavior that imposes great economic and social costs on communities.<sup>1</sup> Extensive use of tobacco is known as a health and epidemic problem in adolescents.<sup>2</sup>

The World Health Organization (WHO) has estimated that 8 million people die annually from tobacco-related diseases by 2020.<sup>3</sup> The WHO emphasizes that if the current trend of smoking continues, by 2030 the number of victims will be 10 million<sup>4</sup>, 70% of which will occur worldwide in developing countries.<sup>5</sup>

Smoking causes 90% of lung cancers, 40% of other cancers, 75% of respiratory diseases, 50% of cardiovascular diseases, and 12% of all deaths.<sup>6</sup> More than \$ 150 billion is spent annually on health problems caused by smoking.<sup>7</sup> Despite the fact that the harms of smoking have been well established, many adolescents are still interested in smoking.<sup>8</sup> The age of onset of smoking has decreased in

developed as well as developing countries<sup>9</sup> and approximately 90% of smokers experienced smoking at younger ages.<sup>10</sup> The lower the age of onset of smoking, the more dependent the smoker becomes to this habit, which would ultimately lead to prolonged smoking.<sup>11</sup>

The prevalence of smoking in different parts of the world varies from 14.2% to 39%.<sup>12,13</sup> In Iran, the prevalence of smoking is 9.2% to 28.8%, which has been estimated to be 14.2% in adolescents.<sup>14</sup> Adolescence is a critical period of development since during this period, many positive health behaviors (such as diet and exercise) and dangerous health behaviors (such as smoking and alcohol consumption) are formed.<sup>15</sup> One of the most important requirements for a country to achieve economic, social, and political progress and stability is to pay attention to the health and developmental needs of this age group.<sup>16</sup>

One of the concerns of health / social policymakers in today's society is the increasing prevalence of addictive behaviors, especially smoking addiction in adolescents.<sup>17,18,19</sup>

Cigarette addiction treatment is expensive and difficult and requires a variety of treatment approaches, such as medication and psychotherapy. However, even the most effective treatments are associated with a high rate of recurrence of smoking; that is because susceptible environments, ease of access to cigarettes, social networks, and supporting smoking friends reduce the progress of smoking treatment and finally lead to its cessation.<sup>20</sup>

Therefore, prevention of smoking is easier than addiction treatment and is considered as the most appropriate and logical solution.<sup>21</sup> Necessary requirements for the prevention of smoking include the analysis of smoking behavior among children, correcting misconceptions about smoking, empowerment of individuals against smoking since childhood, taking into account family pressures and crises of childhood, and the role of social variables.<sup>22,23</sup>

Empowerment is currently one of the most important concepts in community development.<sup>24</sup> The term empowerment was first used in texts of political and social sciences and soon found its place in management and health issues.<sup>25</sup> From the perspective of the WHO, empowerment, as the heart of health promotion,<sup>26</sup> includes the process through which individuals gain further control over decisions and actions that affect their health.<sup>27</sup>

Empowerment has different levels; empowerment at the individual level is the elimination of personal disabilities and the formation of a sense of personal power and self-efficacy. Interpersonal competence means having the ability to influence others.<sup>28</sup>

To empower individuals, previous studies have emphasized improving components such as problem solving skills, self-efficacy, self-control, self-esteem, emotional management, shifting attitudes toward smoking, and adaptation towards environmental conditions.<sup>22, 29, 30</sup> In order to design appropriate prevention programs, it is necessary to be aware of the factors influencing the onset and persistence of

smoking addiction. Over the recent years, one of the most important achievements in the field of theorizing and policy-making of prevention programs has been the emphasis on risky and protective factors as a descriptive and predictive framework.<sup>31</sup>

Hence, this study was conducted to answer the key question of what are the correlates and the power of explaining various components of empowerment related to the prevention of smoking in children and adolescents? By answering this question, we can design and implement appropriate interventions and strategies to prevent smoking behavior in adolescents. We could also prevent and control the burden of diseases resulting from this problem.

## Methods

This descriptive-analytical (cross-sectional) study was performed on 422 male students in high schools, Spring 2020, in Urmia, Northwest Iran. In this study, To determine the sample size, preliminary data on smoking frequency were used in a pilot study that was performed on 100 students randomly. With the initial analysis on the information and taking into account the minimum value (odd's ratio) about the relationship between the factors affecting smoking is 1.9 and with a confidence level of 95% , power 80% and considering the design effect of 1.5 and drop out Equivalent to 20% by using EPI INFO.2000 software to estimate the sample size, finally the sample size was 422 people.

. The study subjects were selected via multi-stage sampling method; primarily, Urmia city was divided into two central and peripheral districts. A list of secondary schools was then extracted from the Urmia Education Department. 12 male schools were randomly selected from each district (total of 24 high schools). Afterwards, in proportion to the number of students studying at different levels(1st-, 2nd-, and 3rd-year) of education in these schools, the study samples (422 male students) were selected employing simple random sampling method and entered the study. The inclusion criteria in this study were being 1st-, 2nd-, and 3rd-year male students and not having experienced mental and or cognitive problems. All the subjects filled a written consent to participate in the study. The exclusion criteria were filling the questionnaire incompletely. The youngest students was 15 years old and the oldest one was 18 years old. Therefore, a written parental informed consent, as well as written student assent, was obtained from all the participants in this study.

It should be noted that in the present study, the meaning of active smoking is” Students who have smoked 100 cigarettes in their lifetime and currently smoke cigarettes every day (daily) or some days (non-daily)”;and experienced smoking is” Students who have smoked at least 100 cigarettes in their lifetime, but say they currently do not smoke”.

## Study Tools

The data collection tool of this study was a researcher-made questionnaire consisting of the following parts: Part 1 comprises demographic characteristics of the student and his smoking status. Part 2 includes items about different components of student empowerment, including sensation seeking Questions (with 10 items), for example, "I don't like to experience any substance that has strange or dangerous effects.", problem-solving skills (with 10 items), for example, "when making decisions, I look at the consequences of all the ways and compare them to each other.", self-efficacy (with six items), for example, "I'm sure I can resist the temptation to smoke well.", self-esteem (with six items), for example, "I feel as though I have a lot of good attributes.", negative attitude towards smoking (with eight items), for example, "if a person consumes a small amount of cigarettes and drugs, he will definitely become addicted.", belonging to the group (with seven items), for example, "I like to be noticed when I'm with others". There were a total of 47 items based on the 5-point Likert scale, with "I strongly agree" getting a score of 5, "I disagree" a score of 4, "I have no idea" a score of 3, "I disagree" a score of 2, and "I completely disagree" getting 1.

Part 3 includes items of the SPB (with six items), for instance, "when someone smokes next to me, I try not to be exposed to the smoke." These items are rated on a 4-point Likert scale, 3 for always, 2 for often, 1 for rarely, zero for not at all. The score of the subscales of the questionnaire was transformed linearly to a 0–100-point scale, with 100 indicating the best status and zero the worst. It should be noted that the main outcomes of the study is a linearly transformed variables taken from sum of the Likert scale responses in Parts 2 and 3 of the questionnaire.

To determine the validity of the researcher-made questionnaire based on the study of valid sources<sup>22,29,32,33</sup>, the qualitative method of content validity was used (an experienced panel of experts, including health education specialists, psychologists, medicine, and preventive medicine). In this method, the experts are asked to examine the items of the questionnaires in terms of simplicity, clarity, relevance, and necessity and express their opinions and suggestions. After receiving the feedback and suggestions from the experts, the necessary amendments were made to the study tools. Finally, the validity of the tools was confirmed.

The reliability of the questionnaire was measured by Cronbach's alpha test method on 30 male students who were similar to the studied population in terms of demographic characteristics. The values were 0.71 for sensation seeking, 0.78 for problem-solving skill, 0.82 for self-efficacy, 0.79 for self-esteem, 0.74 for negative attitude towards smoking, 0.82 for group dependence, 0.81 for SPB, and ultimately, the instrument reliability was confirmed.

## **Data analysis**

The data collected in SPSS software version 22 were analyzed using descriptive statistics, such as frequency and the mean and standard deviation. According to the results of Kolmogorov-Smirno test and the normality of data distribution, inferential statistics, such as Pearson correlation coefficient test and linear regression(Stepwise) analysis(smoking prevention behaviors were considered as dependent

variable and problem-solving skills, negative attitude towards smoking, self-efficacy, and self-esteem, Sensation Seeking and Dependence on group were considered as independent variables), were also utilized to analyze the data. In all the statistical analyses, the significance level was considered to be below 0.05.

## Results

The response rate was 91.4% as 457 out of 500 participants responded to the questionnaire and 35 (7%) questionnaires were incompletely answered, whereas incomplete questionnaires were excluded from the study.

In this study, 422 male students with an average age of  $16.93 \pm 0.76$  were studied. The number of active smoking students was 44 (10.42%) and the number of those who experienced smoking was 172 (40.75). Table 1 depicts an overview of the demographic characteristics of the samples.

The average score of the components related to students' empowerment associated with smoking prevention was not satisfactory. Based on the results of the study, the mean scores of the components of self-efficacy, self-esteem, sensation seeking, negative attitude towards smoking, group dependence, and problem-solving skills were  $49.15 \pm 7.68$ ,  $53.09 \pm 6.98$ ,  $56.36 \pm 5.25$ ,  $57.74 \pm 5.83$ ,  $58.46 \pm 6.98$ , and  $59.57 \pm 8.49$ , respectively (Table 2). In addition, the mean score of the SPB in the students was  $55.56 \pm 8.50$  (Table 2).

The results of Pearson correlation coefficient test showed that problem-solving skills, negative attitude towards smoking, self-efficacy, and self-esteem were positively and significantly related to the SPB. In addition, a significant and inverse relationship was observed between group dependence and the SPB, yet no significant relationships were found between the students' sensation seeking and the SPB (Table 3).

To determine the predictive power of empowerment components on the SPB, multiple linear regression analysis (stepwise method) was used. In this regression analysis, the components of problem solving skills, self-efficacy, self-esteem, sensation seeking, group dependence, and negative attitude toward the SPB were entered in the regression equation. Based on the results, problem-solving skills, negative attitude toward smoking, group dependence, and self-efficacy were identified as the final predictors of the SPB in the students. In general, these variables were able to explain about 26.5% ( $R^2 = 0.264$ ) of the changes in the SPB (Tables 4).

## Discussion

In the study of any behavior, it is better to pay particular attention to the cause and effect relationships. The behavior of individuals could be attributed to different factors that need to be scientifically examined. The current work aimed to investigate the factors predicting the SPB based on different components of empowerment in students. According to the obtained results, 10.42% of the students were active smokers and 40.75% of them had a smoking experience.

Increasing the effectiveness of interventions in order to reduce smoking in adolescents necessitates identification of the determinants of the SPB in this segment of population. Based on the results of the present study, there was a positive and significant relationship between problem-solving skills, negative attitude towards smoking, self-efficacy, and self-esteem with the SPB. Moreover, a significant and inverse relationship was observed between group dependence and the SPB, yet no significant relationships was found between the students' sensation seeking and the SPB. That is, those with problem-solving skills, self-efficacy, self-esteem, and a negative attitude toward smoking were more likely to engage in smoking preventive behaviors and those who felt more dependent on a group in which they participate were less likely to engage in the SPB.

In the present study, problem-solving skill was the strongest and most influential component of the behavior and was alone able to predict 15.5% of the changes in the SPB in the students. Problem-solving skill is a kind of goal-oriented thinking,<sup>34</sup> a mental process, and logical and systematic thinking, which helps a person to find multiple solutions once dealing with problems, such as addiction and smoking, and then find the best solution.<sup>35</sup>

The study of Parsian et al. revealed that adolescent problem-solving skills are a major predictor in the prevention of addiction and smoking. Their results are consistent with those of the present study.<sup>36</sup> Hitchcock also points out that one of the key points in the discussion of substance abuse, such as smoking, is paying attention to skills, like problem-solving skills, which enable people to deal with problems.<sup>37</sup>

Negative attitudes toward smoking are the second component of empowerment, which explained the SPB in students. The study of Morvati Sharifabad et al. revealed that creating negative attitudes toward smoking in adolescents through various educational programs regarding the individual and social effects of this dangerous behavior could be effective on adolescents' reluctance to smoking.<sup>38</sup> Various studies have shown that teenagers believe that smoking is a way to gain social status and comfort. This unhealthy behavior should be controlled by reducing their positive attitude towards smoking and creating a negative attitude towards it.<sup>39,40</sup>

Self-efficacy was the third component of empowerment predicting the SPB in students. Bandra considers self-efficacy to be the most important prerequisite for behavior change and predictor of behavior.<sup>41</sup> In the study of Panahi et al., self-efficacy was mentioned as an important component in predicting the behaviors that prevent smoking.<sup>32</sup> According to Ghasemi et al., non-smoking students had a high ability not to consume whereas consumer students had a low ability to quit smoking due to certain problems, such as peer pressure or loss of fun with friends.<sup>42</sup> On one hand, this could be due to the connection and friendship with peers who consume tobacco and on the other hand, belonging to a group is one of the important needs of adolescents.<sup>43</sup> Given the importance of self-efficacy in performing healthy behaviors, increasing the life skills of students, particularly the skill of saying no and their resistance to peer pressure, could be considered for improving their self-efficacy.

According to the obtained findings herein, the feeling of belonging to a group was found to be the fourth component associated with students' empowerment concerning smoking preventive behavior. Learning any behavior occurs more profoundly from the groups that are closer to an individual; thus, these groups also act as outstanding role models for the individual.<sup>44</sup> In general, if the group to which a person belongs is involved in deviant actions, in fact the individual considers that group as a role model.<sup>45</sup> Hawkins' model of social development explains abnormal behaviors, including substance use (smoking and other addictive substances), based on social bonding. This model points to three effective factors in reducing a person's commitment to society, namely the pressures of a huge difference between goals and the individual's perception of the availability of the necessary conditions to achieve those goals, social disorder, and the process of socialization. According to this theory, emotional attachment to groups and peers who use addictive substances is considered to be the leading cause of substance abuse.<sup>46</sup> For note, it is not that a single factor is a necessary and sufficient condition for substance abuse (smoking); substance abuse is a combined result of various factors. Some of these factors increase the risk of consumption and others prevent and reduce drug use.

However, this study, like other studies, had its limitations. To begin with, this study is a cross-sectional study and cannot be used to examine the cause-and-effect relationship. Accordingly, it could be recommended that stronger studies be used for this purpose. Furthermore, the obtained results could not be generalized beyond the study sample and can be therefore generalized only to populations with similar features. Finally, the data collection tool in this study was a self-report questionnaire and the participants may have underestimated or overestimated their smoking preventive behavior, which may have affected the outcomes.

## **Conclusion**

Based on the results of this study, the empowerment components predicted 26.5% of the variance in smoking prevention behaviors in students. Problem-solving skills, negative attitudes toward smoking, self-efficacy, and group affiliation were the strongest predictors of smoking prevention behaviors, respectively. The obtained findings of the present study could be conducive to the development of ecological health promotion strategies, including family, school, and community organizations, such as, youth affairs organization, municipality, and education. This could ultimately promote smoking prevention-associated healthy behaviors among adolescents.

## **Abbreviations**

SPB:Smoking Preventive Behavior ; SPSS: Statistical Package for Social Sciences; WHO: The World Health Organization.

## **Declarations**

## **Acknowledgements**

This article is the result of a research project approved by the Vice Chancellor for Research of Urmia University of Medical Sciences and Health Services. In this way, the authors express their gratitude and appreciation to the Vice Chancellor for Research of the University, the Vice Chancellor for Research of the General Directorate of Education of Urmia and the participants in this study.

### **Authors' contributions**

Study design: NSh, AD, FMT

Data collection and analysis: NSh, AD, BR

Manuscript preparation: NSh, FMT

### **Funding**

There was no specific funding for this study

### **Availability of data and materials**

All data generated or analysed during this study are included in this published article.

### **Ethics approval and consent to participate**

The current study was conducted according to the Declaration of Helsinki and approved by the medical ethical committee of Urmia University of Medical Sciences (IR.UMSU.REC.1398.007). Subsequently written informed consent was obtained for all children included in this study via both parents for children aged < 18 years and adolescents themselves if  $\geq 18$  years.

### **Consent for publication**

Not applicable.

### **Competing interests**

The authors declare that they have no conflict of interest in this work.

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## Tables

Tables 1-4 are in the supplementary files section.

## Supplementary Files

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