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DOI: 10.4103/jehp.jehp_436_21

# A model for implementing oral health-promoting school: Integration with dental students' educational curriculum: A protocol study

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## Abstract:

**BACKGROUND:** Schools are ideal setting for children's oral health-promoting programs. It is an integrated model for oral health-promoting schools (OHPS) with the capacities of dental school's curriculum and dental students as workforces. In this protocol, the principle of planning and implementation of the oral health program is described.

**MATERIALS AND METHODS:** Based on the PRECEDE-Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development (PROCEED) planning model, a framework for determining the potential predisposing, reinforcing, and enabling factors that could be intervening was diagnosed. To adapt the phases of the planning model for integration of the "OHPS" principles and the dental students' curriculum, the following steps are supposed to be considered: Phases 1–5 which are to assess the baseline data will include the assessment of children oral health status and parents and teachers' knowledge, attitude, and performance. Phase 6 or implementation phase will be allocated to oral health education interventions for students, parents, and teachers, professional screening, prevention, and referral. Phase 7 or the process assessment phase will be to record the number of screened students, the amount of fissure sealant and fluoride provision, and percentage of trained parents and teachers. Phase 8 or the impact assessment phase will assess the students' improvement in knowledge and practice, decayed, missing, and filled teeth scores, teachers and mothers' oral health attitudes and behaviors, and brushing and flossing behaviors. At the last, cost analysis of the program and long-term monitoring of the interventions is suggested.

**CONCLUSION:** In case that the effectiveness of this model is proven, it can be implemented by other dental schools for the primary schools in their regions. Considering the number and distribution of dental schools in the country, this model is executable as targeted population oral health promotion approach in 6–12-year-old schoolchildren.

## Keywords:

Dental, education, health promotion, oral health, public health, school dentistry

## Introduction

Ensuring students' oral health leads to proper physical and mental development and improving their quality of life.<sup>[1-3]</sup> Studies have shown that students with dental problems are more likely to miss school or experience activity restriction or emotional disturbance than their healthy peers.<sup>[3,4]</sup>

Dental caries is a common problem in Iran yet. According to a new review on the Iranian dental caries status, mean decayed, missing, and filled teeth (DMFT) was between 2.12 and 2.54 and about 23%–30% of 12-year-olds were caries free.<sup>[5]</sup> Maintaining and improving the students' oral health, directly and indirectly, improves the quality of their life and education.<sup>[6,7]</sup> Providing school supportive program in addition to the at-home behavior

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**How to cite this article:** Tahani B, Asgari I. A model for implementing oral health-promoting school: Integration with dental students' educational curriculum: A protocol study. *J Edu Health Promot* 2022;11:277.

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Received: 05-04-2021  
Accepted: 24-11-2021  
Published: 25-08-2022

changes can overcome the barriers to promoting dental health in socially deprived communities.<sup>[8,9]</sup>

Oral health education programs aim to improve oral health literacy in order to implement behavioral changes and promote oral health.<sup>[10]</sup> Health behaviors, beliefs, and attitudes are shaped mainly during childhood and accordingly schools are the most appropriate setting for the application of health education programs by providing the opportunity to teach and promote healthy lifestyles and self-care practices in a vast group of children, at very low cost.<sup>[11]</sup> Positive outcomes in children and adolescents' oral cleanliness, oral health knowledge, and oral behavior have been shown through implementing school-based oral health education programs.<sup>[12,13]</sup> Schools can also provide supportive measures including policies and programs to identify the children in need of dental care and refer them to service centers.<sup>[14]</sup> The experience of running "oral health-promoting schools [OHPS]" in different parts of the world testifies to this, and school-based preventive oral health programs are referred to as "cost-effective" interventions.<sup>[11-14]</sup>

However, in Iran, none of the schools have currently implemented such a comprehensive plan. Currently, through the foundation of the "Departments of Dental Public Health" at the Iranian dental schools, they are responsible for teaching dental students about the concepts, strategies, and programs of oral health promotion. Furthermore, they tried to create the attitude, and empower dental graduated to provide preventive services. The present protocol introduces an integrated model of targeted population oral health promotion along with the graduated dental curriculum. This paper presents the details of planning, and describes the interventions covered by the plan. Before starting the project, a comprehensive review of the available scientific evidence about the effective interventions in primary schools elsewhere in the world was conducted by searching the scientific databases, including PubMed, CDC, WHO reports, and the Cochrane Library. The infrastructure needed to implement oral health promotion programs was extracted in the areas of physical, organizational, educational, and support facilities.

This protocol is produced within the agreement between the Vice Chancellery for Research at Isfahan University of Medical Sciences and the Deputy of Health and Research of the Department of Education of the Isfahan Province, as an Action Research Plan with which has been conducted since September 2018.

## Materials and Methods

### Study design and setting

This paper is the protocol of an oral health-promoting program which includes a cross-sectional baseline

study, a quasi-experimental interventional study, and then a descriptive evaluation study. The setting for data collection would be the public primary schools of Isfahan city, and the intervention will be performed by cooperation of the students of Isfahan School of Dentistry.

### Study participants and sampling

The frame of this study includes the students, parents, and teachers from the public primary schools. The public schools of Isfahan distribute into five main divisions due to their geographic location. To reach a representative sample of the students, by a multistage cluster sampling, five primary schools of medium or low socioeconomic status will be randomly selected from different regions of city (one school from each region). These schools will be recognized as pilot "OHPS." The minimum sample size calculated based on the one-sample paired design (before-after) formula<sup>[14]</sup> is to be 350 by considering a standard error of 2.7 of dental caries in a similar study,<sup>[15]</sup> and the required minimum accuracy of 1 and the design effect equivalent to 1.5 in cluster sampling.

### Ethical consideration

The explanations of the project will be given to all the participants and the guardians of the students and the legal steps in the research deputy of the provincial education organization; administrative affairs will be done. Furthermore, separate informed consent will be taken from the student's gradients for any oral examination or therapeutic intervention. Individuals' personal information is protected and analyzed anonymously. The study ethical code is IR.MUI.REC.1397.1.012.

### Data collection tool and technique

#### *Intervention planning*

Interventions are going to be planned based on the multidimensional PRECEDE-Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development (PROCEED) planning.<sup>[16]</sup> This model has two general parts: PRECEDE provides a framework for determining the potential Predisposing, Reinforcing, and Enabling factors. During this phase, the clinical and behavioral outcomes that are the ultimate goal of health planning are defined before any action. Then, factors affecting these health outcomes are identified and prioritized based on the effects they have on the health outcomes. PROCEED components highlight the implementation and evaluation of the intervention.

Based on previous studies on the schoolchildren's oral health status, the factors affecting the oral health, and the effectiveness of interventions,<sup>[16-20]</sup> a conceptual map

was designed [Figure 1]. Adaptation of the phases of this planning model (Phase 1: Social Assessment, Phase 2: Epidemiological Assessment, Phase 3: Behavioral Assessment, Phase 4: Educational Assessment, Phase 5: Executive Assessment, Phase 6: Implementation, Phase 7: Process Assessment, Phase 8: Impact Assessment, and Phase 9: Cost Assessment) with the design of the "OHPS" leads to the following plans and interventions. Phases 1–5 include the assessment of students' oral health status, assessment of parents' knowledge, attitude, and performance, assessment of teachers' attitude, performance, and knowledge of, and evaluation of schoolchildren's performance and oral health behaviors. Phase 6 includes oral health education interventions for school students, parents, and teachers, professional screening, prevention, and referral. Phase 7 includes extraction of data on percentage of screened students, percentage of students receiving fissure sealant or fluoride and percentage of trained parents, and teachers. Phase 8 includes assessment of students' improvement in knowledge and practice, DMFT scores, teachers and mothers' oral health attitudes and behaviors, and brushing and flossing behaviors. Phase 9 includes a cost analysis of implementing and monitoring the interventions that will be carried out using an economic method.

### Assessment phases

#### *Schoolchildren's knowledge, attitude, and practice*

A self-administered questionnaire was developed to extract the children's basic knowledge about oral health. Based on the literature review,<sup>[21,22]</sup> item pooling of relevant questions was conducted. To ensure the face and content validity, the questions and educational objectives were provided to 5 experts (3 oral public health and 2 pediatric professors) to rate the relevance of the questions based on a three-point Likert scale (from 1: completely relevant to 3: not relevant). Questions were mostly about caries, risk factors, number of permanent teeth, approximate time of eruption, and

duration and frequency of brushing. The reliability of the questionnaire was assessed by calculating the Guttman score in a pilot study on 50 schoolchildren out of the project. After confirming the validity and reliability, the questionnaires will be distributed among the students by two dental students.

To record the oral health status of the schoolchildren, clinical dental examination will be done by 5<sup>th</sup>-year dental students and recorded in an electronic oral health recording software designed by Asgari.<sup>[23]</sup>

#### *Parents' s knowledge, attitude, and practice*

A self-administered questionnaire consisting of the knowledge, attitude, and practice assessment sections was developed. It will be distributed among the parents in the first session of the workshop (workshop description is given in the intervention phase).

Knowledge questions were all multiple-choice questions with options "yes," "no," and "don't know." Attitude questions were designed based on the five-point Likert scale (strongly agree to strongly disagree). The questions in the performance section were asked about the oral health care of parents and their children, separately. Questions were developed based on a literature review.<sup>[24,25]</sup> To ensure the face and content validity according to the method described in the schoolchildren section, the questionnaire was evaluated by 5 professors of the Departments of Pediatrics and Oral Public Health. The reliability of the awareness questions was assessed by a pilot study on 50 parents of patients attending the pediatric clinic using split-half method. The reliability of attitude questions after the pilot study was assessed by Cronbach's alpha. Attitude questions were designed based on the five-point Likert scale (strongly agree to strongly disagree). The questions in the performance section were to assess the oral health behavior of parents and their children. The validity of the questionnaire was measured as in previous sections.

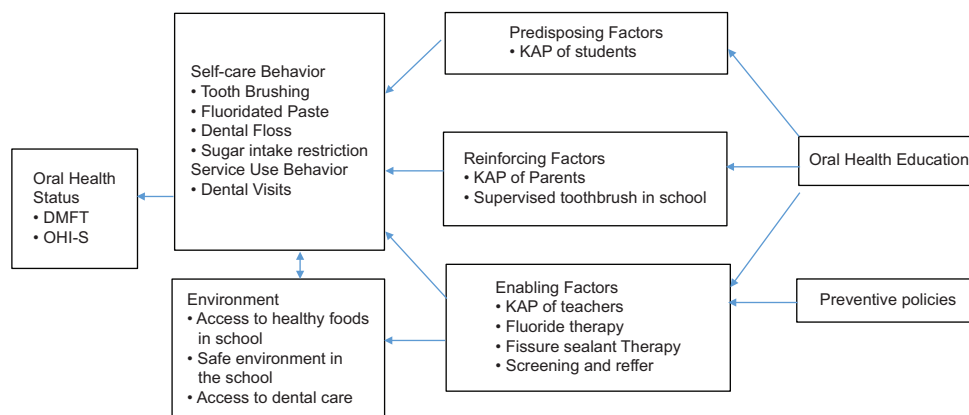


Figure 1: Conceptual map of the model planning based on PRECEED-Model for schoolchildren oral health promotion

### *Teachers's knowledge, attitude, and practice*

A questionnaire was developed based on the study of Mansoury *et al.* in 2003.<sup>[26]</sup> The questions were reviewed based on oral health booklets for teachers and health-care providers, published by the Ministry of Health,<sup>[27]</sup> and minor modifications were made in the content. The questionnaires will be distributed to the teachers in cooperation with the school administrator and were gathered on the same day.

### **Interventions phases**

1. Schoolchildren training: Oral health issues will be taught to the schoolchildren by:

- Face-to-face training will be theoretically and practically provided by the dental students in one session using colorful flip charts, big demonstration toothbrush and dental arches, disclosing tablets, dental floss, mirrors, real toothbrush, and paste. Each student was given a toothbrush free of charge
- Training through printed media.

Worksheet 1: This worksheet includes activities such as puzzles, cluttered words, tables, painting, and crafting, all of which were related to the oral health topics.

Worksheet 2: The basic oral health-related items were designed and integrated into different chapters of the elementary textbooks. The face and content validity of these worksheets were confirmed based on the opinion of primary education experts in the provincial education council and community of dental experts. The worksheets will be also taught to the teachers in their workshops.

2. Providing preventive services: Children who are clinically examined and have healthy first or second molars with moderate to high caries risk will be selected for fissure sealant. In two clinics of university, the dental students will perform fissure sealants based on the last evidence for 1–4 teeth as needed for each child. All stages of the work from tooth selection to final stage of evaluation will be monitored by the supervising professors

3. Parents' training includes two workshops, a printed media, and invitation to a virtual telegram channel. The framework used to develop and design the parents' educational content was based on the Theoretical Domains Framework model.<sup>[28]</sup> Hence, the content and headings of each of the 14 domains of this model were identified. Then, methods to present this content were selected based on the best available evidence and an expert panel validity assessment. The training content includes presentation, movies, and photos

Teaching will be provided by two senior dental students, followed by a faculty member and schoolteacher. To assure the parents' access to the

materials presented in each session, pamphlets will also be designed, validated, and provided based on the contents of the session.

4. Teachers training all teachers of second grade would be recruited. Regarding the adult learning theories<sup>[29]</sup> after analyzing the baseline KAP study, knowledge needs, attitudes, and performance problems of schoolteachers will be extracted and prioritized according to their prevalence and importance. The educational intervention program will consist of two parts. The first part includes an interactive lecture-based workshop that will be conducted in cooperation with the Education Council twice a month. These sessions will include slide presentations and exchange of their actual experiences at the schools. Another part of the teachers' intervention program will be provision of educational aids as books and videos based on the topics taught in the workshops.

### **Evaluation phases**

- Students: The posttest questionnaire will be redistributed 5 months later and new findings were compared using paired *t*-test
- Parents: Paired *t*-test will be used to compare the pre-and post-intervention scores. ANOVA test was used to compare the mean score of knowledge based on demographic factors
- Teachers: The short-term effect of the intervention on increasing the knowledge and attitude will be evaluated 1 month later. Durability of training will also be assessed at 6-month follow-up. The teachers will also give a checklist to identify the executive constraints and barriers during the program.

### **Discussion**

The current protocol provides a description of a proposed model for OHPS, designed to be a part of dental students' education at dental schools. In its planning, efforts were made to both follow and adopt the recommendations of the WHO<sup>[30]</sup> and to utilize the potentials of dental school curriculum.

Key steps recommended by the WHO to consider in this protocol include establishing or involving a school health team and a community advisory committee, conducting a situational analysis, obtaining political, parental, and community commitments, establishing supportive school health policies, and setting goals and objectives.<sup>[30,31]</sup>

In our model, in order to involve the stakeholders of the school and community in planning the program, we will organize some meetings with the schools' authorities and the Provincial Education Council to advocate our



project and to receive their comments before final planning. On the other hand, we will hold meeting with the head of Provincial Health Center, the head of Oral Health Bureau in the Provincial Health Center, and the deans of the Dental School to introduce and involve them and separate meetings with the governors and health staff of the schools to introduce the plan and get their administrative supports. Parents were another community group we tried to get involved. They will very soon be introduced to the plan by informed letters and involved in our educational plans by participating in the workshops and doing the at-home activities.

In order to cover the assessment phase, we will conduct some surveys to collect baseline data about the current oral health status, risk factors, oral health behavior, and knowledge of schoolchildren, as well as the knowledge, attitude, and practice of schoolteachers and parents. In order to avoid duplication of efforts, the existing oral health-related activities organized by/for the schools is monitored; for example, the educational sessions for schoolteachers are based on the available oral health educational contents published by the oral health bureau of the Ministry of Health. Further, the fluoride varnish is provided in agreement with the Provincial Health Center.

Overcoming the shortage of workforce by integrating the dental student's requirement similar to Karimi *et al.*<sup>[32]</sup> study is one of the strengths of this study. This trial will therefore be a model of OHPS which is implemented and coordinated by an academic center. Hence, it is expected to improve the knowledge and oral health behaviors of either schoolchild or their parents and schoolteachers. Along with the improving of the attitude and practice of dental students about preventive care and oral health education, the final goal would be the reduction of caries rate in the covered schools compared to the others.

And finally, if the effectiveness of this model is proven, it can be implemented by other dental schools for their regions and, moreover, more schools can be covered. Considering the number of dental schools in the country and dental students (about 2000), this model can benefit both the schoolchildren in deprived schools and university students. The results based on the proposed goals will be presented in upcoming articles.

### Limitation and recommendation

Due to the problems and challenges of implementing the program at the community level, it is possible that some steps of the work will change slightly from the standards of a research project. However, the implication of the available human resources at dental schools is highly recommended for oral health-promoting programs.

## Conclusion

In the case of short-term and long-term effectiveness of this program, this model can be offered to other universities in the country or similar in other parts of the world. Furthermore, using the physical and human resources of the university to promote people's health is a practical way to reach a socially accountable university.

### Acknowledgment

This protocol is based on a research plan approved by the Research Bureau of Isfahan Department of Education and Dental Research Institute of Isfahan University of Medical Sciences, No. 197012. The result of this project will be published as two articles. The ethical code is IR.MUI.REC.1397.1.012. We would like to thank the scientific and financial support of this center and also to appreciate the support and cooperation of all stakeholders in the OHPS project.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

## References

1. Cinar AB, Murtomaa H. Interrelation between obesity, oral health and life-style factors among Turkish school children. *Clin Oral Investig* 2011;15:177-84.
2. Martins-Júnior P, Vieira-Andrade R, Corrêa-Faria P, Oliveira-Ferreira F, Marques L, Ramos-Jorge M. Impact of early childhood caries on the oral health-related quality of life of preschool children and their parents. *Caries Res* 2013;47:211-8.
3. Mijan MC, Leal SC, Bronkhorst EM, Frencken JE. Children's oral health-related quality of life (OHRQoL) three years after implementation of treatment protocols for managing cavitated carious dentine lesions. *Oral Health Prev Dent* 2019;17:83-9.
4. Gilchrist F, Rodd H, Deery C, Marshman Z. Assessment of the quality of measures of child oral health-related quality of life. *BMC Oral Health* 2014;14:40.
5. Soltani M, Sayadizadeh M, Estabragh SR, Ghannadan K, Malekmohammadi M. Dental caries status and its related factors in Iran: A meta-analysis. *J Dent* 2020;21:158-76.
6. Quadri MF, Jaafari FR, Mathmi NA, Huraysi NH, Nayeem M, Jessani A, *et al.* impact of the poor oral health status of children on their families: An analytical cross-sectional study. *Children* 2021;8:586.
7. Genderson MW, Sischo L, Markowitz K, Fine D, Broder HL. An overview of children's oral health-related quality of life assessment: From scale development to measuring outcomes. *Caries Res* 2013;47 Suppl 1:13-21.
8. Pine C, Adair P, Robinson L, Burnside G, Moynihan P, Wade W, *et al.* The BBaRTS healthy teeth behaviour change programme for preventing dental caries in primary school children: Study protocol for a cluster randomised controlled trial. *Trials* 2016;17:103.
9. Eley C, Weston-Price S, Young V, Hoekstra B, Gadhia T, Muirhead V, *et al.* Using oral hygiene education in schools to tackle child tooth decay: A mixed methods study with children and teachers in England. *J Biol Educ* 2020;54:381-95.

10. Vadiakas G, Oulis CJ, Tsinidou K, Mamai-Homata E, Polychronopoulou A. Oral hygiene and periodontal status of 12 and 15-year-old Greek adolescents. A national pathfinder survey. *Eur Arch Paediatr Dent* 2012;13:11-20.
11. Haque SE, Rahman M, Itsuko K, Mutahara M, Kayako S, Tsutsumi A, *et al*. Effect of a school-based oral health education in preventing untreated dental caries and increasing knowledge, attitude, and practices among adolescents in Bangladesh. *BMC Oral Health* 2016;16:44.
12. Angelopoulou MV, Oulis CJ, Kavvadia K. School-based oral health-education program using experiential learning or traditional lecturing in adolescents: A clinical trial. *Int Dent J* 2014;64:278-84.
13. Fraihat N, Madae'en S, Bencze Z, Herczeg A, Varga O. Clinical effectiveness and cost-effectiveness of oral-health promotion in dental caries prevention among children: Systematic review and meta-analysis. *Int J Environ Res Public Health* 2019;16:2668.
14. Chow SC, Shao J, Wang H, Lokhnygina Y. *Sample Size Calculations in Clinical Research*. 3<sup>rd</sup> ed. Chapman & Hall/CRC Biostatistics Series, New York, Taylor & Francis. P. 50.
15. Asgari I, Ebn Ahmady A. Social factors and dental health in the urban adolescents of Isfahan, Iran. *Oral Health Dent Manag* 2014;13:798-804.
16. Crosby R, Noar SM. What is a planning model? An introduction to PRECEDE-PROCEED. *J Public Health Dent* 2011;71 Suppl 1:S7-15.
17. Takeuchi R, Kawamura K, Kawamura S, Endoh M, Uchida C, Taguchi C, *et al*. Evaluation of the child oral health promotion 'MaliMali' Programme based on schools in the Kingdom of Tonga. *Int Dent J* 2017;67:229-37.
18. Stein C, Santos NM, Hilgert JB, Hugo FN. Effectiveness of oral health education on oral hygiene and dental caries in schoolchildren: Systematic review and meta-analysis. *Community Dent Oral Epidemiol* 2018;46:30-7.
19. Lai H, Fann JC, Yen AM, Chen LS, Lai MH, Chiu SY. Long-term effectiveness of school-based children oral hygiene program on oral health after 10-year follow-up. *Community Dent Oral Epidemiol* 2016;44:209-15.
20. Dudovitz RN, Valiente JE, Espinosa G, Yepes C, Padilla C, Puffer M, *et al*. A school-based public health model to reduce oral health disparities. *J Public Health Dent* 2018;78:9-16.
21. Geethapriya PR, Asokan S, Kandaswamy D. Comparison of Oral health status and knowledge on oral health in two age groups of schoolchildren: A cross-sectional study. *Int J Clin Pediatr Dent* 2017;10:340-5.
22. Rad M, Shahravan A, Haghdoost AA. Oral health knowledge, attitude, and practice in 12-year-old schoolchildren in Iran. *J Int Soc Prev Community Dent* 2015;5:419-24.
23. Asgari I. Development an electronic oral health record application for educational dental setting. *J Educ Health Promot* 2018;29:124.
24. Soltani R, Sharifirad G, Hasanzadeh A, Golshiri P, Barati M. Mothers' knowledge and attitude on oral health preschool children in Isfahan. *Iran J Health Syst Res* 2013;9:712-9.
25. Tahani B, Yadegarfar G, Ahmadi A. Knowledge, attitude, and practice of parents of 7-12-year-old children regarding fissure sealant therapy and professional fluoride therapy. *J Educ Health Promot* 2017;6:106.
26. Mansoury T, Mortazavi V, Salehi A. A Survey on the Knowledge and Attitude of Primary School's Health Instructors in Isfahan City toward Oral Health Affairs in 2002. Thesis no 81016. Dental field. Isfahan School of Dentistry. Academic Year 2003-2004; 2002.
27. Samadzadeh H, Mousavi FN, Vakilzadeh Sh, Meschi M, Hatami B. *Booklet of Oral Health Knowledge for Elementary Students*. 1<sup>st</sup> ed. Tehran, Iran: Golabgir Publishing Co.; 2015.
28. Cane J, O'Connor D, Michie S. Validation of the theoretical domains framework for use in behaviour change and implementation research. *Implement Sci* 2012;7:37.
29. Sink DL. *Design models and learning theories for adults*. American Society for Training and Development. 2014;181-6.
30. World Health Organization. WHO Information Series on School Health. *Oral Health Promotion: An Essential Element of a Health-promoting School*. Geneva: World Health Organization; 2020. Available from: [https://www.who.int/oral\\_health/publications/doc11/en](https://www.who.int/oral_health/publications/doc11/en). [Last accessed on 2020 Mar 15].
31. Kwan SY, Petersen PE, Pine CM, Borutta A. Health-promoting schools: An opportunity for oral health promotion. *Bull World Health Organ* 2005;83:677-85.
32. Karimi N, Saadat-Gharin S, Tol A, Sadeghi R, Yasari M, Mohebbi B. A problem-based learning health literacy intervention program on improving health-promoting behaviors among girl students. *J Educ Health Promot* 2019;8:251.