



Oral Health Educational Intervention for Primary Healthcare Providers Using the Flipped Approach

Maedeh Bonabi¹, Simin Z Mohebbi^{1,2*}, Reza Yazdani^{1,2}, Sepide Rabiei¹, Jorma Virtanen³

1. Department of Community Oral Health, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran
2. Research Center for Caries Prevention, Dentistry Research Institute, Tehran University of Medical Sciences, Tehran, Iran
3. Department of Clinical Dentistry, Faculty of Medicine, University of Bergen, Bergen, Norway

Article Info

Article type:

Original Article

Article History:

Received: 05 Aug 2023

Accepted: 10 Feb 2024

Published: 10 Aug 2024

* Corresponding author:

Department of Community Oral Health,
School of Dentistry, Tehran University of
Medical Sciences, Tehran, Iran

Email: smohebbi@tums.ac.ir

ABSTRACT

Objectives: This study evaluated the effect of a flipped oral health educational program for primary healthcare providers (PHCPs) on their knowledge, attitude, and practice.

Materials and Methods: This field trial was conducted on PHCPs (N=118; 61 cases and 57 controls) in District Health Centers (DHCs) of Tehran, Iran in 2012. The participants filled out a self-report questionnaire with questions on knowledge (N=34), attitude (N=8), and oral health practice (N=14). The intervention included an educational booklet delivered to the staff followed by a brief educational session using the flipped approach and a reminder pamphlet after 1 month. After 4 months, the questionnaire was completed again by the participants. Statistical analysis included paired sample t-test, ANCOVA, and linear and logistic regression.

Results: Most participants were females (N=114), and the mean age was 37±8 years. The scores of the three domains of knowledge and also the total knowledge score, the attitude score, and the practice score significantly improved in the intervention group compared to the control group (P<0.001). Knowledge about the oral health of children (P=0.001) and the total knowledge score (P<0.05) significantly increased in the control group, but the increase in other domains was not statistically significant (P>0.05).

Conclusion: The oral health knowledge of PHCPs was insufficient, and their practice and attitude were not desirable. The oral health educational program with the flipped approach had a positive impact on the PHCPs' knowledge, attitude and practice, and may be utilized in the academic curriculum or continuing medical education (CME) courses.

Keywords: Oral Health; Education; Health Personnel

➤ **Cite this article as:** Bonabi M, Mohebbi SZ, Yazdani R, Rabiei S, Virtanen J. Oral Health Educational Intervention for Primary Healthcare Providers Using the Flipped Approach. *Front Dent.* 2024;21:31.

INTRODUCTION

Although most oral and dental conditions are preventable, many people suffer from them worldwide [1]. The conventional treatments for oral health conditions are costly, being the fifth most expensive treatment in industrial countries [2]. In low-income countries, if treatment is available, it would probably cost more than the whole budget allocated for a child's healthcare needs [1]. The healthcare programs of the World Health Organization

[3] emphasize on the necessity of oral health as part of general health; every effort for oral healthcare promotion should be in conformity with general healthcare [4].

Primary healthcare providers (PHCPs) are more likely to communicate with different age groups in a population compared to dentists. Knowledge about the primary oral health risk factors and the relationship between oral health and general health is imperative for PHCPs in order to be able to make effective and timely decisions

to promote oral health [5]. Therefore, recent recommendations focus on the contribution of primary healthcare providers to improve oral healthcare [6]. Healthcare providers, however, receive limited oral health education. For example, general health students pass two credits regarding oral and dental health in their undergraduate program [7] while there is no specific credit for oral and dental health among 130 credits that midwifery students pass in their four-year course period [8]. By providing oral health education, screening and consultation with patients and necessary referrals to a dentist, healthcare providers may have a constructive influence on oral health outcomes of vulnerable populations [9].

Evidence shows that adding oral healthcare to the duties of non-dentist PHCPs can improve the availability of preventive oral healthcare in deprived areas by improving access to oral healthcare through a diverse workforce and collaborations with medical colleagues [10]. The American Academy of Pediatric Dentistry and American Academy of Pediatrics insist on merging oral health in general health in primary healthcare settings [10]. As oral health could be determined by oral hygiene, smoking, mental health, stress, and diet, and these factors can cause a number of chronic diseases, using a collaborative approach is highly recommended [11].

The oral health educational courses can be useful for non-dental healthcare providers as they may be the only care givers for people who do not have access to a dentist [12]. In a study conducted in Iran in 2014, 60% of the PHCPs (N=680) were eager to provide oral health instructions to patients [13].

PHCPs commonly receive educational pedagogy which relies on the traditional approaches of knowledge transition by expert teachers mostly characterized by inactive learners who are not engaged enough in their learning and in translating knowledge into behavior and practice [14]. To minimize such educational limitations, there has been a shift towards learner-centered learning models [15]. This shift was accompanied by a recent surge in the flipped approach in education [16]. The concept of flipped classroom, also known as the

inverted classroom, refers to the reallocation of practice within or outside the classroom in an actual teaching task by teachers. One of the characteristics of this method is that tutors do not pass on related information during the class time; they share this information with the learners for self-learning and the learners may accomplish learning as home task [17]. This method seemed to be helpful in improving knowledge, attitude, skills, and problem-solving skills in nursing education [18]. To the best of the authors' knowledge, the effectiveness of the flipped method in oral health education of PHCPs has not been previously evaluated.

Health centers in small cities and countries in which the physicians and the staff are working in various sectors, including primary healthcare and midwifery, vaccination, and general health provide good opportunity for integration of oral health into general health. The existing general health practices and programs, in which children are regularly screened for health from birth provide a proper context for oral health education. On the other hand, these staff need to pass courses to extend their medical license or job promotion [19] which may provide motivation for them to attend continuing medical education (CME) courses including oral health promotion courses.

Obligations for PHCPs to annually attend CME programs [19] is a good opportunity to provide them with oral health educational programs. The aim of this study was to evaluate the effectiveness of the flipped method in changing oral health knowledge, attitude, and practice of PHCPs.

METHODS

Overview:

This was an oral health intervention study using a booklet as a study material that was distributed in health centers. Two weeks later, an interactive session with question and answer time was held for the intervention group. One month later, a pamphlet containing important points of the booklet was given to the participants. After 4 months, the questionnaire was filled out again by the participants. Moreover, their level of satisfaction with the intervention was questioned.

District Health Centers (DHCs) and participants:

Tehran has as a total of 7 DHCs; three of which, are located in non-affluent areas. Each DHC supervises 15 to 30 public health centers with varying numbers of PHCPs (one to five) in each center [20].

Two of the three DHCs were randomly assigned to the intervention and control groups. Therefore, in one DHC, PHCPs (N=61) were assigned to the flipped oral health educational intervention while the PHCPs in the other DHC (N=57) did not receive any training during the intervention. Totally, 118 PHCPs participated in baseline and post-intervention assessments.

Data collection was performed by using a valid questionnaire at baseline and 4 months later as the outcome. Figure 1 shows the study flow-chart.

Educational interventions:

An evidence-based booklet [20] was used for the intervention, consisting of six parts: oral health and diseases in adults, oral health and diseases in children, oral health in pregnancy, fluoride and dental caries, dental emergencies, and the relationship between oral and systemic diseases. A pamphlet was also designed, which included the most important topics of the booklet; both were in Persian language.

Intervention group (booklet, educational session

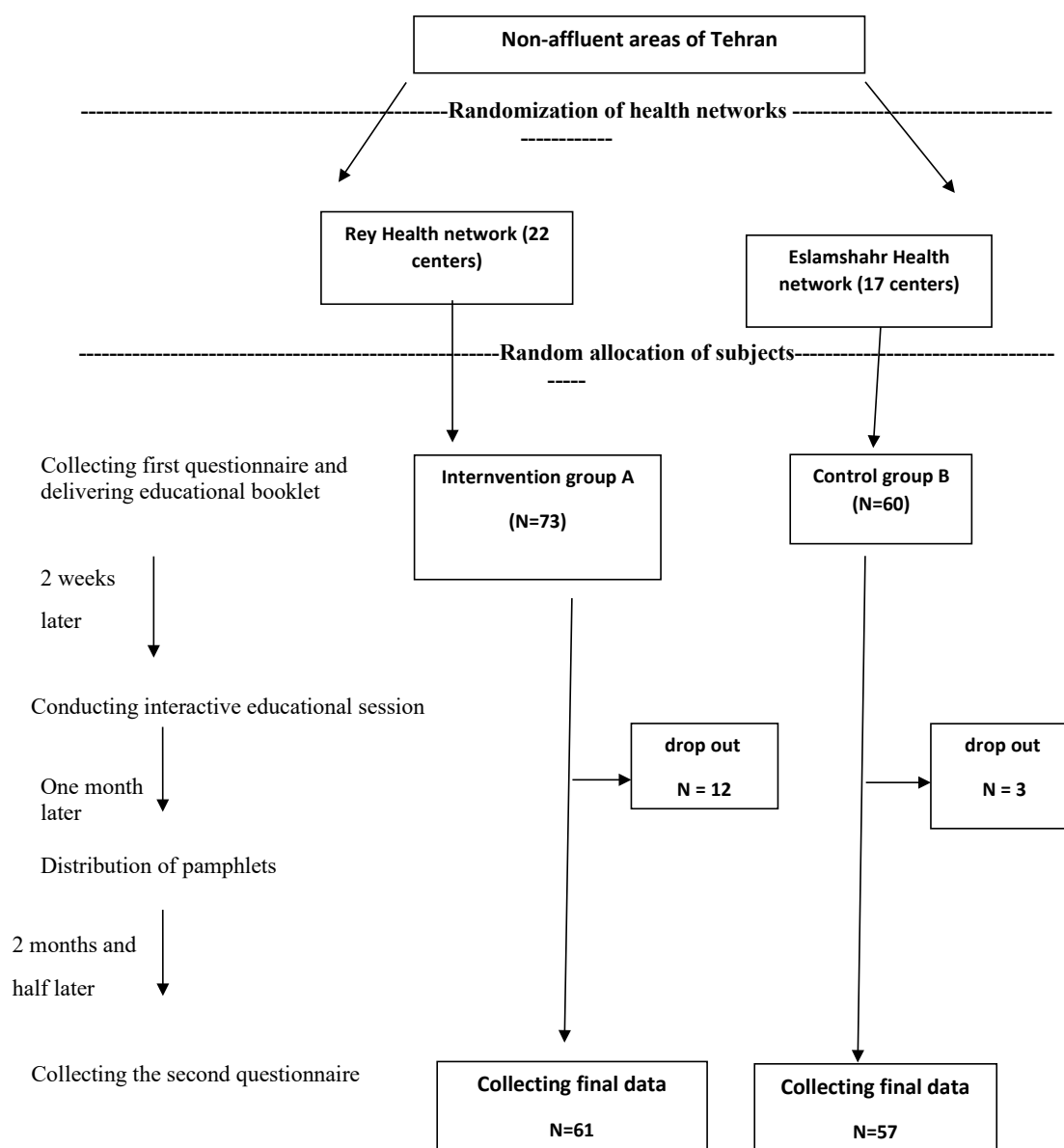


Fig. 1. Flowchart of educational intervention in two health networks

with flipped approach, and pamphlet): The PHCPs received the booklet after completing the baseline questionnaire. An interactive educational session was held 2 weeks later. A half-day session by one of the authors (S.R) provided the PHCPs with a short interactive lecture on the topics of the booklet, blended with case-based presentations, and discussions about preventive approaches. Another session was held one week later for those who could not take part. After one month, the reminder pamphlet was given to the intervention group.

Control group: The control group received no oral health educational information during this period. After completion of the study, they received the booklet and the pamphlet.

Participants received a certificate of attendance in a continuing medical education course and some gifts.

The data collection tool was a questionnaire which was derived from valid questionnaires of former studies and some researcher-designed questions [21,22] and contained multiple-choice questions and five-point Likert scale knowledge and attitude questions from strongly agree to strongly disagree with scores from 1 to 5, respectively. Demographic questions and sources of learning in the field of oral health were multiple-choice or open-ended questions.

Validity and reliability of the questionnaire:

The content validity of the questionnaire was assessed by experts at the Community Oral Health Department of Tehran University of Medical Sciences qualitatively, and necessary modifications were made. A pilot study was also conducted on 20 PHCPs, and they were asked to express their opinion about the quality of the questionnaire as well as grammar and wording. In this phase, three questions from the practice domain and one question from the knowledge domain were omitted, and minor changes were made in some other questions.

For reliability assessment, the test-retest method was used on 20 PHCPs. The actual agreement for most questions was over 0.85, and two questions with agreement percentages less than 0.6 were omitted. The internal consistency of the questionnaire was acceptable as the Cronbach's alpha for all domains (knowledge, attitude, and practice) was between 65% and 75%.

Demographic questions:

Demographic questions asked for gender, age, highest educational degree acquired, socioeconomic status in their working area (affluent/non-affluent), working sector (only public, or public and private sectors) and personal oral health behaviors (OHBs) including five questions about tooth brushing, dental flossing, fluoride application, dental visits, and snacking. The sum of scores for OHB variables ranged from zero to 26 [20].

Oral health knowledge, attitude and practice questions:

The knowledge domain contained 34 questions with 12 questions in the field of pediatric dentistry, 9 questions in the field of general dental knowledge, and 13 questions in the field of dentistry-related medical knowledge.

The answers to the knowledge questions were dichotomized for scoring as "1" for correct answers and "0" for false and "I do not know" answers. The sum of item scores could range from zero to 12 in pediatric dentistry, zero to nine in general dental knowledge, and zero to 13 in dentistry-related medical knowledge, and the total knowledge score could range from zero to 34 for each participant.

The oral health attitude section contained eight 5-point Likert-scale questions ranging from strongly agree to strongly disagree scored from 0 to 4. The highest score indicated the most positive attitude. The final score was the sum of item scores, which could range from 0 to 32 for the attitude domain for each participant.

The oral health practice section contained 14 questions; 2 were multiple choice questions. Also, it contained a table that asked about the physicians' practice regarding newborns, toddlers and pregnant mothers. The total score for the practice section could range from zero to 14 for each participant.

Satisfaction questions:

The post-test questionnaire had a new section with two questions that asked about the compliance of the participants to the contents of the lecture and booklet. Also, the effect of each component of the intervention on detection of oral and dental diseases, and consultation and timely referral of patients to a dentist was assessed. These questions were multiple-choice questions with answer choices

of “very much, high, medium, low, very low, no idea, and no company.”

Ethical considerations:

Participation in the study was voluntarily, and the participants filled out the questionnaires anonymously. All respondents signed written informed consent forms. The Ethics Committee of Tehran University of Medical Sciences approved the study (IR.TUMS.REC.1396.2949). A certificate of participation in a continuing medical education course program was issued for the participants.

Statistical analysis:

Data were analyzed using PASW version 18. (IBM, USA). Descriptive data were expressed in percentage, mean, and standard deviation. The difference in the mean values among the subgroups was analyzed by independent-samples t-test and ANOVA, and the Bonferroni test was used as the post-hoc test. The frequency difference between the subgroups was also analyzed by the Chi-square test. The difference in the mean values before and after the intervention was analyzed by paired-samples t-test and univariate ANCOVA. To analyze the quantitative data, a linear regression model

and two methods of qualitative data analysis of logistic regression were used. The significance level was set at $P < 0.05$.

RESULTS

The mean age of the PHCPs participating in the study was 37 ± 8 years (range 22 to 56 years). The majority of the participants in the study were women; men comprised 3% of the study population. The mean score of personal OHB was 19.7 ± 5.2 (range 10 to 26) out of 34. Among PHCPs, 27% had an associate degree and 66% had a bachelor's degree or higher (Table 1).

Knowledge level before and after the intervention and the associated factors:

The mean knowledge domain score and total score (Table 2) significantly increased in the intervention group after the training ($P < 0.001$). In the control group, knowledge about pediatric dentistry ($P = 0.001$) and total knowledge ($P < 0.05$) significantly increased, but the increase in other areas was not statistically significant ($P > 0.05$).

The difference between the mean pre- and post-intervention scores in all knowledge domain scores and total knowledge score in the intervention group was greater than that in the control group ($P < 0.001$).

Attitude before and after the intervention and the associated factors:

The mean attitude score after the intervention in both the intervention and control groups ($P < 0.001$) significantly increased. Univariate analysis showed that this increase in the intervention group was significantly greater than that in the control group (Table 3).

Table 1. Demographic characteristics of 118 primary health care providers in two District Health Centers in Tehran

		Number	Percent
Gender	Female	114	97
	Male	4	3
Oral health behaviors	Low (10-18)	38	32
	Medium (19-21)	52	44
	High (22-26)	28	24
Educational level	Diploma	8	7
	Associate	32	27
	Bachelor and above	78	66

Table 2. Mean score of knowledge gained by primary health care providers in two district health centers in Tehran (N=118)

Knowledge score mean		Baseline	Intervention	MD	SE	95% CI		P ¹	P ²
						Upper	Lower		
Children oral health	Intervention	4.98	10.02	5.03	0.34	-0.43	-1.47	<0.001*	<0.001
	Control	5.16	6.11	0.95	0.26	1.79	0.84	<0.001*	
Public oral health	Intervention	5.79	8.49	2.71	0.18	-2.35	-3.06	<0.001*	<0.001
	Control	5.75	5.88	0.12	0.17	0.47	-0.22	0.478	
Oral health in relation with public health	Intervention	5.57	11.44	5.87	0.39	6.66	5.07	<0.001*	<0.001
	Control	6.39	6.77	0.39	0.36	0.33	-1.11	0.287	
Overall	Intervention	16.34	29.95	13.61	0.67	14.95	12.27	<0.001*	<0.001
	Control	17.3	18.75	1.460	0.65	2.75	0.16	0.028*	

MD: mean difference; SE: standard error; CI: Confidence interval

1- Paired sample t-test

2- Analysis of Covariance (ANCOVA)

Practice scores before and after the intervention and the associated factors:

The mean practice score significantly increased after the intervention in the intervention group ($P < 0.001$), while in the control group, the increase in the domain scores was not significant (Table 3).

The difference in the mean practice scores before and after the intervention in the intervention group was more than that in the control group ($P < 0.05$).

Factors related to changes in the knowledge score of PHCPs:

Linear regression (Table 4) showed that the differences in the total knowledge and all three domain scores were correlated with the educational intervention and baseline knowledge score in the same domains, such that those who had a lower knowledge score showed higher scores after the intervention ($P < 0.001$).

Factors related to changes in the attitude score of PHCPs:

According to the linear regression (Table 5), educational intervention, baseline attitude

score and OHBs were effective on the change in the attitude score of PHCPs, such that those who received the educational intervention and had a lower baseline attitude score ($P < 0.001$) and a lower OHB score ($P < 0.05$) experienced a greater improvement in their attitude score after the intervention.

Factors related to changes in the practice score of PHCPs:

In PHCPs, the intervention, OHB score, and pretest score of individuals in practice were effective on the change in their practice score in post-test, such that those who received the educational intervention and had a higher OHB score ($P < 0.05$) and a lower baseline practice score ($P < 0.001$) showed a higher improvement in practice score (Table 6).

Satisfaction of participants with the intervention:

Compliance of the content of the interactive session and booklet with the needs of PHCPs:

Among all participants, 88% of the staff in the family health department rated the compliance of their educational needs with the content of the educational seminar as high and very high,

Table 3. Mean scores of attitude and practice in primary health care providers (N=118) working in two district health centers in Tehran

	Groups	Baseline	Follow up	MD	SE	95% CI		P ¹	P ²
						Upper	Lower		
Attitude	Intervention	22.8	28.92	6.12	0.74	7.59	0.31	<0.001	<0.001
	Control	21.82	23.30	1.47	0.58	-0.31	-2.63	0.014	
Practice	Intervention	10.39	11.17	0.78	0.39	2.27	0.71	<0.001	0.038
	Control	10.65	11.16	0.51	0.38	1.28	-0.26	0.192	

MD: mean difference; SE: standard error; CI: Confidence interval

1- Paired sample t-test

2- Analysis of Covariance (ANCOVA)

Table 4. Linear regression of factors related to difference in oral health knowledge score of primary health care providers (N=118) working in two district health centers of Tehran after adjustment for background characteristics

Knowledge score	Unstandardized Coefficients		Standardized Coefficients	P	95% CI for B	
	B	SE	B		Upper	Lower
Gender	1.56	3.28	0.03	0.625	8.06	-4.95
Age	0.04	0.05	0.03	0.510	0.15	-0.07
Educational Level	-0.24	0.65	-0.02	0.713	1.05	-0.53
Oral health behaviors	0.05	0.16	0.02	0.731	0.38	-0.26
Educational intervention	11.77	0.82	0.74	<0.001	13.4	10.14
Primary knowledge score	-0.58	0.09	-0.37	<0.001	-0.41	-0.76
Primary attitude score	0.01	0.08	0.01	0.86	0.17	-0.14

SE: standard error; CI: Confidence interval

All variables are continuous values, except for gender, grade, and educational intervention

Educational Level: diploma and lower, associate degree, bachelor's degree and higher

Educational intervention: control, intervention

Table 5. Linear regression of factors related to difference in oral health attitude score of primary health care providers (N=118) working in two district health centers in Tehran after adjustment for background characteristics

	Unstandardized Coefficients		Standardized Coefficients	P-value	95% CI for B	
	B	S.E	Beta		Upper limit	Lower limit
Attitude score						
Gender	1.38	3.15	0.03	0.66	7.63	-4.87
Age	-0.06	0.05	-0.08	0.26	0.05	-0.17
Educational Level	-0.09	0.62	-0.01	0.89	1.15	-1.32
OHB	-0.42	0.16	-0.19	0.008*	-0.11	-0.73
Educational intervention	5.32	0.79	0.47	<0.001*	6.89	3.75
Baseline knowledge score	0.17	0.08	0.16	0.039*	0.34	0.01
Baseline attitude score	-0.67	0.08	-0.64	<0.001*	-0.52	-0.82

SE: standard error; CI: Confidence interval

All variables are continuous values, except for gender, grade, and educational intervention

Educational Level: diploma and lower, associate degree, bachelor's degree and higher

Educational intervention: control, intervention

Table 6. Linear regression of factors related to difference in oral health practice score of primary health care providers (N=118) working in two District Health Centers of Tehran after adjustment for background characteristics

	Unstandardized Coefficients		Standardized Coefficients	P-value	95% CI for B	
	B.	S.E	Beta		Upper limit	Lower limit
Practice score						
Gender	1.38	1.6	0.06	0.391	4.55	-1.79
Age	-0.02	0.03	-0.05	0.46	0.03	-0.07
Educational Level	0.21	0.32	0.05	0.5	0.84	-0.41
OHB	0.17	0.08	0.16	0.033*	0.33	0.01
Educational intervention	0.89	0.4	0.15	0.029*	1.69	0.09
Primary knowledge score	0.08	0.04	0.13	0.082*	0.16	-0.01
Baseline attitude score	0.01	0.04	0.02	0.839	0.08	-0.07
Baseline practice score	-0.79	0.08	-0.73	<0.001*	-0.64	-0.95

SE: standard error; CI: Confidence interval

All variables are continuous values, except for gender, grade, and educational intervention

Educational Level: diploma and lower, associate degree, bachelor's degree and higher

Educational intervention: control, intervention

while this value was 88% for the oral health information booklet.

Effect of educational seminar, booklet and pamphlet of oral health information on detection of oral and dental diseases, consultation, and referral of patients:

Among all participants, 84% rated the impact of the educational seminar of oral health promotion on consultation and timely referral of patients to a dentist as very high and high. This value was 88% and 83% for the effect of booklet and pamphlet, respectively. None of the PHCPs (100%) had participated in any other oral health education seminar during the past 4 months.

DISCUSSION

This study showed that the educational intervention for PHCPs was effective in increasing their knowledge. This finding was similar to the result of Douglass et al, [23] and Schaff-Blass et al, [24] who showed that the knowledge of physicians increased after oral health education. In contrast to the present study, a systematic review in 2017 [25] and a meta-analysis in 2018 [26] concluded that there was a lack of strong evidence regarding the outcomes and effectiveness of the flipped approach in health/medical education for promotion of knowledge and skills. This conclusion could be due to the small number of

educational studies available at that time, and the poor reporting quality of educational studies. In the present study, the educational material was tailored according to the participants' career needs. The present study revealed that those with lower scores at baseline benefitted the most from the intervention. The same was true about the improvement in attitude.

Some studies in clinical epidemiology and biostatistics [27], emergency medical clinical clerkship [28] and surgery core clerkship [29] reported positive changes in attitude of the participants by using the flipped approach as an educational method in contrast to traditional methods. Also, in line with the present study, another study stated that after a training program provided to children's caregivers, they had a more positive attitude and became aware of the importance of oral healthcare in their workplace [30]. Learner-centered methods mainly focus on problem solving [31] and changing attitude [32]. In comparison to leader-centered methods, learner-centered methods can change skills and strategies of the learners.

It was reported that those who took part in CME courses were 4 times more likely to refer children under the age of one to a dentist [22]. Similarly, in the present study, the intervention increased the practice score and referral rate. Similar to knowledge and attitude, the impact of the educational intervention was greater on those with lower baseline score. Some studies found that PHCPs provided preventive oral healthcare for their patients in Medicaid system [33,34]. Such findings contradicted the results of another study which showed that educational intervention directly increased the knowledge and attitude of the participants but did not change the participants' practice of care [35].

University may be the best place for oral and dental education to increase knowledge and create a positive attitude in students. After entering the work field and engaging in multiple tasks, the chance of accepting new information and tasks would decrease [36]. In some countries, oral health topics are included in the medical educational curricula [37]. Many authors suggested that oral health should be incorporated in the curriculum of medical

students and other related disciplines [37,38] in order to increase oral health knowledge and access of patients to preventive dental care.

In addition, CME courses for physicians usually aim to provide the latest information to the medical team (with the aim of upgrading their knowledge and skills and the credibility of medical licensure organizations). Physicians in different countries need to provide a certificate of participation in such courses for renewal of their medical license. Some studies on CME courses for physicians have claimed limited impact for those conducted in one single session [39]. Although some of them may be useful in changing the traditional teaching mode of physicians and provision of post-training support or change the behavior of participants in consulting the parents about oral health promotion of their children [36].

In the present study, the majority of PHCPs reported "very high and high" levels of compliance of the flipped approach oral health educational session and booklet content with their needs, which may be because oral healthcare is part of their tasks, although not sufficiently addressed.

In a study by Tune et al, in 2013, similar to the present study, medical students were satisfied with the flipped approach in the field of cardiovascular, respiratory, and renal physiology [40].

The majority of the participants expressed very high and high levels of impact of the oral health educational seminar and booklet on consultation and referral of patients to a dentist.

Due to the high concern of the target group in the healthcare centers, coordinating a meeting for PHCPs was challenging and they were not willing to attend training courses. Encouraging them to participate in the study and filling out the questionnaire for the second time was another limitation. Thus, PHCPs were provided with a certificate of attendance in a CME program. Also, they received some gifts.

The 4-month follow-up period in this study may not be sufficient to predict the long-term performance of the participants of the course and the definite effect of the intervention on improvement of oral health of patients [40].

Also, the study population mostly comprised of women, but it cannot be mentioned as a limitation. The PHC workers in Iran are mostly women as they are engaged with the population of mothers and children.

CONCLUSION

The oral health knowledge of PHCPs was insufficient, and their practice and attitude were not desirable. The oral health educational program with the flipped approach had a positive impact on the PHCPs' knowledge, attitude and practice, and may be utilized in the academic curriculum or CME courses.

ACKNOWLEDGMENT

This study was funded by Tehran University of Medical Sciences, Research Center for Caries Prevention, Dentistry Research Institute, Tehran.

CONFLICT OF INTEREST STATEMENT

None declared.

REFERENCES

1. Watt RG. Strategies and approaches in oral disease prevention and health promotion. *Bulletin of the World Health Organization*. 2005;83:711-8.
2. développement OmdlsDse, Staff WHO, Organization WH, UNICEF. Global strategy for infant and young child feeding: World Health Organization; 2003.
3. Petersen PE. Global policy for improvement of oral health in the 21st century-implications to oral health research of World Health Assembly 2007, World Health Organization. *Community dentistry and oral epidemiology*. 2009;37(1):1-8.
4. Health NIo. National Institute of Dental, Craniofacial Research: A national call to action to promote oral health: a public-private partnership under the leadership of the Office of the Surgeon General. Public Health Service, Centers for Disease Control and Prevention, National Institutes of Health, National Institute of Dental and Craniofacial Research. 2003.
5. Kagihara LE, Niederhauser VP, Stark M. Assessment, management, and prevention of early childhood caries. *J AM ACAD NURSE PRAC*. 2009;21(1):1-10.
6. Association AD. Future of dentistry. Chicago: J AM Dent Assoc. Health Policy Resources Center. 2001;56.
7. Education MoHaM. Course Characteristics

- and subjects of General health Tehran: Ministry of Health and Medical education; ; 2010 [cited 2022 August]. Course Characteristics and subjects.]. Available from: <https://shmu.ac.ir/sph/fa/page/684/%DA%A9%D9%88%D8%B1%DB%8C%DA%A9%D9%88%D9%84%D9%88%D9%85-%D8%A8%D9%87%D8%AF%D8%A7%D8%B4%D8%AA-%D8%B9%D9%85%D9%88%D9%85%DB%8C>
8. Sciences TUoM. Midwifery Curriculum [cited 2018 December]. Available from: http://fnm.tums.ac.ir/85516/sec_18/p_20.aspx?lang=fa.
 9. Mouradian WE, Schaad DC, Kim S, Leggott PJ, Domoto PS, Maier R, et al. Addressing disparities in children's oral health: a dental-medical partnership to train family practice residents. *J DE*. 2003;67(8):886-95.
 10. Haden NK, Catalanotto FA, Alexander CJ, Bailit H, Battrell A, Broussard J, et al. Improving the oral health status of all Americans: roles and responsibilities of academic dental institutions: the report of the ADEA President's Commission. *JDE*. 2003;67(5):563-83.
 11. Sheiham A, Watt RG. The common risk factor approach: a rational basis for promoting oral health. *Community Dent Oral Epidemiology: Commentary*. 2000;28(6):399-406.
 12. Bolden AJ, Logan HL, Jakobsen JR, Evans TA. Perception of oral health needs by Southeast Iowa non-dental health care providers. *Spec Care Dentist*. 1994;14(5):194-7.
 13. Rabiei S, Mohebbi SZ, Yazdani R, Virtanen JI. Primary care nurses' awareness of and willingness to perform children's oral health care. *BMC Oral Health*. 2014;14(1):26.
 14. King A. From sage on the stage to guide on the side. *College teaching*. 1993;41(1):30-5.
 15. Della Ratta CB. Flipping the classroom with team-based learning in undergraduate nursing education. *Nurse Educ*. 2015;40(2):71-4.
 16. Betihavas V, Bridgman H, Kornhaber R, Cross M. The evidence for 'flipping out': a systematic review of the flipped classroom in nursing education. *Nurse Educ Today*. 2016;38:15-21.
 17. Dong X. Application of Flipped Classroom in College English Teaching. *Creat. Educ*. 2016;7(09):1335.
 18. Tan, C., Yue, W.G. and Fu, Y., 2017. Effectiveness of flipped classrooms in nursing education: Systematic review and meta-analysis. *Chin. Nurs. Res.*, 4(4), pp.192-200.
 19. Education MoHam. Iranian center for Continuing medical education: Iranian center for Continuing medical education; [Available from: [http://www.ircme.ir/app_web/\(guest\)/cms/menu/DynamicPage.aspx?CenterID=4&PageID=349](http://www.ircme.ir/app_web/(guest)/cms/menu/DynamicPage.aspx?CenterID=4&PageID=349)].

20. Mohebbi SZ, Rabiei S, Yazdani R, Nieminen P, Virtanen JI. Evaluation of an educational intervention in oral health for primary care physicians: a cluster randomized controlled study. *BMC Oral Health*. 2018;18(1):218.
21. Di Giuseppe G, Nobile CG, Marinelli A, Angelillo IF. Knowledge, attitude and practices of pediatricians regarding the prevention of oral diseases in Italy. *BMC Public Health*. 2006;6(1):176.
22. Prakash P, Lawrence HP, Harvey BJ, McIsaac WJ, Limeback H, Leake JL. Early childhood caries and infant oral health: Paediatricians' and family physicians' knowledge, practices and training. *J. Paediatr Child Health*. 2006;11(3):151-7.
23. Douglass JM, Douglass AB, Silk HJ. A practical guide to infant oral health. *AFP*. 2004;70(11).
24. Schaff-Blass E, Rozier RG, Chattopadhyay A, Quiñonez R, Vann Jr WF. Effectiveness of an educational intervention in oral health for pediatric residents. *Ambul Pediatr*. 2006;6(3):157-64.
25. Chen F, Lui AM, Martinelli SM. A systematic review of the effectiveness of flipped classrooms in medical education. *Med Educ*. 2017;51(6):585-97.
26. Chen KS, Monrouxe L, Lu YH, Jenq CC, Chang YJ, Chang YC, et al. Academic outcomes of flipped classroom learning: a meta-analysis. *Med Educ*. 2018;52(9):910-24.
27. Kensington-Miller B, Novak J, Evans T. Just do it: flipped lecture, determinants and debate. *IJEMST*. 2016;47(6):853-62.
28. Heitz C, Prusakowski M, Willis G, Franck C. Does the concept of the "flipped classroom" extend to the emergency medicine clinical clerkship? *WestJEM*. 2015;16(6):851.
29. Liebert CA, Lin DT, Mazer LM, Bereknyei S, Lau JN. Effectiveness of the surgery core clerkship flipped classroom: a prospective cohort trial. *Am J Surg* 2016;211(2):451-7. e1.
30. Graham E, Negron R, Domoto P, Milgrom P. Children's oral health in the medical curriculum: a collaborative intervention at a university-affiliated hospital. *J. Dent. Educ*
31. Norman DA, Spohrer JC. Learner-centered education. *Commun ACM*. 1996;39(4):24-7.
32. Cheang KI. Effect of learner-centered teaching on motivation and learning strategies in a third-year pharmacotherapy course. *Am. J. Pharm. Educ*. 2009;73(3):42.
33. Dano-Hinosolango, M. A., & Vedula-Dinagsao, A. (2014). The impact of learner-centered teaching on students' learning skills and strategies. (*IJCDSE*), 5(4), 1813-1817.
34. Nowak AJ, Casamassimo PS. Using Anticipatory Guidance to Provide: Early Dental Intervention. *JADA*. 1995;126(8):1156-63.
35. Lewis CW, Grossman DC, Domoto PK, Deyo RA. The role of the pediatrician in the oral health of children: a national survey. *Pediatrics*. 2000;106(6):e84-e.
36. Kay E, Locker D. A systematic review of the effectiveness of health promotion aimed at improving oral health. *Community Dent Health*. 1998;15(3):132-44.
37. Sohn W, Ismail AI, Tellez M. Efficacy of educational interventions targeting primary care providers' practice behaviors: an overview of published systematic reviews. *J. Public Health Dent*. 2004;64(3):164-72.
38. Sarabadani, J., Javadzadeh, A., Pakfetrat, A. S., Delavarian, Z., Maramayi, M., & Seyyedi, S. A. (2011). Oral medicine course offer in general medical students training curriculums.
39. Pediatric Nursing Certification Board [Available from: <http://www.pncb.org/ptistore/control/certs/cpn-cpnp/index>].
40. Tune JD, Sturek M, Basile DP. Flipped classroom model improves graduate student performance in cardiovascular, respiratory, and renal physiology. *Adv. Physiol. Educ* 2013;37(4): 316-20.