



Association between healthcare activities, education, and demography of school health trainers and periodontal indices of children in elementary schools of Tabriz, Iran

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Original Article

Abstract

BACKGROUND AND AIM: Teachers and healthcare providers play an essential role in raising the level of awareness and knowledge and serve as a model for different aspects of healthcare. Primary school healthcare providers with the necessary education could improve the oral health of the students. One of the methods for evaluating oral health is the assessment of periodontal indices. The Community Periodontal Index of Treatment Needs (CPITN) is one of the most common indices for the assessment of gingival status. This study aimed to evaluate gingival health and its relationship with the level and the type of education and activity of healthcare providers in elementary schoolchildren.

METHODS: This descriptive cross-sectional study was performed on 800 elementary schoolchildren in Tabriz, Iran, in 2017. Students' gingival status was assessed with the CPITN. The healthcare teacher-associated factors, also, were determined through a checklist including age, sex, education, and activity. The data were analyzed with SPSS software. Independent t-test and chi-square test were done. $P < 0.05$ was considered significant.

RESULTS: 63.2% of students had a CPITN score of 1, 31.5% of students had a CPITN score of 0, and 5.3% of students had a CPITN score of 2. Students of teachers with higher academic education ($P = 0.029$) and with health-related education ($P = 0.013$) received lower CPITN scores and had better periodontal health. There was no statistically significant relationship between age, sex, and activity of the teachers and CPITN of the students ($P > 0.05$).

CONCLUSION: There was a significant relationship between the gingival and oral health of students and the level of education of healthcare teachers and their health-related university education. We strongly recommend the continuing education program for the healthcare providers in elementary schools.

KEYWORDS: Gingiva; Health Personnel; Periodontal Index; Students

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Periodontal disease is a multifactorial disease that impacts the various components of the periodontium and also can lead to several health consequences.¹ Oral hygiene can improve the

health of students and help provide the health of tomorrow's society and guarantee the promotion of learning and enhancement of their knowledge. Teachers and healthcare providers can play an important role in raising

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the level of awareness and knowledge and can be a model for different aspects of healthcare. Healthcare providers can accomplish this important task in a variety of ways. The school is a basic institution that provides opportunities for the development of the health of students and the community, and the large population of students and teachers are recognized as the most talented human resources that play a significant role in healthcare activities, affecting themselves and the society.²

The role of health educators in the development of primary healthcare will improve the students' health, including oral health, by recognizing and attempting to partially resolve students' health problems in collaboration with parents and teachers. School healthcare providers can play a significant role in improving the oral health of students through the necessary education to recognize the problem. Training in the proper methods of brushing and flossing and careful and complete supervision of their proper implementation is among the duties of healthcare providers in the field of oral healthcare in schools.³

One of the most important causes of tooth loss is dental caries and gingival diseases. The untreated periodontal disease showed to be leading toward more complicated situations for oral cavity structures. Bone resorption, the mobility of teeth, and tooth loss are the most common consequences of untreated periodontal disease.⁴ The loss of teeth could lead to nutritional disorders and systemic diseases. One of the indicators of oral health assessment is periodontal indices, which can indicate oral health status in individuals of society.^{5,6}

Health educators have a unique position in the process of educating and raising students' awareness, with a major role in timely prevention and diagnosis because they are in regular and continuous contact with students and can report quickly when a problem arises. However, does the ability to teach require an educational background or

the active presence of teachers at school? Or can teachers with greater work experience provide better care for their children or younger and naive teachers with less education? There is no report available on the relationship between educational background, healthcare teachers' activity, and periodontal indicators.^{7,8}

Studies have shown that the prevalence of gingival diseases, especially gingivitis, in elementary schoolchildren in Isfahan, Iran, is approximately 73.0%.⁹ This study was designed to investigate the health status of gingiva and factors that can influence it in elementary schoolchildren in Tabriz, Iran, in 2017. In addition, the relationship between educational background and health activities of school health educators with the periodontal health index was examined.

Methods

Study population: This cross-sectional descriptive study was carried out on 800 students of Educational District One in Tabriz, who were randomly selected from 12 schools in the 2017-2018 educational year. We had a two-stage sample selection process, first for the selection of the district where one should be selected among ten. In this stage, we used simple random sampling. Then for selection of the elementary schools and the students within the district, we used complete enumeration. Teachers who were absent on the day of data collection for any reason such as sick leave were excluded from the study. The sample size was estimated at 800 subjects after estimating the prevalence in the auxiliary sample consisting of both sexes, with approximately 5.0% dropout based on the Cochran table. The number of students of each gender was selected proportional to the school population.

Procedural steps: Two types of checklists were used in the study: the first one for the intraoral examination of the students and the second for data collection of the teachers. For intraoral examination, the data were collected with a pre-prepared checklist. The

examinations were performed under natural light with a standard World Health Organization (WHO) probe and a disposable mirror by a trained dentist. Periodontal examination was determined by the Community Periodontal Index of Treatment Needs (CPITN). The CPITN scores the periodontal status using five scores (Table 1): score = 0: healthy, score = 1: gingival bleeding, score = 2: presence of calculus, score = 3: shallow pocket (up to 5 mm), and score = 4: deep pocket (≥ 6 mm).¹⁰

To determine the periodontal status, the mouth was divided into six areas. For each area, the right central and first molar teeth of the maxilla and mandible were considered as indices, and periodontal status was assessed and scored with a periodontal probe. A single tooth with all the symptoms was considered as the worst state. The mean was calculated for each student, and the status of the health educators of the selected schools was also determined through a checklist. The checklist included age, sex, physical activity of the teachers in the school, history of their education about oral and dental health, and the number of years that they were engaged in health of the children. All the dental examinations were performed by the professors experienced in the use of CPITN criteria. They were calibrated by Department of Community Dentistry, School of Dentistry, Tabriz University of Medical Sciences, Tabriz. The Kappa agreement between the examiners was 0.91.

The data were reported using descriptive statistics [mean, standard deviation (SD), and percentage] for quantitative data. Since the

distribution of the data was normal, chi-square test was used to investigate the relationship of the educational background and gender with CPITN and independent t-test was used to investigate the relationship between the physical activity, age, and years of engagement of healthcare teachers with CPITN using SPSS software (version 17, SPSS Inc., Chicago, IL, USA) at a significance level of $P < 0.05$.

Ethical considerations: An examination was performed on the teeth of children with the implicit consent of the children and their parents. The preventive diagnosis of dental diseases was the benefit of the study, which was explained to the students if necessary. The students and teachers were free to participate in the study. Informed consent was obtained from the parents and children for participation in the study. The children were selected at random and had no specific criteria for entry. If the child did not wish to participate in the study, another child was selected. The Ethics Committee of the Deputy of Research of Tabriz University of Medical Sciences reviewed and approved the study protocol (IR.TBZMED.REC.1397.011).

Results

This study was carried out on 390 female students (48.7%) and 410 male students (51.3%). The mean age of the students was 9.3 years. A total of 506 (63.2%) students had bleeding on probing (BOP), i.e., CPITN score of 1, 252 subjects (31.5%) had healthy periodontium, i.e., CPITN score of 0, and 42 subjects (5.3%) had calculus and periodontal pockets < 3 mm of depth, i.e., CPITN score of 2 (Figure 1).

Table 1. The Community Periodontal Index of Treatment Needs (CPITN) scores and the treatments

Score	Criteria	TN	Interpretation
0	Healthy periodontium	0	No treatment is needed
1	Bleeding observed during/after probing	1	Improvement of personal oral hygiene
2	Presence of supragingival or subgingival calculus	2	Professional cleaning of teeth and removal of plaque retentive factors along with oral hygiene instructions
3	Pathological pocket 4-5 mm, gingival margin situated on black band of the probe	2	Scaling and root planning along with oral hygiene instructions
4	Pathological pocket 6 mm or more, black band of the probe not visible	3	Complex treatment like deep scaling, root planning, and more complex surgical procedures

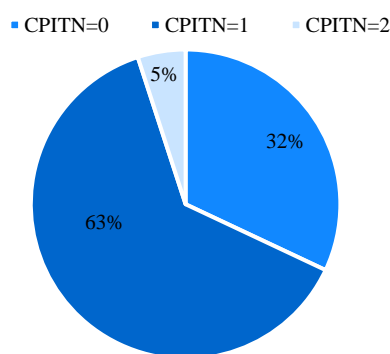


Figure 1. Distribution of the Community Periodontal Index of Treatment Needs (CPITN) scores among students

The results showed that the CPITN periodontal index was not significantly different between male and female students ($P = 0.329$). Approximately, 75.0% of healthcare teachers ($n = 9$) had an associate degree and 25.0% ($n = 3$) had a bachelor's degree (Figure 2).

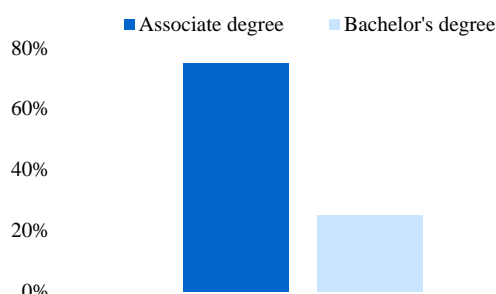


Figure 2. Distribution of teachers' degree

75.0% of healthcare teachers ($n = 9$) had health-related education, whereas 25.0% ($n = 3$) did not have health-related education (Figure 3).

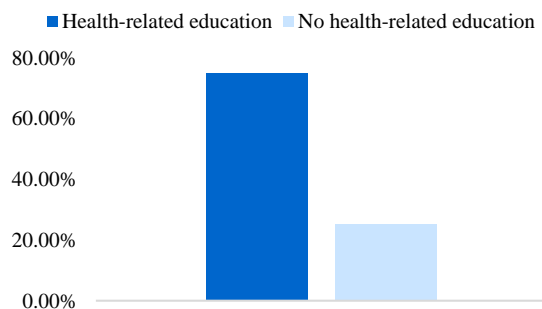


Figure 3. Distribution of teachers' health-related education

Approximately, 66.6% ($n = 8$) of healthcare teachers were on the job for > 15 years, 25.0% ($n = 3$) were on the job for 10-15 years, and one teacher (8.4%) was a healthcare teacher for 5-10 years (Figure 4).

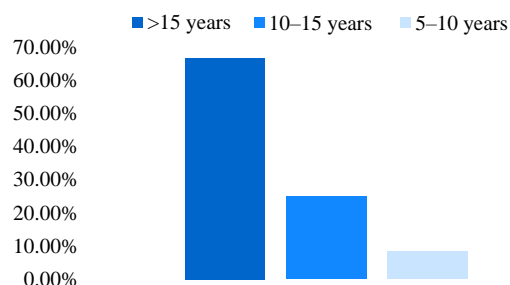


Figure 4. Distribution of the term of healthcare teachers being on the job

Approximately, 70.0% of students visited the healthcare teacher once a week and 20.0% did not visit the healthcare teacher at all; 5.0% of students visited the teacher twice a week and 5.0% referred to the teacher ≥ 3 times a week (Figure 5). Approximately, 16.6% of healthcare teachers ($n = 2$) were in the range of 26-30 years, and 16.6% ($n = 2$) and 66.6% ($n = 8$) were in 31-35 and 36-40 years, respectively.

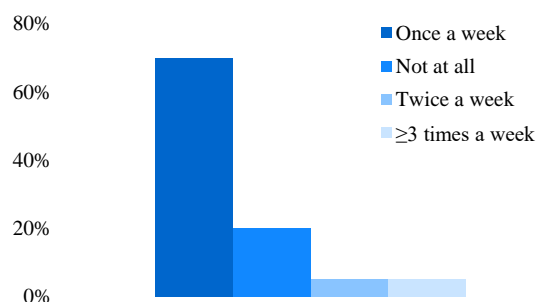


Figure 5. Distribution of the term of students visiting the healthcare teacher

According to the results of chi-square test, CPITN did not increase or decrease significantly in age or sex groups of the teachers ($P > 0.05$). Based on the results of independent t-test, there was a significant relationship between the CPITN of students and the healthcare teachers' health-related

education ($P = 0.013$) and university educational level ($P = 0.029$), namely students of teachers with higher academic education and with health-related education received lower CPITN scores and had better periodontal health.

Discussion

The present study was performed to investigate the gingival health and its contributing factors in elementary schoolchildren in Tabriz.

In the past two decades, there have been many reports and studies on the epidemiology of periodontal diseases. Many of these studies have used the CPITN to determine treatment needs (TN).¹¹

Global studies have shown that gingivitis affects approximately 50.0% of children at 4-5 years of age, after which the rate increases to as high as 100% at puberty and decreases to 50.0% after puberty, remaining almost stable until adolescence.¹²

The results exhibited that the CPITN was not significantly different between male and female children, with no significant difference between the two sexes in terms of health needs.

Nokhostin et al. in Kermanshah, Iran, evaluated the oral health status of students; 26.3% of female students had clinically healthy gingiva. There was a significant relationship between the frequency of brushing and the mean Decayed, Missing, and Filled Teeth (DMFT) and gingival health.¹³

In another study, the prevalence of gingivitis was 37.8% among 6-year-old children of Rayen, Kerman, Iran.¹⁴

The study of Pajand and Mohseni in Mashhad, Iran, showed that 56.0% of children, aged 7-11 years, had more than one affected papillary gingiva, and the oral condition deteriorated with aging.¹⁵

Another study in Bushehr, Iran, showed that the prevalence of mild gingivitis was 46.3% in male students and 31.1% of students had healthy gingiva without symptoms of any inflammation and disease.¹⁶

In a study in Tehran, Iran, the prevalence

of aggressive periodontitis in girls, 15-18 years of age, was 0.14%.¹⁷ In determining the prevalence of periodontitis, 8.6% of high school children in Saudi Arabia had periodontitis,¹⁸ but the prevalence of it was 0.5% in 14-16-year-old students in Tabriz.¹⁹

The frequency of gingivitis in boys and girls in the primary dentition period is almost equal. However, some studies have reported a slightly higher incidence in boys than girls, which has been attributed to less attention to oral hygiene and elimination of microbial agents by boys.^{9,12,20,21} The results of these studies are consistent with those of the present study.

However, a study in Yemen showed that the prevalence of gingivitis in children > 12 years of age was 78.6%, of which 47.7% were mild gingivitis,²² which is not in agreement with the results of this study. The discrepancy between the results of these two studies might be attributed to the different study populations, increased health awareness, and educational systems which are different between the two countries.

A study in United Arab Emirates (UAE) showed that children > 6 years old had higher gingival scores compared to those \leq 6 years.²³

Certain local factors could predispose children to acute or chronic gingivitis mainly by interfering with oral hygiene, dental physiology, and the equilibrium of body systems. These factors include orthodontic appliances, tooth crowding, chronic oral respiration, malnutrition, viral infections, stress, socioeconomic status, and insomnia, which should be considered in the process of treatment.^{12,24}

Recommendations for improving oral hygiene are essential in the treatment of gingival diseases, including the use of appropriate toothpaste for the age of the child, the use of child-friendly toothpastes and floss, and brushing teeth at least once or twice a day for at least one minute each time. Parents' supervision and assessment is needed in brushing and flossing in children < 8-10 years of age.^{12,25} There was a significant

relationship between students' CPITN and the level of education of healthcare teachers, health-related university education, and the history of healthcare teaching in schools.

Considering the aim of this study, it is necessary to determine periodontal TNs and awareness of the status quo and inform local authorities for the provision of TNs and plans for prevention and treatment. Since the former education of the teachers cannot reflect the current knowledge of them, we suggest applying the measures to assess their current knowledge in this regard. In addition, it seems necessary to bring to play other factors that can influence the oral health of the children like crowding, stress, and other physiologic and psychological determinants.

According to the results of the study, we strongly recommend the continuing education program for the healthcare providers in elementary schools. Implementation of "health-related academic education" as a prerequisite for enrollment of healthcare providing teachers is another suggestion.

Conclusion

In the present study, the results of the gingival health of the students were consistent with other studies in Iran, indicating that the prevalence of gingivitis was 68.5%. All the students need to be educated in oral hygiene, and the supervision of oral healthcare teachers should increase. There was a significant relationship between the gingival and oral health of students and the level of education of healthcare teachers and their health-related university education.

Conflict of Interests

Authors have no conflict of interest.

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References

1. Eke PI, Dye BA, Wei L, Slade GD, Thornton-Evans GO, Borgnakke WS, et al. Update on prevalence of periodontitis in adults in the United States: NHANES 2009 to 2012. *J Periodontol* 2015; 86(5): 611-22.
2. Taghizadeh Ganji A, Jafari A, Poorgholi N, Iranizadeh H. Evaluation of knowledge, attitude and practice of Tabriz's school health workers about oral and dental health. *J Dent Med Tehran Univ Med Sci* 2009; 22(3): 132-8. [In Persian].
3. Mazloomimahmoodabad S, Hadavandkhani M, Shirazi J, Dehghanitafti A. Survey of awareness, attitude and performance on oral health in high school teachers in Yazd city, In 2010. *Toloo e Behdasht* 2010; 9(1): 27-34. [In Persian].
4. Harris RJ. Untreated periodontal disease: A follow-up on 30 cases. *J Periodontol* 2003; 74(5): 672-8.
5. Afshar H, Ershadi A, Ershadi M. An investigation on the correlation between DMFT and OHI- S indices on 12-year-old school girls in Kashan. *Front Dent* 2004; 1(1): 38-42.
6. Oh TJ, Eber R, Wang HL. Periodontal diseases in the child and adolescent. *J Clin Periodontol* 2002; 29(5): 400-10.
7. Hooley M, Skouteris H, Boganin C, Satur J, Kilpatrick N. Parental influence and the development of dental caries in children aged 0-6 years: A systematic review of the literature. *J Dent* 2012; 40(11): 873-85.
8. Delshad Noughabi A. Mouth and dental health in manner and instructions of Islam Prophet (PBUH). *J Rafsanjan Univ Med Sci* 2008; 6(4): 7-13. [In Persian].
9. Ketabi M, Tazhibi M, Moheb Rasoul S. The prevalence and risk factors of gingivitis among the children referred to Isfahan Islamic Azad University (Khorasgan Branch) Dental School, In Iran. *Dent Res J* 2006; 3(1): 33-6.
10. Almas K, Bulman JS, Newman HN. Assessment of periodontal status with CPITN and conventional periodontal indices. *J Clin Periodontol* 1991; 18(9): 654-9.
11. Baelum V, Papapanou PN. CPITN and the epidemiology of periodontal disease. *Community Dent Oral Epidemiol* 1996; 24(6): 367-8.
12. Oliver RC, Brown LJ, Loe H. Periodontal diseases in the United States population. *J Periodontol* 1998; 69(2): 269-78.
13. Nokhostin MR, Siahamari A, Akbarzadeh Bagheban A. Evaluation of oral and dental health of 6-12 year-old students in Kermanshah city. *Iran South Med J* 2013; 16(3): 241-9. [In Persian].
14. Jahanimoghdam F, Shamsaddin H. The prevalence and risk factors of gingivitis in a population of 6-year-old

- children in Iran. *J Oral Health Oral Epidemiol* 2016; 5(3): 129-33.
15. Pajand H, Mohseni M. A study of oral hygiene and gingival status of 7-11 years old children in Mashhad, Iran. *J Mashad Dent Sch* 2002; 26(1-2): 25-34.
 16. Behrouzi S, Tahmasbi R. The prevalence of gingivitis and its determinants in 6-16 YR. students of bushehr port/Iran. *Iran South Med J* 2003; 5(2): 152-60. [In Persian].
 17. Sadeghi R, Semiari H, Aziz T, Abedi P, Khodaverdi A, Reeyazi S. Prevalence of aggressive periodontitis in 15-18 years old schoolgirls in Tehran, Iran. *J Dent Tehran Univ Med Sci* 2005; 18(4): 22-30. [In Persian].
 18. AlGhamdi A, Almarghani A, Alyafi R, Ibraheem W, Assaggaf M, Howait M, et al. Prevalence of periodontitis in high school children in Saudi Arabia: A national study. *Ann Saudi Med* 2020; 40(1): 7-14.
 19. Lafzi A, Kashefi Mehr A, Amid R. The prevalence of localized aggressive periodontitis in 14-16 years old school students in Tabriz. *J Dent Sch Shahid Beheshti Univ Med Sci* 2005; 23(1): 122-9. [In Persian].
 20. Dean JA, Avery DR, McDonald RE. McDonald and Avery's dentistry for the child and adolescent. 9th ed. St. Louis, MO: Mosby/Elsevier; 2011. p. 435-50
 21. Talebi Ardakani MR, Moein Taghavi A, Farzan H, Mirhosseini Nia M, Mehran N. Evaluation of prevalence of gingivitis in students of 8-11 years of Yazd in primary school in 1379. *Majallah-I-Dandanpizishki* 2003; 15(2): 50-60. [In Persian].
 22. Al-Haddad KA, Ibrahim YT, Al-Haddad AM, Al-Hebshi NN. Assessment of gingival health status among 5- and 12-year-old children in Yemen: A cross-sectional study. *ISRN Dentistry* 2013; 2013: 352621.
 23. Gopinath VK, Rahman B, Awad MA. Assessment of gingival health among school children in Sharjah, United Arab Emirates. *Eur J Dent* 2015; 9(1): 36-40.
 24. Sharma U, Gill N, Gulati A, Passi S, Verma L, Bal IS, et al. Effect of oral health behavior and demographic variables on gingival health in 11-16-year-old school children in Chandigarh, India: A cross-sectional study. *J Investig Clin Dent* 2019; 10(3): e12405.
 25. Poureslami HR, Makarem A, Mojab F. Paraclinical effects of Miswak extract on dental plaque. *Dent Res J* 2007; 4(2): 106-110.