Assessment of periodontal diseases related knowledge in female middle school teachers of Riyadh city, Kingdom of Saudi Arabia

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Abstract
Aim: To assess the knowledge of periodontal health and the contributing factors among middle school teachers in Riyadh city, Kingdom of Saudi Arabia.

Methods: An online questionnaire based cross-sectional survey of middle school teachers was conducted in Riyadh city using a stratified random sampling method. Data analysis was performed using SPSS. Differences between groups were examined using Chi-square test for linear trends and cross tabulations to compare responses from different groups.

Results: Of the 898 middle school teachers responded to the survey, majority of teachers had sufficient knowledge of causes and prevention of gingivitis. Statistical significance were found based on type of school, age, and years of teaching experience in relation to the knowledge of periodontal diseases ($p<0.05$).

Conclusion: The oral health knowledge was found satisfactory among the middle school teachers. However, there is still a need for improving oral health knowledge among school teachers on periodontal diseases and its prevention.

Keywords: Knowledge, teachers, periodontal disease

Introduction
Periodontal disease and dental caries are the two most common oral diseases and they often begin in childhood [1]. Periodontal disease is an infectious condition due to microbial plaque, which accumulates on the tooth surface at the gingival margin and causes an inflammatory reaction [2]. Periodontitis is one of the most prevalent chronic conditions worldwide, common in developing countries [3]. Prevalence rates and patterns of oral diseases have changed considerably over the past two decades. Such changes are often ascribed to changing living conditions and lifestyles, effective use of oral health services, and implementation of school-based programs [4].

For an effective dental education of children a multi-disciplinary approach is needed. The teacher is a dynamic force of the school and plays a pivotal role in any educational system [5]. The school teachers are a significant resource to implement the recommendation for the use of alternative personnel to reduce preventable diseases such as oral diseases [6]. Since school teachers play a significant role in passing the preventive information and health promotion, it is also important that their own oral health knowledge, attitude, and behavior conform to the professional recommendations. A teacher with oral health knowledge and a positive attitude toward dental health can always play an important role in health education of school children and be a role model for children and the community [7-10].

A study carried out in Madina City, KSA using self-administered questionnaires revealed positive attitudes towards school-based oral health promotion among teachers. This study found an urgent need for implementation of systematic oral health programs for children in KSA [11]. Almas et al., (2003) carried out a study to assess the knowledge and practices of oral hygiene methods among primary and secondary school teachers in Riyadh city, KSA which concluded that there is much resemblance in knowledge and practice of oral hygiene habits among male and female schoolteachers and there is a need to enhance their knowledge regarding oral health and disease [12].

WHO recommends oral health promotion for improving knowledge, attitude, and behavior...
related to oral health and for prevention and control of dental diseases among schoolchildren [13]. Teachers with good knowledge, attitude, and practice of oral health can be used as oral health educators [14]. A cross sectional study was conducted to assess knowledge and the associated factors among Indian school teachers towards oral disease revealed that school teachers, particularly, younger teachers and those with only basic educational qualifications need to be further motivated to improve their awareness and knowledge about oral diseases [15]. Another study concluded that the overall oral health knowledge, attitude, and behavior are poor among school teachers [16].

Findings of some studies suggested that the knowledge, attitude, and practices among school teachers were found just satisfactory and fair [16, 17]. On the other hand, one study concluded that most of the teachers were found to have good knowledge with respect to oral hygiene practices [18]. Studies suggested that teachers required further education about oral health through an effective media to further deliver oral health education to students [19] and recommended that since information was gained more from dentists and televisions, more dental health programs should be encouraged in televisions and dentists should play a vital role in enlightening people about oral health [20].

The lack of adequate oral health knowledge, training on aspects of oral health, lack of resources and time, and failure to incorporate oral health into the curriculum have been considered as barriers to teaching oral health education in schools [21]. Few studies have been determined schoolteacher’s oral health knowledge and his/her behavior towards oral health [22-25]. The oral health knowledge among school teachers have been mostly studied in general and on primary and preschool worldwide [14, 17, 26-28]. Few studies have been conducted in the KSA on the oral health knowledge of school teachers [12, 29, 30]. Studies including periodontal disease knowledge among school teachers have been very scarce and mostly conducted in the Indian subcontinent. No research has been specifically conducted on periodontal diseases awareness of middle school teachers in KSA. There is paucity in dental and general health knowledge among female teachers in Riyadh, KSA [12]. Hence, the aim of this study is to assess the knowledge of oral health and periodontal disease among female middle school teachers in Riyadh city, KSA.

Materials and methods
This study involved a self-administered structured closed-end questionnaire survey of female middle school teachers in Riyadh City, KSA. The questionnaire instrument was initially designed and used by Manjunath and Kumar (2013) in English to ascertain the level of knowledge of oral health and their determinants. The questionnaire was translated to Arabic by forward-backward translation method used by the WHO. The questionnaire had a total of 13 questions including three demographic characteristics such as type of school, age, and years of teaching experience. Questionnaire consisted questions on the knowledge of gum bleeding, dental plaque and calculus, impact of the oral health on general health, importance of treating toothache, effect of tooth brushing and dental floss on preventing periodontal diseases and, brushing time.

The Arabic questionnaire was piloted on a representative sample of teachers who were not part of study sample. During the pilot study, face validity of each item of the questionnaire (13 items) was examined and the data collected were used to assess the internal reliability of the questionnaire. Internal consistency of questionnaire using Cronbach’s alpha was found to be 0.864. A stratified random sampling technique was used to draw the sample of female middle school teachers of both government and private schools. The survey link was sent to a random sample of mobile numbers of the teachers selected from the list through WhatsApp. A total of 1200 female middle school teachers were selected based on the findings from the pilot study and using the sample size formula.

A cross-sectional survey of female middle school teachers in Riyadh city, KSA was conducted. Both private and government female school teachers were invited to participate in this study. All the subjects prior to study were informed about the study by their school academic guidance. This took place during in the months of November-December 2015. Questionnaire was provided in Arabic language to the middle school teachers. The participants were asked to answer the questionnaire and return within a week. A completed questionnaire indicated the consent to participate in the study. Anonymity and confidentiality were assured. There was no personal identifier on the questionnaire. The teachers were informed that they are free to participate or not, and that choosing not to participate will not disadvantage them in any way.

The quantitative data was entered onto computer for analysis using Statistical Package for Social Science (IBM SPSS) Version 20 for Windows. Descriptive analysis was undertaken to present an overview of the findings from this sample with an analysis by type of school, age, and teaching experience. Differences between groups were examined using Chi-square test for linear trends across the rated questions, and cross tabulations to compare responses from different groups. The level of significance was set at p ≤ 0.05. Riyadh Colleges of Dentistry and Pharmacy Ethics Committee approved the protocol for this study and the questionnaire instrument.

Results
Of the 1200 questionnaires distributed to the government and private school teachers, 898 were completed and returned giving an overall response rate of 75%. The median age of the participants was 35-44 years. The majority (86.4%, n=776) were from governmental schools and had a teaching experience of more than 10 years (65.8%, n=591) (Table 1). The majority (86.1%, n=773) of teachers had the knowledge that gum bleeding is inflamed gum and 58% (n=521) knew that using tooth paste, tooth brush, and dental floss prevents gum bleeding. However, only 21.2% (n=190) had the knowledge of plaque as a soft debris and 46.1% (n=414) had the knowledge of calculus as hard debris. Just over one quarter (26.5%, n=238) had the knowledge that plaque leads to periodontal disease. The majority (97%, n=871) had the knowledge that oral health has an impact on general health and importance of treating toothache (94.2%, n=846). The majority had the knowledge that tooth brushing (88.6%, n=796) and dental floss (76.4%, n=686) helps in preventing periodontal disease. One-third of the respondents (33.5%, n=301) had the knowledge of 2-3 minutes brushing time (Figure 1 and 2).

Government teachers were more likely to agree that plaque leads to inflammation of gums (p=0.028). Teachers aged 35 – 44 years were more likely to agree that plaque leads to inflammation of gum and that oral health has an impact on general health (p=0.025). Teachers with more than 10 years of experience were more likely to agree that calculus is hard
debris (p=0.019), plaque leads to inflammation of gum (p=0.048), and that oral health has an impact on general health (p=0.000). Government teachers were more likely to agree that gum bleeding means inflamed gum (p=0.227). On the other hand, private teachers were more likely to agree that using tooth paste, tooth brush, and dental floss can prevent periodontal disease (p=0.500).

Government teachers were more likely to agree that calculus is hard debris (p=0.005). Teachers aged 35 years and above were more likely to agree that gum bleeding means inflamed gum (p=0.178). However, 45 years old and above were more likely to agree that using tooth paste, tooth brush, and dental floss prevent gum bleeding (p=0.119). Teachers aged 25 – 34 years were more likely to agree that plaque is a soft debris (p=0.113) and 35 – 44 years old teachers were more likely to agree that calculus is a hard debris (p=0.081). Teachers over 5 years of experience were more likely to agree that gum bleeding is inflamed gum (p=0.528). However, teachers with < 5 years of experience teachers were more likely to agree that using tooth paste, tooth brush, and dental floss prevent gum bleeding (p=0.434). Furthermore, they were more likely to agree that plaque is soft debris (p=0.010).

Table 1: Distribution of middle school teachers based on demographic characters (n=898)

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Frequency (n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-34</td>
<td>205</td>
<td>22.8</td>
</tr>
<tr>
<td>35-44</td>
<td>433</td>
<td>48.2</td>
</tr>
<tr>
<td>45 &amp; above</td>
<td>260</td>
<td>29</td>
</tr>
<tr>
<td>School type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>776</td>
<td>86.4</td>
</tr>
<tr>
<td>Private</td>
<td>122</td>
<td>13.6</td>
</tr>
<tr>
<td>Teaching experience in years</td>
<td>Frequency (n)</td>
<td>Percent (%)</td>
</tr>
<tr>
<td>&lt; 5</td>
<td>165</td>
<td>18.4</td>
</tr>
<tr>
<td>5-10</td>
<td>142</td>
<td>15.8</td>
</tr>
<tr>
<td>&gt;10</td>
<td>591</td>
<td>65.8</td>
</tr>
</tbody>
</table>

Fig 1: Basic oral health knowledge of middle school teachers
Fig 2: Knowledge of periodontal health among middle school teachers

Fig 3: Basic oral health knowledge of middle school teachers with school type
Fig 4: Knowledge of periodontal health among middle school teachers with school type

Fig 5: Basic oral health knowledge of middle school teachers with age
Fig 6: Knowledge of periodontal health among middle school teachers with age

Fig 7: Basic oral health knowledge of middle school teachers with teaching experience
Discussion

School teachers play an importance positive influence on the students. They have the potential for implementation of continued basic health instructions to the students. However, adequate training and knowledge to provide such health education is essential. The present study was conducted to assess the knowledge of periodontal diseases among the female middle school teachers of Riyadh, KSA of grades 7 through 9, consisting of students from aged 12 to 15 years. Many studies have been reported among primary school teachers knowledge on periodontal disease \[31-33\], but very few studies are available among middle school teachers \[19, 34\].

Among the participating 898 female middle school teachers, 86.4% belonged to government school and 13.6% to private school. There was a good response rate of 75%. The majority of teachers who responded were aged between 35-44 years (48.2%). This was in exact similarity with a study in India \[19\]. The current study was also alike another study \[5\] where the majority of school teachers were between the similar age group of 31-40 years (35%). The majority of the teachers had an experience of 10 years (65.8%). This was in comparison with the study by Shekar et al., (2014) where the school teachers had higher experience of 10-15 years \[17\]. This could be because teachers of middle school typically have higher qualification and hence higher age and experience. Moreover knowledge and awareness improves with age and experience. On knowledge of oral health and periodontal disease, only 21.2% of the teachers knew that plaque is soft debris and 46.1% knew that calculus is hard debris. Only 37.5% had the knowledge that plaque leads to inflamed gums which was in similar lines with a study by Manjunath and Kumar (2013) \[5\]. This lack of knowledge among the participants on aspects of plaque, soft debris, calculus, and hard debris shows lack of training in oral health education. The majority of teachers had the knowledge that gum bleeding is caused by inflamed gum which was better in comparison with another study \[5\]. Knowledge on prevention of gum bleeding using toothpaste, tooth brush, and dental floss was known to more than half (58%) of the participants. This was in contrast from a study \[19\] where about 73.4% of the whole study population had no appropriate knowledge on the cause of bleeding gums. Furthermore it was dissimilar to another study \[17\] where only 27% felt that regular use of toothbrush, toothpaste, and dental floss would prevent gum bleeding. This can be a result of the awareness created in the recent years in educational institutions, television, and paper media on importance of oral health care.

In comparison to the current study (88.6%), a study in Hail \[34\] reported that regular tooth brushing (97.3%) keeps away from gingival disease. Similarly, another study in Riyadh by Almas et al. (2003) where 72% of female teachers considered irregular tooth brushing a cause of gum disease was similar to the current study \[12\]. On the knowledge of gum bleeding and its causes, the findings of the present study (86.1%) can be compared to a study in Al-Kharj \[35\] where 71.4% of teachers recognized that bleeding gums on brushing the teeth may be a sign of periodontal disease. The oral health knowledge of the school teachers in this study can be compared to the study in Hail \[34\] where the knowledge of teachers about gingival diseases was satisfactory.

Both the government and private school teachers had satisfactory knowledge on periodontal health. However, the private teachers had a marginally better knowledge on periodontal diseases and prevention. They reported correctly
on gum bleeding, inflammation of gums, plaque causing periodontal disease, and prevention by using tooth paste, tooth brush, and dental floss. This study has been conducted on only female middle school teachers, however in other studies with both genders included; the female school teachers have shown a better knowledge of oral health. There is a scarcity of studies on the knowledge of periodontal diseases among middle school teachers in comparison to the accessibility of studies on primary teachers and dental caries. These are just the views of teachers from one city in KSA, thus its teachers may not be representative of the national picture. However, the response rate for this questionnaire survey of teachers was very good (75%) and comparable to other similar studies, thus providing support to generalize the findings to the teachers population under the study. This study highlights the need to tailor oral health counseling of teachers. There need to be an increased oral health promotion of the teachers so they can help in an improvement of the children’s oral health.

More studies on periodontal health knowledge are of great importance and need. A comparative study using gender differences in knowledge of periodontal disease needs to be studied. Moreover, a study comparing the periodontal health knowledge among the primary and middle school teachers would throw light on the existing lacunae in promoting oral health in schools. A qualitative study using interviews/focus groups need to be conducted to understand the knowledge and attitude of teachers in-depth.

**Conclusion**

The overall oral health knowledge in this study was satisfactory among the female middle school teachers of both government and private schools. However, there is a need for developing oral health knowledge on periodontal diseases and its prevention among the female middle school teachers. Hence, there is a necessity for the school teachers to influence positively and educate the school children on oral health knowledge.

**References**