

The Impact of Teachers' Oral Health Knowledge on the Oral Condition of Kindergarten Children in Baghdad City

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Abstract: ***Background:** Teachers have an internationally recognized potential role in oral health education, and this considerable importance has therefore been attributed to their knowledge. A teacher with adequate knowledge toward oral health may play a better role in health education for kindergarten children and thus implementing healthy oral practices, which will eventually leads to better oral health condition. **Aim of the study:** This study was conducted to assess oral health knowledge among kindergarten teachers and its impact on the oral health condition of kindergarten children in Al-Rusafa Sector, Baghdad, Iraq. **Materials and Methods:** Two study samples were involved in this study. A self-administered questionnaire, which discusses the knowledge of teachers regarding children's oral health, was distributed among total 80 public kindergarten teachers (First study sample). This was followed by clinical oral health examination for kindergarten children (second study sample). Total 400 children were examined from both genders and from two age groups (4 and 5 years old). Simple random sampling technique was employed for the selection of study participants. **Results:** Teachers demonstrated incomplete knowledge regarding children's oral health. Only 53.8% of the respondents were aware of that brushing and flossing is indicated for kindergarten children. Additionally, only 42.5% of the teachers knew that bigger amount of food intake doesn't increase the risk of having dental caries. Only 33.8% were aware about the necessity of doing fillings for primary teeth. Around 18.0% only were aware that adults' help is needed during brushing, and that first permanent tooth doesn't appear at the age of 4 years. While around 98.8%, had the adequate knowledge of the necessity of good nutrition towards oral health, and also about the causes of dental caries, about 88.0% of the respondents were aware of the required amount of toothpaste required for children, and children can have gum problems, also 87.5% of them knew about good oral health. More than 80% of teachers were aware that fluoride could prevent dental caries, and 77.5% of them knew that fluoride doesn't cause tooth whitening. Meanwhile, 68.8% were aware about harmful effects of dental plaque, and that brushing twice a day only is not enough to prevent dental caries. In addition, 66.3% of teachers knew the number and eruption time of primary teeth, as well as they thought that sugary snacks is not recommended to be consumed between meals. About 62.5% of teachers were aware of the importance of primary teeth. However, no obvious differences were found in children's plaque and gingival indices regarding the level of teachers' knowledge, the same was seen dmfs scores. **Conclusions:** The studied kindergarten teachers demonstrated incomplete oral health knowledge. There is a definite and immediate need for organized training of kindergarten teachers on basic oral health knowledge and practices. However, teachers' oral health knowledge regarding children's oral health does not affect children's oral health status.*

Keywords: Oral health knowledge and education, teachers' impact, kindergarten children, oral health questionnaire.

1. Introduction

The teacher is a dynamic force of the school and plays a pivotal role in any educational system [1]. Teachers, in general, can influence large numbers of children and their parents to implement the correct recommendations for the use of alternative personnel in order to reduce the burden of preventable different diseases, including oral diseases [2]. Many advantages of utilizing the services of teachers in health education and promotion such as the continuity of the instructions being given, integration of general and oral health practices with other daily activities, as well as the low costs associated with such approaches [3,4].

The lack of adequate oral health knowledge, training on aspects of oral health [5], lack of resources [6], lack of time, and failure to incorporate oral health into the curriculum have been implicated as barriers to teaching oral health education [7].

Since teachers may play a vital role in giving the preventive

information and health promotion, it is important that their own oral health knowledge conform to the professional recommendations. A teacher with adequate oral health knowledge, positive attitude toward dental health can always play an important role in children's health education, and thus, be a role model for children and the community at large [8–11]. Similarly, a teacher with poor oral health knowledge may have an adverse impact on children's oral health practices, and thus on their oral health status.

Kindergarten teachers have a great potential for determining children's health practices [12–13]. Children spend considerable time in kindergartens during this habit formation age; hence, teachers' role during these development stages is critical [3]. Numerous studies conducted around the world in order to demonstrate the knowledge, and willingness of teachers to promote children's oral health [14–16]. Previous surveys carried out in Minnesota and Michigan, USA, among school teachers [17–18] suggested that oral health knowledge of teachers was often inadequate and inaccurate. They were ill informed and

held inconsistent opinions about basic oral health related concept. However, a study involving Arab school teachers demonstrated positive levels of dental knowledge and attitudes amongst the group and also highlighted the fact that the teacher's main reported source of knowledge was the dental office [3].

It becomes important to assess the level of oral health knowledge of kindergarten teachers whom are in such a vital position while shaping the society's future generation, and their ability to implement healthy oral practices, which will lead to healthier oral condition. Wherefore this study was undertaken, with an objective to assess oral health knowledge among public kindergarten teachers and its impact on children's oral condition in Al-Rusafa sector, Baghdad/ Iraq.

2. Materials and Methods

This descriptive cross-sectional study was conducted among a sample of kindergarten teachers as well as children aged 4 and 5 years old attending public kindergartens in Baghdad/ Iraq.

Official permission was obtained from the Iraqi Ministry of Education before data collection in order to examine the selected individuals with no obligations. Total 80 teachers and 400 children were drawn randomly to participate in this study throughout the use of probability sampling (simple random sampling).

The main instrument for the research data collection was a structured self-administered questionnaire introduced in Arabic language to evaluate teachers' knowledge and awareness regarding children's oral health. Total 17 items related to oral health were introduced in questionnaire format to assess the level of teacher's knowledge and the degree of awareness towards children's oral health. Each teacher was given a questionnaire copy, and the response rate was 100%. This was followed by clinical oral health examination including dental and gingival were performed for all the 400 children.

Oral cleanliness was recorded using the plaque index (Silness and Loe, 1964) criteria [19]. While, the gingival index (GI) by Loe and Silness (1963) was used for the assessment of gingival condition [20]. Diagnosing the extent and severity of tooth decay were carried out following the WHO criteria (1987) [21]. Clinical examination was carried out utilizing plane mouth mirror with dental explorer.

Data description and statistical analysis were done using IBMSPSS version 23-computer software (IBM Statistical Package for Social Sciences) in association with Microsoft Excel. Level of significance can be tested as probability of error (p-value) thus, Not Significant if P- value>0.05, Significant if P- value<0.05, and Highly significant if P- value<0.01.

3. Results

3.1 The sample

Table (1) illustrates the distribution of the total children's sample by age and gender. The sample consisted of 400 kindergarten children, distributed equally between the 2 involved age groups (4 and 5 years old) and selected from both genders. Higher percentage of girls (56.25%) was seen compared to boys (43.75%).

Relating to teachers, Table (2) showed the distribution of all the 80 kindergarten teachers according to sociodemographic variables. These variables included age groups, and they were almost equally distributed, educational status, with largest proportion had an institutional degree, years of experience in teaching field, with the majority of teachers had more than 10 years of experience. In addition to marital status, where married teachers constituted the biggest proportion, and lastly teachers whom are mothers of living children whom constituted (87.5%) of the sample.

3.2 Assessment of teachers' knowledge and awareness towards children's oral health.

Table (3) reviewed teachers' scores regarding their knowledge and awareness towards children's oral health, Teachers demonstrated moderate but incomplete knowledge regarding children's oral health. Almost all the sample (98.8%) had the adequate knowledge of the necessity of good nutrition towards oral health and about the causes of dental caries. Majority (88.0%) of the respondents were aware of the required amount of toothpaste required for children's brushing; also, they knew that children could have gum problems. About (87.5%) of them knew about good oral health with more than (80.0%) of teachers were aware of fluoride benefits and (77.5%) of them knew that fluoride doesn't cause tooth whitening. Meanwhile, (68.8%) were aware about harmful effects of dental plaque, and that brushing twice a day only is not enough to prevent dental caries. In addition, (66.3%) of teachers knew the number and eruption time of primary teeth, as well as they thought that sugary snacks is not recommended to be consumed between meals. Almost (62.5%) of teachers were aware of the importance of primary teeth. While, only (53.8%) have the awareness about brushing and flossing as being indicated for the children. Although, less than half of teachers study sample (42.5%) were aware that the amount of food intake does not increase the probability of caries development. About one third only have the awareness about the necessity of doing fillings for primary teeth, however, (13.8%) do not know about this. Only minority of teachers (18.8%) aware that adults' help is required during children's tooth brushing. The least proportion of teachers (17.5%) aware that the 1st permanent tooth doesn't appear at 4 years old, and only (8.8%) of them do not know about this information.

Table 1: The distribution of total kindergarten children sample by age and gender

| Age (year) | Gender | | | | Total | |
|------------|--------|-------|-------|-------|-------|-----|
| | Boys | | Girls | | | |
| | No. | % | No. | % | No. | % |
| 4 | 88 | 22 | 112 | 28 | 200 | 50 |
| 5 | 87 | 21.75 | 113 | 28.25 | 200 | 50 |
| Total | 175 | 43.75 | 225 | 56.25 | 400 | 100 |

Table 2: The distribution of total kindergarten teachers according to the sociodemographic variables

| Sociodemographic variables | No. | % | |
|------------------------------|-------------|----|------|
| Age group (years) | 30-39 | 27 | 33.8 |
| | 40-49 | 27 | 33.8 |
| | 50+ | 26 | 32.5 |
| Educational Status | Sec. school | 9 | 11.3 |
| | Institute | 41 | 51.3 |
| | College | 30 | 37.5 |
| Years of teaching experience | <5 | 19 | 23.8 |
| | 10-May | 15 | 18.8 |
| | >10 | 46 | 57.5 |
| Marital status | Single | 6 | 7.5 |
| | Married | 74 | 92.5 |
| Mother for living children | No | 10 | 12.5 |
| | Yes | 70 | 87.5 |

Table 3: Assessment of teachers' knowledge and awareness towards children's oral health

| Knowledge score about children's oral health | Aware | | Unaware | | Don't Know | |
|---|-------|------|---------|------|------------|------|
| | No. | % | No. | % | No. | % |
| Good nutrition is necessary for both oral and general health. (True) | 79 | 98.8 | 1 | 1.3 | --- | --- |
| Soft drinks and ice cream can cause dental caries. (True) | 77 | 96.3 | 3 | 3.8 | --- | --- |
| A preschool child need a Pea size toothpaste during brushing. (True) | 71 | 88.8 | 7 | 8.8 | 2 | 2.5 |
| Good oral health means a mouth free of dental caries. (False) | 70 | 87.5 | 8 | 10 | 2 | 2.5 |
| Gum problems can occur in preschool children. (True) | 70 | 87.5 | 6 | 7.5 | 4 | 5 |
| Fluoride is important to prevent tooth decay. (True) | 65 | 81.3 | 6 | 7.5 | 9 | 11.3 |
| Fluoride is important for tooth whitening. (False) | 62 | 77.5 | 11 | 13.8 | 7 | 8.8 |
| Plaque can cause gum problems and tooth decay. (True) | 55 | 68.8 | 6 | 7.5 | 19 | 23.8 |
| Brushing twice a day is enough to prevent tooth decay. (False) | 55 | 68.8 | 25 | 31.3 | --- | --- |
| Children have 20 primary teeth that begin erupting around 6 months of age and they continue to erupt through about 2 years of age. (True) | 53 | 66.3 | 10 | 12.5 | 17 | 21.3 |
| Best time for sugary food snacking is between meal times. (False) | 53 | 66.3 | 20 | 25 | 7 | 8.8 |
| Primary teeth are essential for good nutrition, language development, self-esteem, but not affect permanent teeth. (False) | 50 | 62.5 | 25 | 31.3 | 5 | 6.3 |
| Brushing and flossing is indicated for preschool children. (True) | 43 | 53.8 | 31 | 38.8 | 6 | 7.5 |
| The bigger amount of food intake, | 34 | 42.5 | 40 | 50 | 6 | 7.5 |

| | | | | | | |
|--|----|------|----|------|----|------|
| the greater the risk for caries. (False) | | | | | | |
| It is not necessary to do fillings in baby's teeth. (False) | 27 | 33.8 | 42 | 52.5 | 11 | 13.8 |
| Preschool children don't need an adult's help in brushing their teeth. (False) | 15 | 18.8 | 64 | 80 | 1 | 1.3 |
| First permanent teeth appear at age of 4 years. (False) | 14 | 17.5 | 59 | 73.8 | 7 | 8.8 |

Table 4: Mean values and Standard error (SE) of children's caries-experience regarding teachers' knowledge scores.

| Variables | Teachers score (terciles) | No. | dmfs | |
|--|---------------------------|-----|-----------|----------|
| | | | Mean ±SE | P-value* |
| Teacher's knowledge about children's oral health | Lowest (<= 59) | 27 | 10.0 ±1.1 | 0.43[NS] |
| | Average (60-71) | 34 | 10.0 ±0.8 | |
| | Highest (72+) | 19 | 11.0 ±1.2 | |

* Comparison of mean values of the three categories of teachers' scores.
 (NS) Not Significant (P>0.05).

Table 5: Mean values and Standard error (SE) of children's plaque index regarding teachers' knowledge scores

| Variables | Teachers score (terciles) | No. | PII | |
|--|---------------------------|-----|-------------|----------|
| | | | Mean ±SE | P-value* |
| Teacher's knowledge about children's oral health | Lowest (<= 59) | 27 | 1.15 ±0.042 | 0.62[NS] |
| | Average (60-71) | 34 | 1.19 ±0.028 | |
| | Highest (72+) | 19 | 1.18 ±0.039 | |

* Comparison of mean values of the three categories of teachers' scores.
 (NS) Not Significant (P>0.05).

Table 6: Mean values and Standard error (SE) of children's gingival index regarding teachers' knowledge scores

| Variables | Teachers score (terciles) | No. | GI | |
|--|---------------------------|-----|-------------|----------|
| | | | Mean ±SE | P-value* |
| Teacher's knowledge about children's oral health | Lowest (<= 59) | 27 | 0.96 ±0.040 | 0.62[NS] |
| | Average (60-71) | 34 | 0.96 ±0.027 | |
| | Highest (72+) | 19 | 0.99 ±0.040 | |

* Comparison of mean values of the three categories of teachers' scores.
 (NS) Not Significant (P>0.05).

3.3 The impact of teachers' knowledge, on children's oral condition

Concerning children's (dmfs) mean values, as showed in Table (4), results reviewed no statistical significant difference (P>0.05) in relation to the level of teacher's knowledge about children's oral health. Although, when dealing with plaque index mean values, approximate values were recorded in all of the scoring categories, with the highest plaque mean found in children's relating to teachers with average knowledge scores, with no statistical significant difference recorded (P>0.05). Almost similar results were reviewed in Table (5) regarding gingival index mean values, however, the highest mean value was found to be relating to teachers' with the highest knowledge scores, and also the difference was statistically not significant (P>0.05).

4. Discussion

This study was conducted in Baghdad city, to assess knowledge level of kindergarten teachers regarding children's oral health. Results showed that no obvious differences were recorded in children's (dmfs) mean values regarding the categories of teacher's knowledge about children's oral health. Likewise, children's mean values of both plaque and gingival indices were also approximate regarding the categories of teacher's knowledge, and no significant difference was recorded ($P>0.05$).

All the above findings suggested that teachers' knowledge have no impact on children's oral condition, as this may suggest that knowledge alone is not enough, unless it turns into real actions.

Teachers, in addition to providing education to the children, also have ethical responsibility of ensuring their health and safety.

In order to do this, teachers need to have sound knowledge and favourable practices regarding oral and general health. Teachers have the potential for reaching all the children and establish continual instructions. Moreover, they can integrate oral health practices with other activities and the entire process would be inexpensive. However, a possible disadvantage could be that the teachers may not have an adequate knowledge and practices in order to deliver oral health messages correctly [22, 23] as was also observed in the current study. Anecdotal evidence (evidence based on personal accounts rather than facts or research) highlights various practical limitations for teachers to improve their oral health knowledge and practices that also reduces their motivation to provide oral health education in kindergartens. These mainly include the absence of a satisfactory part that deals with oral health education inside the teaching curriculum of kindergarten teachers, adding to that the lack of support and reinforcements from professionals, in terms of supervisory visits, seminars, continuing education [14-15].

Reinforcement through repeated oral health education sessions has shown to induce significant improvement in the knowledge of oral health practices and reduction in plaque and gingival indices scores for children [24].

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