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Research Article

Assessing Untreated Dental Caries among Private and Public Preschool Children in Riyadh, a Cross-Sectional Study Design

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Abstract

Aim: To assess the prevalence of untreated dental caries among private and public pre-school children in Riyadh using the DMFT/dmft and the PUFA/pufa indices and to correlate the DMFT/dmft and PUFA scores with different variables related to education level of parents, oral hygiene measures, and eating habits.

Materials & Methods: Total 530 preschool children aged 3–5years old were randomly recruited from different private and public school of the Riyadh. Caries were recorded in terms of decayed, missing and filled teeth for both primary teeth (dmft) and permanent teeth (DMFT). The PUFA/pufa index was also recorded for both dentitions regarding the presence of severely decayed teeth with visible pulpal involvement (P/p), ulceration caused by dislocated tooth fragments (U/u), fistula (F/f) and abscess (A/a).

Results: Of the total sample, 85.5% of preschool children showed one or more decayed tooth in their oral cavity with mean dmft was 5.54 (SD: 3.49). Over all in pufa the mean pufa value was 0.67(SD: 1.74) , p (Pulp involvement) component showed highest value with mean of 0.62(SD: 1.63) followed by f (fistula) 0.03(SD: 0.17) and a (abscess) 0.01(SD: 0.11). With respect to age group the mean for dmft for 3 years was 4.26(SD: 3.63), 4.63(SD: 2.97) and 5.81(SD: 3.54) for 4 and 3 years old kids respectively with the significant difference among age groups with p value 0.003. Related to brushing habits, 89.3% reported that their kids do brush the teeth and 96.2% parents reported that they encourage their kids to brush their teeth and 31% reported that their kids brush their teeth twice daily. Brushing habit differ significantly among gender, girls were brushing more frequently than boys with p value 0.003.

Conclusion: Through this cross-sectional study we concluded that the proportion of untreated dental caries was high among preschool children recruited for the study which points to the need for diverting attention in order to promote early detection and primary prevention of caries prevalence and progression. Moreover deciduous dentition needs more vigilant screening and early treatment so to prevent the progression of caries in permanent dentition.

Keywords: PUFA/pufa index, Untreated dental caries, Caries assessment, Pre-school children

Introduction

Worldwide the prevalence of caries have been reduced drastically however problem still exists in developing and under developing countries [1]. Even though the prevention is easy and very cost-effective this chronic disease is prevalent in individuals' of all age group [2]. Preventive and curative techniques of dental caries are very effective and efficient nevertheless treating young children's caries is still limited in high-income countries (Beltrán-Aguilar et al, 2005).

In Saudi Arabia the prevalence of dental caries has been reported in many studies and the recent systematic review reported the mean dmft as 5.38, and 3.34 for primary and permanent dentition respectively [3]. With the change in lifestyle, increased consumption of junk food and other products having high content of sugar such as juices and chocolates have increased the prevalence of dental caries in last few decades in many countries and one such country is Saudi Arabia [4,5]. Due to this shift in life style the prevalence of dental caries has been increased drastically and specially in the young kids as reported by different studies conducted in the region of Riyadh among kids of different age groups [6-8].

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Different scales have been used to calculate the prevalence and mean scores of dental caries. One such scale which is in use since 1938 is the DMF index. However with the advancement in dentistry different tools have been formulated to overcome the drawback of DMF index and one of the major drawback is that it does not give estimation to treatment needs [9]. In the recent time PUFA index (pulpal involvement, ulceration, fistula, or abscess) has come up with altogether different idea for caries assessment [10]. It does not only give the estimation to treatment need but also provides consequences of untreated caries including pulpal involvement and abscess, which are more serious than caries itself as pulpal involvement and abscess formation causes all the pain discomfort and swelling [11].

Different studies conducted worldwide have reported the proper functionality and usability of this tool in different age group and among different regions [12-14]. The purpose of this study is to use DMF index in harmony with PUFA index so that it can better present information regarding the prevalence of dental caries and thus, may provide more data that can help determine treatment needs of those affected by caries. As best of our knowledge only one study in the Middle East has used the PUFA index [15], and no studies were done in Saudi Arabia to record the consequences of untreated dental caries by using DMFT/dmft along with PUFA/pufa to report the current prevalence along with the treatment need. Thus to fill this literature gap we aimed to assess the prevalence of untreated dental caries among private and public pre-school children in Riyadh using the DMFT/dmft and the PUFA/pufa indices along with correlating the DMFT/dmft and PUFA scores with different variables related to education level of parents, oral hygiene measures, and eating habits with a null hypothesis that these variables do not affect the progression of caries into pulpal involvement and beyond.

Materials and Methods

The sample was collected randomly from different private and public pre-schools in Riyadh, and the schools were pre-informed regarding the objectives of the study. Participants were recruited from two private (Al-Tarbiya Al-Namothajiyah School., Al Enayah School) and three public schools (Seven three preschool, Forty five preschool and Seventy two preschool). Approval for the study was obtained from the Riyadh dental college and from the authorities of the schools. The parents of each student received detailed explanatory letters concerning the aims of the study and including their approval about participation. The total sample consisted of 530 preschool children (255 males and 274 females) from two private and three public schools. A team of 5 members was created, which composed of two calibrated examiners and two recorders who performed all of the clinical examinations. Inter- and intra-examiner variability was measured by re-examining every 10th patient. Inter and intra-examiner reliability was 95%. Data were collected by two means: a questionnaire and a clinical examination. Questionnaires were filled by 262 parents only giving the response rate around 50%.

Exclusion criteria

Each student, whom parents refused to participate, as well as mentally handicapped children was excluded from the study.

Questionnaire survey

The survey questionnaire consist of sixteen-item-questionnaire and was delivered to parents and they were asked to complete the questionnaire that included (i) demographic information (age and gender of the child and education level of parents) (ii) oral health related behavior's (the child's snacking habits, tooth brushing practice, and dental visit) and (iii) perceived oral health of the child. A pilot study was conducted among 20 preschool aged children/parents in order to assess the face and content validity of the questionnaire.

Clinical examination

Clinical examination was conducted from February to March 2017 and carried out in one classroom of each school under flashlight. Each student was examined in semi–supine position by the researcher and data recorded by a recorder assistant. Proper diagnosis was made after drying of the tooth surfaces by cotton rolls and tongue depressors were used to ease the proper examination. Caries were recorded for both permanent and primary teeth in terms of decayed, missing and filled teeth index (DMFT and dmft), using WHO recommendations for oral health surveys.

Regarding PUFA index recording, the assessment was made by visually assessing the oral cavity. Per tooth one score was assigened and in case of doubt about the extent of infection the basic score (P/p for pulp involvement) was given by the dentist. The standardized codes and criteria for PUFA index are as follows: P/p: Pulpal involvement is recorded when the opening of the pulp chamber is visible or when the coronal tooth structures have been destroyed by the carious process and only roots or root fragments are left. U/u: Ulceration due to trauma from sharp edges of a dislocated tooth with pulpal involvement or root fragments has caused traumatic ulceration of the surrounding soft tissues; e.g., tongue or buccal mucosa. F/f: Fistula is scored when pus releasing sinus tract related to a tooth with pulpal involvement was present. A/a: Abscess was scored when a pus containing swelling related to a tooth with pulpal involvement is present.

Data were analyzed using Statistical Package for Social Sciences (IBM SPSS) Data Entry software version 20.0, and descriptive statistics were conducted as means and standard deviations, frequencies and percentages. The "Untreated Caries, PUFA Ratio" was also calculated.

Results

The sample was distributed according to age and gender as shown in Table 1. The three years old students represented 4.3% of the total sample, while the four year's students represented 17.3% and five years students represented 78.3% of the total sample. In addition, males represented 48.2% and females comprised of 51.8% of the total sample.

Of the total sample, 85.5% of preschool children showed one or more decayed tooth in their oral cavity and the Mean dmft was 5.54 (SD: 3.49) (Table 2). Moreover 52.8% of children showed more than 3 carious teeth in their oral cavity. Comparison of mean dmft values with respect to the gender, girls showed little higher values 5.78(SD: 3.63) compared to that of boys 5.32(SD: 3.33) however the mean difference were not significant with the

Table 1: Socio-demographic characteristics of study participant.

Variables	Frequency	Percentage
Age		
3 year	23	4.3
4 years	92	17.4
5 years	415	78.3
Gender		
Male	255	48.2
Female	275	51.8
School		
Private	215	40.6
Public	315	59.4
Father's Education		
Primary School	6	2.3
High School	45	17.2
Graduate	209	79.8
Others	2	0.8
Mother's Education		
Primary School	8	3.1
High School	40	15.3
Graduate	212	81.2
Others	1	0.4

Table 2: Mean value for DMFT/dmft.

Dmft	Permanent Dentition	Primary Dentition
Total	0.14(0.57)	5.54(3.49)
Decayed	0.12(0.51)	4.13(3.31)
Missing	00(00)	0.19(0.70)
Filled	0.020.17()	1.21(1.91)

p value 0.131. Moreover with respect to age group the mean for dmft for 3 years was 4.26(SD: 3.63), 4.63(SD: 2.97) and 5.81(SD: 3.54) for 4 and 3 years old kids respectively with the significant difference among age groups with p value 0.003. However the dmft did not differ with in public and private schools with p value 0.844.

The overall prevalence of pufa was 22.6%. Over all in pufa the mean pufa value was 0.67(SD: 1.74) , p (Pulp involvement) component showed highest value with mean of 0.62(SD: 1.63) followed by f (fistula) 0.03(SD: 0.17) and a (abscess) 0.01(SD: 0.11). This indicates 22.6 % of decayed component had progressed mainly to pulpal involvement. dmft showing highly significant positive correlation with pufa suggesting children with high dmft have more number of pulpal involvement. No significant difference was found in pufa with respect to gender, age and school with p value 0.347, 0.62 and 0.291 respectively.

Out of total participants, the response rate to fill questionaries' was 49.43 % from parent. The oral health knowledge of the subjects was generally poor, whereas they held very positive attitudes toward oral health. Out of total 262 parents, 57.3% reported their children studied in public school 54.9% reported that their kids are in stage III kindergarten. Regarding educational status of the parents, 56.0% of fathers and 56.85 of mothers had done graduate. Of total 48.0% fathers reported working in government sector. Moreover 38.1% mothers were working mothers.

Related to brushing habits, 89.3% reported that their kids do brush the teeth and 96.2% parents reported that they encourages their kids to brush their teeth and 31% reported that their kids brush their teeth twice daily (Figure 1). However dental floss was used by 5.3% of kids only. Brushing habit differ significantly among gender, girls were brushing more frequently than boys with p value 0.003. However dental visit and sugar intake did not differ significantly among gender with p values 0.456 and 0.209 respectively. Brushing habit, dental visit and sugar intake were not significantly different with respect to type of schools with p value 0.662, 0.850 and 0.720 respectively.

Of total 62.2% of the participants reported that they never visit dentist (Figure 2). Frequency of sweets consumption was strongly related to dmft where 66.0% are eating sweet once or twice daily (Figure 3).

Regarding juice and soft drink intake 76% reported that their kids drink juice once or twice daily however 93% parents reported that their kids weekly take the soft drinks (Figure 4).

Discussion

With the advancement in health sciences, the field of dentistry has been grown and modified in terms of its preventive and treatment methodologies. Different tools have been tested and used in dental survey by researchers and epidemiologist. In this study we have used two different tools for reporting consequences of untreated carious lesions in our population. PUFA index provided the effective way of evaluating clinical consequences of un-treated caries and help to understand and

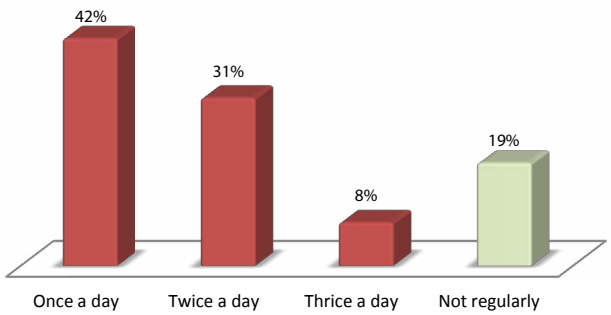

Figure 1: Bar graph showing brushing habits of study participants.

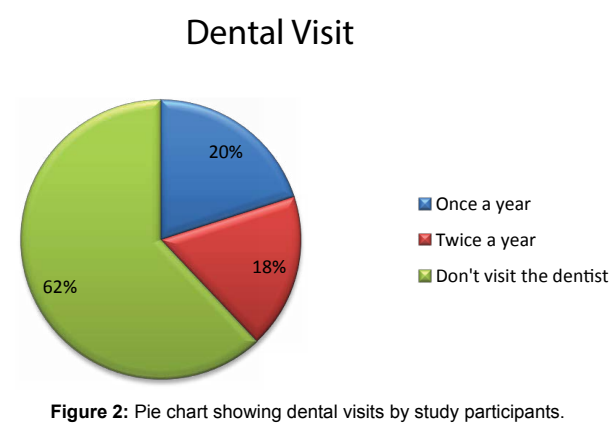

Figure 2: Pie chart showing dental visits by study participants.

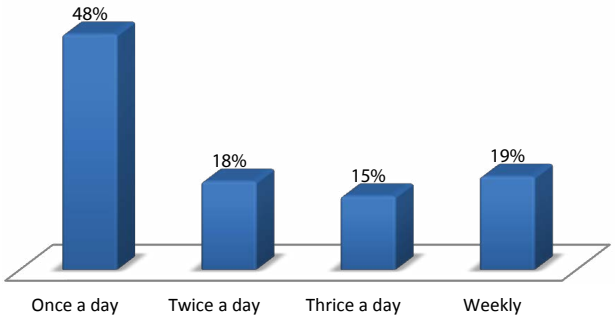

Figure 3: Bar graph showing sugar intake of study participants.

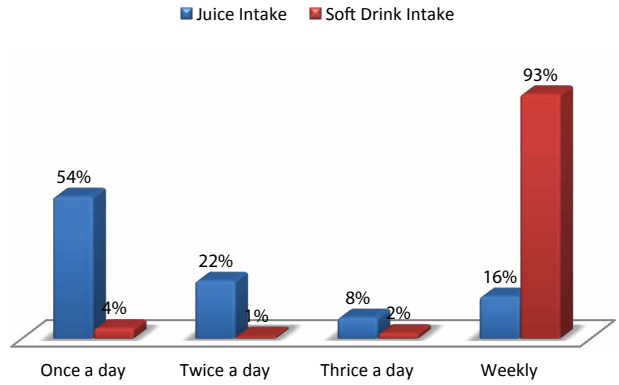

Figure 4: Bar graph showing juice and soft drink intake of study participants.

plan for treatment program on the other hand DMFT provided the current estimation of caries. The complementary use of PUFA along with DMFT provided different scope of dental caries assessment along with treatment need.

In our sample, the prevalence of dental caries was found to be 85% by DMFT scale. These findings are comparable with the study done by [8] in Saudi Arabia and higher than other countries, as reported 31.4% by Ramakrishna (2013) in South India, while Bian et al. (2000) in China reported a prevalence of 36%, Japan 60 to 77%, Thailand 62% and Hong Kong was 63% (Bagramian etal., 2009). On comparison with the results of the National Oral Health Survey, the prevalence reported in this study is considerably lower (Bagramian et al., 2009).

On the other hand PUFA reported prevalence of pufa codes as 22.6%. This was less than that observed in other studies by [13], 38.6%, [10] in Philippines 85% and Bagińska et al. (2013) among Polish children 43.4%. Moreover in our study ean pufa value was reported to be 0.67 and it was less than that reported by [10] among 6 year olds, which was 3.4. But higher than that reported by [13] (0.9) in Chandigarh 2014 and as reported by [12] in Brazil (0.4). Moreover in our study the "p" component of pufa formed majority of the total score. These findings are comparable to studies reported earlier ([10,12,13], Bagińska et al., 2013) this further shed the light over the idea as proposed by [12] in 2011 to merge 'f' and 'a' components and eliminating the 'u' component completely.

Our results reported that the mean 'dmf' and 'pufa' scores increased significantly over the ages of 3, 4 and 5 years. This can be attributed to the increasing exposure to oral environment and transitioning food. The dmft increased significantly with increasing age highlighting the significant effect of lifestyle modification. This also signifies the need of educating both parents and children the importance of maintaining proper diet along with proper oral hygiene care.

In our study the prevalence of daily brushing is reported as 89.3% significantly more prevalent in girls compared to boys. A figure which is higher to that reported in a Saudi study conducted in 2003 and found that 65% of students were doing brushing at least once [16]. The same study reported that private school students had a better dental hygiene practice and that age was inversely related to oral health practices. While in our study, we found that both age and type of schooling were not significantly related to the habit of tooth brushing.

Our results are consistent with a Chinese study that assessed oral health behavior in school children and reported that, around 22% of the 12-year-old group brushed at least twice a day, 62% reported brushing frequency to be once a day and it was observed that 16% never brushed or brushed less frequently [17-20]. Our study reported that three fourth of students were using toothbrush as a tool for brushing and 31% were doing twice and. Also in our study reported that the study participants did not frequently use oral floss. The results are consistent with the findings of a study conducted in 2003 in Riyadh, which reported that only 5.1% of students were using dental floss [16].

More than three third children were brushing regularly but still the prevalence of caries were reported high in our study that pinpoints the importance of proper brushing technique and importance of doing brush atleast twice daily. Moreover as reported by parents more than half of them never took their children to a dentist could have also impacted the high prevalence of the caries as dental visits should be carried timely for screening and monitoring caries at early stage to stop caries progression [21,22]. Other indicators that could have resulted in the high prevalence of caries could be sugar intake and soft drink intake as reported by parents. Perhaps further studies are needed to study the effect of these indicators on the prevalence of caries as these indicators were found to be same among gender and did not differ with respect to schooling [23-25].

The results of our study should be concluded after considering some of the limitations which are listed as follows; firstly it is a cross-sectional study thus limits the cause and effect relationship [26-28]. Secondly response rate was lower for filling up the questionnaire thus we cannot generalize the findings. However this study has some major strengths that allow us to consider the results valid those are; pilot study was conducted to check the functionality of the questionnaire, secondly Inter- and intra-examiner variability were significantly higher reporting homogenous examination and diagnosis, thirdly two indexes were used that further give authentication to the diagnosis and lastly along with dental examination, questionnaire were used to assess the knowledge and attitude of parents towards oral hygiene and dental caries.

Conclusion

In this study, the high proportion of untreated dental

caries indicated the need for diverting attention of parents and dentist for the care of deciduous dentition. Moreover the need of early detection and treatment should be prioritize by policy makers especially among pre-school kids to avoid any serious consequences of dental caries. Further studies are needed to build upon the findings of this study.

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