RESEARCH ARTICLE

Assessment of Dental Decay in a Group of Children in Jeddah, Kingdom of Saudi Arabia

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ABSTRACT

Aim: The purpose of this research was to determine the prevalence, severity, and pattern of dental decay in 6–7-year-old youngsters in military elementary schools in Jeddah, Kingdom of Saudi Arabia.

Materials and methods: The study included 312 youngsters randomly selected from eight elementary schools. Dental decay prevalence was determined by using dmft/dmfs/DMFT/DMFS indices according to the “British Association for the Study of Community Dentistry” diagnostic specifications.

Results: There was no statistically notable difference in the prevalence of decay between boys and girls ($p = 0.54$). There was a notable difference between the mean dmft and dmfs in primary teeth ($p = 0.000$). There was a notable increase in the prevalence of decay for permanent teeth in males when compared to females ($p = 0.011$). The mean DMFT in boys was notably higher than that in girls ($p = 0.035$). No notable difference was found between males and females in mean DMFS ($p = 0.54$).

Conclusion: The prevalence of dental decay was high among the study sample. There is a vast need to reduce dental decay by increasing dental awareness for youngsters and their parents.

Clinical significance: Age has an important role in evaluating decay prevalence and dmft/dmfs/DMFT/DMFS indices. On the basis of age, caries is prevalent in 6–7-year-old youngsters and the dmft/dmfs/DMFT/DMFS indices resulted in high values.

Keywords: Children, Dental caries, Elementary schools, Prevalence, Severity.

International Journal of Clinical Pediatric Dentistry (2019): 10.5005/jp-journals-10005-1659

INTRODUCTION

During the past decades, the major concern arising from studies worldwide was the prevalence of dental decay. Dental decay is a persistent silent epidemic disease, affecting an individual's dental and general health negatively.^{1,2}

It is significant for dental public health to recognize the level of oral health awareness, knowledge, and high level of dental decay so that the effort can be directed toward the prevention. Dental decay increased notably and is continuing to increase in populations. Generally, in primary dentition, the prevalence of dental decay in most developed countries is decreasing, while in developing countries is increasing rapidly.³

In spite of current enhancement in awareness about dental and oral health among public, dental decay continues to exist a notable complication mainly in growing countries. Youngsters in growing countries have an increased decay prevalence, such as China (85%), India (53%), and South Africa (49%) when compared to developed countries such as England (32%) and Italy (16%).^{4–8}

Dental decay is a multifactorial disease, with several risk elements contributing to their starting and progress. The risk elements can be classified as sociobehavioral, environmental, or biological.^{9–12}

As Kingdom of Saudi Arabia is a multicultural, huge country, decay prevalence differs in its varying cities and districts. However, decay prevalence is increased in many districts and cities of Kingdom of Saudi Arabia. A novel research in Jeddah among preschool youngsters revealed an increased decay prevalence of 89%.¹³ Another investigation by Wyne in Riyadh showed a decay prevalence of 74.8% with a mean dmft score of 6.1 in preschool youngsters.¹⁴

The objective of the current research was to determine the prevalence, severity, and pattern of dental decay in 6–7-year-old

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How to cite this article: AL-Malik M, AlKattan H, ALBukhari L, *et al.* Assessment of Dental Decay in a Group of Children in Jeddah, Kingdom of Saudi Arabia. *Int J Clin Pediatr Dent* 2019;12(5):423–428.

Source of support: Nil

Conflict of interest: None

youngsters in military elementary schools in Jeddah, Kingdom of Saudi Arabia.

MATERIALS AND METHODS

Ethical approval was obtained from the Medical Research Committee in the King Fahd Armed Forces Hospital, Jeddah, Kingdom of Saudi Arabia.

The sample was drawn from 6–7-year-old youngsters attending military elementary schools in Jeddah, the West Province of Kingdom of Saudi Arabia. Eight elementary schools for military dependents are present in Jeddah city, four schools for females and four for males. Each school had around 30–60 youngsters

attending the first and second grade during 2017–2018. The study included a total of 312 youngsters (122 boys and 190 girls) randomly selected from all the schools. All youngsters selected participated in the clinical examination. The parents/caregivers of the selected youngsters were required to sign an informed consent form prior to the start of the study. All youngsters chosen shared in the clinical examination.

Clinical examination forms were developed and tested during the period of examiners calibration at the Dental Department, King Fahd Armed Forces Hospital. Selected investigators went through standardization meetings to unify inter- and intra-examiner reliability. Each investigator conducted 5 patients' examinations to evaluate dental decay, using dmft/dmfs/DMFT/DMFS indices, respectively.¹⁵ Standardization meetings were done many times until the degree of uniformity reached 85% or more.

The dental team consisted of two general dentists and four dental interns. The examiners conducted clinical visual examinations in classrooms using a disposable examination kit and flashlight. Each child was examined in an upright position with the investigator positioned front and the data were written by a dental assistant. Sterilization and infection control guidelines were utilized at all examination locations to confirm protection of contributors.

Dental decay prevalence was determined by using dmft/dmfs/DMFT/DMFS indices according to the "British Association for the Study of Community Dentistry" diagnostic specifications.¹⁶

Statistical Analysis

Data were analyzed utilizing SPSS (version 24; IBM, Armonk, NY, USA). Descriptive and analytic statistics in data analysis were used. The *t* test was utilized to detect the difference between the mean dmft and dmfs in primary teeth and the mean DMFT and DMFS in permanent teeth and a *p* value of less than 0.05 was regarded statistically significant. To detect the relationship between the prevalence of decay and gender in primary and permanent teeth, the Chi-square test was utilized.

RESULTS

The study was done on a sum of 312 youngsters aged 6–7 years, 122 (39.1%) were boys and 190 (60.9%) were girls. In the 312 examined youngsters, the decay prevalence was found to be 88.8% (277 youngsters), while 11.2% (35 youngsters) were clinically decay-free. For those who were identified with decay, 110 (39.7%) of them were males and 167 (60.3%) were females. There was no significant difference (*p* = 0.54) in the prevalence of decay among boys and girls (Table 1 and Fig. 1).

The overall mean dmft for the 312 youngsters was 5.63 (± 3.86) per child and the mean dmfs was 12.16 (± 13.1) per child. These outcomes revealed a statistically notable difference in dmft and dmfs (*p* = 0.000) (Table 2, Figs 2 and 3).

Most of dental decay was made up of carious teeth. Carious teeth made up a medium of 4.54 (± 3.74) teeth per child, which

represented 80.6% of the total dmft and 7.95 (± 9.38) surfaces per child, which represented 65.4% of the medium. Mean missing teeth was 0.58 (± 1.75) per child and filled teeth were 0.86 (± 1.59). Utilizing the independent-sample *t* test, there was no statistically notable difference in the mean dmft and gender (*p* = 0.77) or the mean dmfs and gender (*p* = 0.76) (Tables 3 and 4, Figs 4 and 5).

The type of decay in primary teeth in these youngsters were analyzed. Collective information for the type of decay were shown; The teeth most influenced via decay were primary mandibular second molars (64.4% and 66%) and the least influenced were primary mandibular central incisors (1.7% and 2.6%). The decay predominance was commonly higher in the mandibular primary teeth than similar teeth in the maxilla. Among the mandibular teeth, decay prevalence was the highest in second primary molars (65.2%), followed by first primary molars (57.4%) and primary canines (6.9%). The mandibular primary central incisors were minimally influenced (2.15%). Among the maxillary teeth, the prevalence was the highest in second primary molars (48.55%), followed by first primary molars (43.6%), primary central incisors (36.5%) and primary lateral incisors (18.7%). The maxillary primary canines were minimally influenced (10.3%) (Table 5, Fig. 6).

Regarding permanent teeth, there was a notable increase in the prevalence of decay for permanent teeth in males when compared to females (*p* = 0.011). The mean DMFT was 0.26 (± 0.68) and the mean DMFS was 0.36 (± 1.16). The difference in the mean for DMFT and gender was statistically notable (*p* = 0.035) but insignificant for surfaces (*p* = 0.54) (Tables 6 to 8 and Figs 7 to 9).

The type of decay in permanent teeth in these youngsters were analyzed. Collective information for the type of decay were shown; The teeth most influenced via decay were permanent maxillary central incisors (14.4% and 10.9%) and the least influenced were permanent mandibular central incisors (0.5% and 0.5%).

Fig. 1: Prevalence of caries in relation to gender for primary teeth

Table 1: Prevalence of caries, mean dmft, and dmfs in relation to gender for primary teeth

Gender	No. of children	Caries-free children (%)	Children with caries (%)	dmft ($\pm$ SD)	dmfs ($\pm$ SD)	χ^2	<i>p</i> value
Males	122	12 (9.8)	110 (90.2)	5.71 (± 3.78)	12.44 (± 14.10)	0.38	0.54 NS
Females	190	23 (12.1)	167 (87.9)	5.58 (± 3.92)	11.98 (± 12.41)		
Total	312	35 (10.95)	277 (89.05)	5.63 (± 3.86)	12.16 (± 13.06)		

NS, not statistically significant

Table 2: Difference between mean dmft and dmfs in primary teeth

	<i>N</i>	<i>Mean</i>	<i>Std. deviation</i>	<i>t</i>	<i>df</i>	<i>p value</i>
dmfs	312	12.16	13.06	8.07	380.1	0.000*
dmft	312	5.63	3.86			

*Statistically significant at $p \leq 0.05$ **Fig. 2:** Mean dmft and dmfs in relation to gender for primary teeth **Fig. 3:** Mean dmft and dmfs for primary teeth**Table 3:** Mean dmft (decayed–missing–filled) in males and females for primary teeth

<i>Gender</i>	<i>Decayed</i>	<i>Missing</i>	<i>Filled</i>	<i>Mean dmft (±SD)</i>	<i>t test</i>
					<i>p value</i>
Males	4.27 (±3.72)	0.58 (±1.75)	0.86 (±1.59)	5.71 (±3.78)	0.77 NS
Females	4.72 (±3.74)	0.33 (±1.18)	0.53 (±1.35)	5.58 (±3.92)	
Total	4.54 (±3.74)	0.43 (±1.44)	0.66 (±1.46)	5.63 (±3.86)	

NS, not statistically significant

Table 4: Mean dmfs (decayed–missing–filled) in males and females for primary teeth

<i>Gender</i>	<i>Decayed</i>	<i>Missing</i>	<i>Filled</i>	<i>Mean dmfs (±SD)</i>	<i>t test</i>
					<i>p value</i>
Males	7.01 (±9.27)	3.03 (±8.97)	2.40 (±6.42)	12.44 (±14.10)	0.76 NS
Females	8.55 (±9.43)	1.71 (±5.90)	1.73 (±5.11)	11.98 (±12.41)	
Total	7.95 (±9.38)	2.23 (±7.27)	1.99 (±5.66)	12.16 (±13.06)	

NS, not statistically significant

Fig. 4: Mean dmft in males and females for primary teeth **Fig. 5:** Mean dmfs in relation to gender for primary teeth

Table 5: Caries prevalence by individual primary teeth

Tooth	Maxillary teeth		Mandibular teeth	
	Right (%)	Left (%)	Right (%)	Left (%)
Central incisor	28	45	1.7	2.6
Lateral incisor	17.7	19.7	2.9	3.6
Canine	10.3	10.3	7.4	6.4
First molar	45.2	42	59	55.8
Second molar	50.3	46.8	64.4	66

Fig. 6: Caries prevalence by individual primary teeth (graphical presentation)**Table 6:** Prevalence of caries, mean DMFT, and DMFS in relation to gender for permanent teeth

Gender	No. of children	Caries-free children (%)	Children with caries (%)	DMFT ($\pm$ SD)	DMFS ($\pm$ SD)	χ^2	p value
Males	122	94 (77)	28 (23)	0.36 ($\pm$ 0.76)	0.40 ($\pm$ 0.95)	6.39	0.011*
Females	190	167 (87.9)	23 (12.1)	0.19 ($\pm$ 0.61)	0.33 ($\pm$ 1.28)		
Total	312 (100%)	262 (84)	50 (16)	0.26 ($\pm$ 0.68)	0.36 ($\pm$ 1.16)		

*Statistically significant at $p \leq 0.05$ **Table 7:** Mean DMFT (decayed–missing–filled) in males and females for permanent teeth

Gender	Decayed	Missing	Filled	Mean DMFT ($\pm$ SD)	t test p value
Males	0.30 (0.67)	0.00	0.07 (0.42)	0.37 ($\pm$ 0.76)	0.035*
Females	0.19 (0.61)	0.00	0.01 (0.07)	0.19 ($\pm$ 0.61)	
Total	0.23 (0.63)	0.00	0.03 (0.27)	0.26 ($\pm$ 0.68)	

*Statistically significant at $p \leq 0.05$ **Table 8:** Mean DMFS (decayed–missing–filled) in males and females for permanent teeth

Gender	Decayed	Missing	Filled	Mean DMFS ($\pm$ SD)	t test p value
Males	0.36 (0.88)	0.00	0.04 (0.37)	0.41 ($\pm$ 0.95)	0.54 NS
Females	0.32 (1.28)	0.00	0.01 (0.07)	0.33 ($\pm$ 1.28)	
Total	0.34 (1.14)	0.00	0.02 (0.24)	0.36 ($\pm$ 1.16)	

NS: not statistically significant

Fig. 7: Prevalence of caries in relation to gender for permanent teeth

Fig. 8: Mean DMFT in relation to gender for permanent teeth

Fig. 9: Mean DMFS in relation to gender for permanent teeth

Among the maxillary teeth, decay prevalence was the highest in permanent central incisors (12.65%), followed by permanent first molars (2.85%). Among the mandibular teeth, the prevalence was highest in first permanent molars (4.65%), followed by permanent central incisors (0.5%) (Table 9, Fig. 10).

Concerning calibration and computation procedure for dental and oral health, a comparison between the outcomes of the investigators and the analysis was performed to decide the degree of uniformity among them. A satisfactory degree of uniformity was 85% or higher.¹⁵ Inter- and intra-examiner reliability extended from 0.75 to 0.86, and from 0.93 to 0.98, respectively.

DISCUSSION

The aim of the present research was to decide the pervasiveness, seriousness, and pattern of dental decay in 6–7-year-old youngsters in military elementary schools in Jeddah, Kingdom of Saudi Arabia. The study was a part of an oral wellbeing advancement program in these schools to advance oral wellbeing in this chosen group of youngsters.

In our study, decay prevalence and dmft scores were found to be very high among the selected youngsters. Eighty-nine percent of the youngsters had decay and only 10.95% were decay-free.

This agrees with the study done by AL-Malik and Rehbini, who showed that decay was diagnosed in 96% of the youngsters and only 4% were clinically decay-free.¹⁷ There was no notable difference between decay prevalence and dmft in relation to gender.

The decay segment was the primary part of dmft scores, which demonstrated a high level of untreated decay and a high treatment requirement for these youngsters. A past report has likewise revealed decay as the notable component of dmft scores.¹⁸ The current study showed a dmft score of 5.63, while AL-Malik and Rehbini study revealed a dmft score of 8.06.¹⁷

The information on decay design decides the proper treatment planning for these youngsters. The investigation demonstrated the event of decay in both anterior and posterior teeth in the majority of the boys and girls. The pervasiveness of decay in molars was for the most part reciprocal. The teeth most influenced via decay were mandibular primary second molars (64.4% and 66%) and the least influenced were mandibular primary central incisors (1.7% and 2.6%). The decay predominance was commonly higher in the mandibular primary teeth than similar teeth in the maxilla; this is steady with the discoveries of AL-Malik and Rehbini.¹⁷

The high predominance of decay in this chosen populace can likewise be identified with poor oral cleanliness rehearses, ill-advised dietary propensities, just as poor dental mindfulness and absence of dental information among those youngsters. Extra factors—for example, late first dental visits for standard registration and beginning brushing late, which is normal in Saudi—may likewise be in charge of the high decay predominance.¹⁹

Dental examination is accessible free of charge for this populace; in any case, the dimension of dental decay is high. This could be attributed to the far dental appointment in the clinic or the patient had a bad dental encounter. Standard dental visits are important to improve oral wellbeing. Routine dental visits for normal check-up are not regular in Kingdom of Saudi Arabia; numerous guardians took their youngsters to the dental specialist just when they are in agony.^{18,19}

Although dental awareness is increasing these days in many schools and public areas, still the spread of dental decay is high owing to the decreased dental knowledge of parents.

There is an expanded interest to begin instructive projects for new and eager moms to build their dental learning and to offer counsel to limit cariogenic bites and beverages, to begin oral

Fig. 10: Caries prevalence by individual permanent teeth (graphical presentation)

Table 9: Caries prevalence by individual permanent teeth

Tooth	Maxillary teeth		Mandibular teeth	
	Right (%)	Left (%)	Right (%)	Left (%)
Central incisor	14.4	10.9	0.5	0.5
First molar	3.8	1.9	4.5	4.8

cleanliness early, and to get dental check-ups for their youngsters early. Additionally, we ought to consider the preparation of dental assistants (e.g., dental advisors, dental hygienists, and dental instructors) to help in the control and prevention of dental decay.

CONCLUSION

The prevalence of dental decay was high among the present study sample. There is a vast need to reduce dental decay by increasing dental awareness for youngsters and their parents by implementing a preventive and oral hygiene promotion program.

CLINICAL SIGNIFICANCE

Age has an important role in evaluating decay prevalence and dmft/dmfs/DMFT/DMFS indices. On the basis of age, caries is prevalent in 6–7-year-old youngsters and the dmft/dmfs/DMFT/DMFS indices resulted in high values.

ACKNOWLEDGMENTS

The authors sincerely acknowledge Drs. Muhammad Saifaddin, Khalid Altaf, Muath Bentan, and Eyad Suqati, Dental Interns, Faculty of Dentistry, Ibn Sina National College for Medical Studies, for their help in clinical examination of the children.

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