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Research Article

Oral Health Status of Preschool Children in Egypt

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Abstract

Background: Oral health is an integral part of general health, as oral cavity is considered a gateway of the body. Oral health play an important role in the children's life.

Aims: This study aimed to obtain updated information of oral health status including dental caries situation, gingival condition and traumatic injuries in Egyptian preschool children.

Methods: A cross sectional study was carried out in Mansoura city. One thousand children aged 3 - 6 years who were attending private and public kindergarten were included in the study. Children were examined for dental caries using deft index of primary teeth. Gingival condition was measured through PMA index (papillary, marginal, and attached). Upper and lower primary anterior teeth were assessed for signs of dental trauma: (treated dental injury, enamel fracture, enamel/dentin fracture, pulp injury, and missing tooth due to trauma). Data were analyzed by Mann-Whitney, Kruskal-Wallis and Chi- square tests.

Results: The prevalence of dental caries in preschool children was 61.4%, and the mean dmft (2.930 ± 3.281) in male and (2.332 ± 2.852) in female. However, gingival inflammation prevalence was 7.4%, and dental trauma prevalence was 10%, enamel fracture was the higher followed by dentin fracture and discoloration.

Conclusion: Caries is highly prevalent in Egyptian preschool children. Meanwhile low prevalence of gingival inflammation and traumatic injury were found.

Keywords: Preschool Children; Dental Caries; Gingivitis; Dental Trauma; Prevalence

Introduction

Early childhood caries (ECC) is a global public health problem. The American Academy of Pediatric Dentistry defines ECC as 'the presence of caries in one or more primary teeth (cavitated or non-cavitated) in a child 71 months of age or younger [1]. Early stages of dental caries appear as white, chalky areas on the enamel close to the gum margin (enamel caries). As decaying process progresses to involve the dentin a visible cavity (dentinal caries) will develop. Once dental pulp is involved it becomes painful 1. ECC prevalence in England and USA is 6.8 - 12% and 11 - 53.1% respectively. Highest prevalence of caries in maxillary anterior teeth was reported from Africa and South-East Asia [2]. In India, ECC prevalence was 44% among 8 - 48 months children [3].

Gingivitis and periodontitis are serious infections that if left untreated can lead to tooth loss [4]. Gingivitis is reversible when properly treated and with good oral hygiene. Bacterial plaque is strongly associated with gingivitis. Whereas periodontitis is irreversible and it may lead to destruction of bone. Untreated gingivitis can advance to periodontitis. Therefore, if gingivitis and periodontitis are assessed at an early stage it would minimize the chance of tooth loss [5,6].

Epidemiological data showed a wide variation in the prevalence of dental injuries in children [7-10]. Dental trauma has severe sequelae as pain, loss of function, adverse effect on the developing occlusion and periapical manifestations [11,12]. Dental injuries to deciduous teeth can result in problems to the underly-

ing permanent teeth, such as hypoplasia, discoloration, and delay in eruption time, and tooth malformation [13]. Consequence of dental trauma includes alteration in physical appearance, speech problem, and emotional impacts, that affect child's quality of life [14,15]. Several studies were carried out on traumatic dental injuries (TDI), more attention has been given to injuries of permanent than primary teeth probably due to the misconception that primary teeth will eventually exfoliate and therefore should not require great care [16]. The prevalence of TDIs among preschool children in different countries ranged from 6.2% to 41.6%. In the Middle East, prevalence rates from 11.1% to 33% have been reported [17-20]. Limited data was available on the prevalence of TDI among preschool children in Egypt.

This study aimed to assess the prevalence of dental caries, gingival inflammation and traumatic injury among Egyptian preschool children.

Materials and Methods

Study design and locality

A descriptive cross-sectional study was carried out in Mansoura city which is the capital city of Dakahlia governorate in Egypt.

Sample size

The target population was children aged 3 to 6 years attending public kindergarten in Mansoura city. A power calculation was used to determine the minimum sample size required to establish significance (at level of confidence 95% and using margin of error 5%). Using a prevalence figure of 33% for gingivitis, 15% for trauma, and 40% for caries, setting the confidence level at 95%, and using a margin of error of 5%, the minimum required samples were 300, 559, and 515 for trauma, caries and gingivitis respectively. However, the sample size was increased, so that, the number of children targeted in the study was 1000.

Sampling procedure

A two-stage random sampling procedure was performed. In the first stage, proportional simple random sampling was used to select kindergartens from different areas in Mansoura city. The second stage involved a random selection of children from each participating kindergarten.

Inclusion and exclusion criteria

Healthy preschool children attending public schools were included in the study.

Exclusion criteria

1. Uncooperative or highly anxious children.
2. Missing permanent anterior teeth or missing primary anterior teeth due to exfoliation.
3. Anterior teeth with structural loss because of caries.

Ethical approval

Approval of the study was obtained from ethical committee faculty of dentistry, Mansoura University. Also approval from ministries of Health and Education in Dakahlia governorate was taken. Parent's consents were taken through formal letter sent to them explaining the study purpose in simple words before starting the study.

Collection of data

Children were examined by two trained and calibrated examiners in the preschool medical room. They were examined under natural light using WHO Probe [21] and appropriate cross infection protection equipment with all instruments individually packaged and sterilized.

Dental caries estimation

Decayed, missed, and filled teeth were recorded according to World Health Organization (WHO) [21]. Dental caries experience was estimated by calculating deft index for primary teeth through adding the three components (decayed, missed, and filled).

Gingival health estimation

Gingival condition was measured through PMA (papillary, marginal, and attached) index [22] which is specially designed for measuring gingival health in children. Score 0 (absence of inflammation) or 1 (presence of inflammation). Severity of gingivitis is recorded by adding scores from papillary, marginal, and attached areas.

Dental trauma estimation

The primary maxillary and mandibular anterior teeth were examined for signs of dental trauma, and when present, TDIs were recorded according to the epidemiological classification adopted by the World Health Organization (WHO) and modified by Andresen., *et al.* [23,24] which included: treated dental injury, enamel fracture only, enamel/dentin fracture, pulp injury, and missing

tooth due to trauma. Enamel/dentin fracture with pulp exposure, discoloration, and sinus tract without signs of caries are enlisted under pulp injury.

Statistical analysis

The data were analyzed using Statistical Package for Social Science (SPSS) [25] version 16. Significance was set at P < 0.05 (Significance level 95%). The prevalence and severity of oral diseases were compared between different groups with either Mann-Whitney, Kruskal-Wallis or Chi- square tests.

Results

Table 1 demonstrated that, prevalence of dental caries was 61.4% among preschool children, this prevalence was higher among males (64.2%) than females (56.6%), and this difference was statistically significant (p = 0.017). Concerning gingivitis, its prevalence was 7.4% with higher prevalence in males (7.9%) than females (6.5%), and this difference was not statistically significant (p = 0.388). For dental trauma, the prevalence was 10%, also males (11.9%) was higher than females (6.7%), and this difference was statistically significant (p = 0.008%).

Oral condition		Absent N (%)	Present N (%)	P[a]-value
Dental caries	Male (n = 629)	225 (35.8%)	404 (64.2%)	0.0001*
	Female (n = 371)	161 (43.4%)	210 (56.6%)	
	Total (1000)	386(38.6%)	614(61.4%)	
	p-value	0.017		
Gingivitis	Male (n = 629)	579 (92.1%)	50 (7.9%)	0.0001*
	Female (n = 371)	347 (93.5%)	24 (6.5%)	
	Total (1000)	926 (92.6%)	74 (7.4%)	
	p-value	0.388		
Dental trauma	Male (n = 629)	554 (88.1%)	75 (11.9%)	0.0001*
	Female (n = 371)	346 (93.3%)	25 (6.7%)	
	Total (1000)	900 (90%)	100 (10%)	
	p-value	0.008		

Table 1: Prevalence of oral conditions among participants.
P: Comparison between male and female by Mann-Whitney test.

Table 2 showed that, dmft was higher in males (2.930) than in females (2.332) with statistical significant difference between them (p=0.01). Also the decayed component was the highest in comparison with other components (missed and filled) in both genders (2.930 in males, 2.332 in females).

Gender	dmft (mean ± SD)	Decayed teeth (mean ± SD)	Missed teeth (mean ± SD)	Filled teeth (mean ± SD)
Male (n = 629)	2.930 ± 3.281	2.387 ± 2.848	0.046 ± 0.224	0.496 ± 1.032
Female (n = 371)	2.332 ± 2.852	1.876 ± 2.413	0.162 ± 0.521	0.294 ± 0.655
P – value	0.01	0.01	0.001	0.04

Table 2: Severity of dental caries regarding the gender.

PMA was higher in males (0.169) than in females (0.138) with no significant difference between them (p = 0.699) (Table 3). Interdental papillae was the most commonly affected area of gingiva and males (0.079) was also higher affected than females (0.065) with no significant difference between them (p = 0.388).

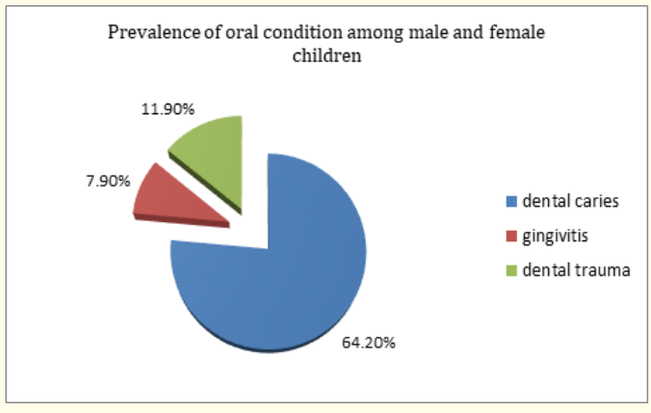
Gender	PMA (mean ± SD)	Interdental papillae (mean ± SD)	Marginal (mean ± SD)	Attached (mean ± SD)
Male (n = 629)	0.169 ± 0.658	0.079 ± 0.271	0.064 ± 0.244	0.039 ± 0.196
Female (n = 371)	0.138 ± 0.561	0.065 ± 0.246	0.059 ± 0.236	0.019 ± 0.136
P - value	0.699	0.388	0.786	0.070

Table 3: Gingival inflammation among male and female children.

In table 4 no pulp injury was recorded in the study. Males with enamel fracture were the highest between all forms of dental trauma(0.064), followed by dentine fracture (0.032) and discoloration (0.024). Concerning females, treated traumatic injury (0.029) was the highest followed by discoloration (0.024) and enamel fracture (0.019).

Gender	Treated injury (mean ± SD)	Enamel fracture mean ± SD	Dentin fracture mean ± SD	Pulp injury mean ± SD	Discoloration mean ± SD
Male (n = 629)	0.008 ± 0.089	0.064 ± 0.244	0.032 ± 0.176	0	0.024 ± 0.153
Female (n = 371)	0.029 ± 0.169	0.019 ± 0.136	0.014 ± 0.115	0	0.024 ± 0.154
P – value	0.008*	0.001*	0.073	1	0.967

Table 4: Severity of dental trauma among male and female children.
P: Comparison between genders by Mann-Whitney test



Discussion

Dental caries is a major dental public health problem affecting most of the children in many countries worldwide [24,25]. It has an effects a social, physical, mental, and financial burden on a global scale [26]. This study was conducted among preschool children aged 3 - 6 years in Mansoura city because of limited epidemiological data for this age group.

In our study, the prevalence of dental caries was 61.4%and this was in accordance to result reported by Abou El-Yazeed study that carried out in El Kalubia Governorate, Egypt [27]. Males showed higher prevalence than females in our study and this coincided with a study performed in Faculty of Oral and Dental Medicine, in Cairo University at 2003-2004 [28]. On the other hand, our result is not in agreement with Abd El-Monem [29] study in Al Giza Governorate 1997, as females were more affected than males. This could be attributed to bad oral hygiene practices in male children and difficult behavior among male children.

The mean dmft score in our study was in the range of 2.2 - 2.9, which is similar to 5-year-old children in previous surveys conducted in 1997 and 2001, in Hong Kong which were 1.8 and 2.3, respectively [30,31]. On the contrary, higher dmft values were found in studies conducted among preschool children of Glassgow 7.9 [32] and Riyadh 6.1 [33]. The difference in the caries prevalence and mean dmft may be due to different levels of preventive measures practiced in these places and due to different environmental, social and cultural differences prevalent in different places. Also this high prevalence can be attributed to lack of awareness among parents due to low socioeconomic status as the children were taken from public schools, as education of parents affects oral status of a child.

Gingivitis is an inflammatory process that begins in early childhood. The information about oral hygiene and gingival health status in a population is important as it helps in planning of preventive services as well as in determination of treatment needs. PMA index was used for evaluation of gingival condition as this index is designed primarily for the examination of gingivitis in children 22. The prevalence of gingivitis was 7.4% in our study which did not match with many studies performed in Srilanka (49.57%) [34] and 46.2% in Cambodia [35]. On the other hand our results matched with the results of a study performed in Cameroon 26.7% [36] and Belgium 3 - 4% [6].

Epidemiological studies on gingivitis indicates that, this disease begins at the age of 5 years with highest point occurring during puberty. Our age group included 3 - 6 years which is the period of primary dentition and gingivitis is known to appear in mixed dentition stage. This is confirmed by a previous research which indicated that gingivitis occurred at rate of 1-9% in early childhood population [35]. Males had more gingivitis than females in our study. Gender variation in gingival index has been noted among Nigerian, Sudan and Jordan school children [37-40].

A systematic review on traumatic dental injuries showed that, one-third of all preschool children have suffered a TDI involving the primary dentition, but variations have been reported between and within countries [41]. In our study, the prevalence of dental trauma was 10%, which was in accordance to many studies performed in Middle East [17-20]. Males showed more prevalence of trauma than females which was significant [42,43]. Also peak age of trauma was 3 years, this may be attributed to the poor motor coordination or the inability of children at this age to evaluate potential risks [44]. Studies have shown a correlation of low socioeconomic status and high prevalence of dental trauma [45,46]. Other determinants as high cost of treatment, low standard of living, and lack of knowledge of parents play a vital role in TDI [45].

Conclusions

Based on the result of this study, we concluded that High prevalence of dental caries, moderate prevalence of dental trauma and low prevalence of gingivitis among preschool children in Mansoura city, Egypt.

Therefore health education and oral health counseling should be given to parents, teachers and children with preventive programs to be conducted regularly at schools so that each child is benefitted. Mothers and teachers should be given practical and emotional support to their children with regard to oral hygiene habits. Moreover, there is a need to draw attention of responsible authorities to improve safe playing areas and addressing the importance of dental trauma among preschool children.

Conflict of Interest

The authors declared no conflict of interest.

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Nil.

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