



## Oral Health Status of Preschool Children in Egypt

Hanaa Mahmoud Shalan<sup>1\*</sup> and Rabaa Mahmoud Abo Bakr<sup>2</sup>

<sup>1</sup>Assistant Professor in Pediatric Dentistry Department, Faculty of Dentistry, Mansoura University, Egypt

<sup>2</sup>Lecturer of Preventive Dentistry and dental public health Department, Faculty of Dentistry, Mansoura University, Egypt

\*Corresponding Author: Hanaa Mahmoud Shalan, Assistant Professor in Pediatric Dentistry Department, Faculty of Dentistry, Mansoura University, Egypt.

Received: March 19, 2018; Published: April 24, 2018

### 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 ( $2.930 \pm 3.281$ ) in male and ( $2.332 \pm 2.852$ ) 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 (dental caries) will develop. Once dental pulp is involved it becomes painful. 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 underlying

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 <sup>a</sup> -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 ( $p = 0.388$ ).

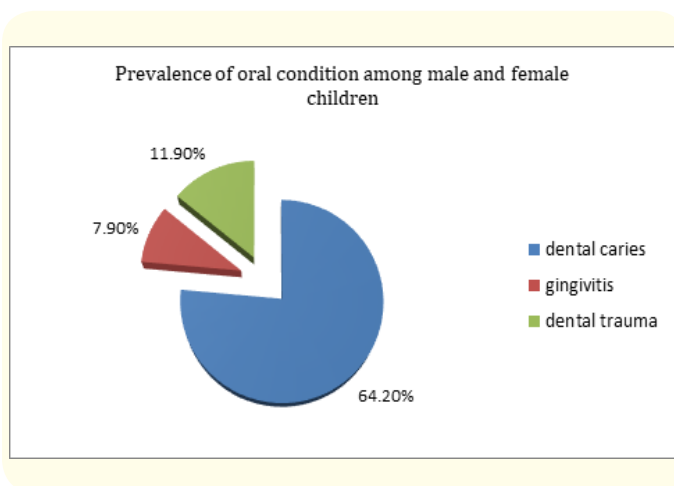
Gender	PMA (mean ± SD)	Interdental papillae (mean ± SD)	Marginal (mean ± SD)	Attached (mean ± SD)
Male (n = 629)	0.169 ± 0.658	0.079 ± 0.271	0.064 ± 0.244	0.039 ± 0.196
Female (n = 371)	0.138 ± 0.561	0.065 ± 0.246	0.059 ± 0.236	0.019 ± 0.136
P - value	0.699	0.388	0.786	0.070

**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 Glasgow 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 benefited. 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.

### Source of Funding

Nil.

### Bibliography

- Priyantha JP, et al. "Prevalence of dental caries among a cohort of preschool children living in Gampaha district, Sri Lanka: A descriptive cross sectional study". *BMC Oral Health* 12 (2012): 49.
- Kumar VD. "Early childhood caries- an insight". *Journal of International Oral Health* 2.1 (2010): 1-9.
- Nilza M., et al. "Breastfeeding and early childhood caries: a critical review". *Journal of Pediatrics* 80.5 (2004): 199-201.
- Shafer, et al. "Shafer's text book of oral pathology". Sixth edition (2009).
- Sayegh A., et al. "Oral health, sociodemographic factors, dietary and oral hygiene practices in Jordanian children". *Journal of Dentistry* 33.5 (2005): 379-388.
- Leroy R., et al. "Oral hygiene and gingival health in Flemish preschool children". *Community Dental Health* 28.1 (2011): 75-81.
- Berti GO., et al. "Epidemiological study of traumatic dental injuries in 5- to 6-year-old Brazilian children". *Brazilian Oral Research* 29 (2015): 1-6.
- ElKarmi RF, et al. "Prevalence of traumatic dental injuries and associated factors among preschool children in Amman, Jordan". *Dental Traumatology* 31.6 (2015): 487-492.
- Bhayya DP and Shyagali TR. "Traumatic injuries in the primary teeth of 4- to 6-year-old school children in gulbarga city, India. A prevalence study". *Oral Health and Dental Management* 12.1 (2013): 17-23.
- Lam R. "Epidemiology and outcomes of traumatic dental injuries: A review of the literature". *Australian Dental Journal* 61 (2016): 4-20.
- Cortes MI, et al. "Impact of traumatic injuries to the permanent teeth on the oral health-related quality of life in 12-14 year old children". *Community Dentistry and Oral Epidemiology* 30.3 (2002): 193-198.
- Feliciano KM and de Franca Caldas A. "A systematic review of the diagnostic classifications of traumatic dental injuries". *Dental Traumatology* 22.2 (2006): 71-76.
- Bijella MF, et al. "Occurrence of primary incisor traumatism in Brazilian children: A house-by-house survey". *ASDC Journal of Dentistry for Children* 57.6 (1990): 424-427.
- Aldrigui JM, et al. "Trends and associated factors in prevalence of dental trauma in Latin America and Caribbean: A systematic review and meta-analysis". *Community Dentistry and Oral Epidemiology* 42.1 (2014): 30-42.
- Cardoso M and de Carvalho Rocha MJ. "Traumatized primary teeth in children assisted at the Federal University of Santa Catarina, Brazil". *Dental Traumatology* 18.3 (2002): 129-133.
- Aldrigui J., et al. "Impact of traumatic dental injuries and malocclusions on quality of life of young children". *Health Quality Life Outcomes* 9 (2011): 78.
- Zadik D. "A survey of traumatized primary anterior teeth in Jerusalem preschool children". *Community Dentistry and Oral Epidemiology* 4.4 (1976): 149-151.
- Hasan A., et al. "Prevalence of traumatic dental injuries in preschool children in Kuwait: a screening study". *Dental Traumatology* 26.4 (2010): 346-350.
- Yagot KH, et al. "Traumatic dental injuries in nursery school-children from Baghdad, Iraq". *Community Dentistry and Oral Epidemiology* 16.5 (1988): 292-293.
- Al-Majed I, et al. "The prevalence of dental trauma in 5-6 and 12-14 yearold boys in Riyadh, Saudi Arabia". *Dental Traumatology* 17.4 (2001): 153-158.
- World Health Organization. "Oral Health Surveys: Basic Methods- 5<sup>th</sup> Edition" (2013): 1-125.
- Stephen HY and Klaus PL. "Periodontal epidemiological indices for children and adolescents: gingival and periodontal health assessments". *The American Academy of Pedodontics* 3.4 (1981): 353-360.
- Andreasen JO, et al. "Dental Trauma Guide: A source of evidence-based treatment guidelines for dental trauma". *Dental Traumatology* 28.2 (2012): 142-147.
- Petersen PE. "The World Oral Health Report 2003: continuous improvement of oral health in the 21st century - the approach of the WHO Global Oral Health Programme". *Community Dentistry and Oral Epidemiology* 31 (2003): 3-24.
- Petersen PE and Lennon MA. "Effective use of fluorides for the prevention of dental caries in the 21st century: the WHO approach". *Community Dentistry and Oral Epidemiology* 32 (2004): 319-321.

26. Darshana B., *et al.* "Oral Health status of 3-6 year old children and their mother's oral health related knowledge, attitude and practices in Mysore City, India". *Asian Journal of Medical Sciences* 6.2 (2015): 66-71.
27. Abou El-Yazeed M., *et al.* "Dental Caries Prevalence among a group of Egyptian Nurseries Children". *Life Science Journal* 8.1 (2011).
28. Awad SM. "Early childhood caries prevalence, demographic characteristics and utilization of dental services provided among children attending pediatric dentistry department, Cairo University (2003-2004)". Master Thesis in Pedodontics, Faculty of Oral and Dental Medicine, Cairo University (2006).
29. Abd El-Monem Azza A. "Prevalence of nursing caries among nurseries children in rural areas of Giza and their life style. Master Thesis in Pedodontics". Faculty of Oral and Dental Medicine Cairo University (1997).
30. Chu CH., *et al.* "Dental caries status of preschool children in Hong Kong". *British Dental Journal* 187.11 (1999): 616-620.
31. Department of Health. "Oral Health Survey 2001". Hong Kong: Government Printer (2002).
32. Cameron FL., *et al.* "Dietary and Social Characteristics of Children with Severe Tooth Decay". *Saudi Medical Journal* 51.3 (2006): 26-29.
33. Wyne AH. "Caries Prevalence, Severity, and Pattern in Preschool Children". *Journal of Contemporary Dental Practice* 3 (2008): 24-31.
34. Perera., *et al.* "Prevalence of dental caries among a cohort of preschool children living in Gampaha district, Srilanka". *BMC Oral Health* 12 (2012): 1-6.
35. Shidara EK., *et al.* "A vicious cycle in the oral health status of schoolchildren in a primary school in rural Cambodia". *International Journal of Dental Hygiene* 5.3 (2007): 165-173.
36. Azodo CC and Agbor AM. "Gingival health and oral hygiene practices of school children in the north west region of Cameroon". *BMC Research Notes* 8 (2015): 385-391.
37. Aranza OT and Pena IT. "Prevalence of gingivitis in preschool age children living on the east side of Mexico city". *Boletin Medico Del Hospital Infantil de Mexico* 68.1 (2011): 19-23.
38. Kolawole KA., *et al.* "Oral hygiene measures and the periodontal status of school children". *International Journal of Dental Hygiene* 9.2 (2011): 143-148.
39. El-Qaderi SS and Quteish T D. "Dental plaque, caries prevalence and gingival conditions of 14-15 year old school children in Jerash District, Jordan". *International Journal of Dental Hygiene* 4.3 (2006): 150-153.
40. Farah HH and Ghandour IA. "Periodontal health status of 12-year-old Sudanese school children and educational level of parents in Khartoum province". *Odonto-stomatologie Tropicale* 32.127 (2009): 25-33.
41. Glendor U. "Epidemiology of traumatic dental injuries- a 12 year review of the literature". *Dental Traumatology* 24.6 (2008): 603-611.
42. Granville-Garcia AF, *et al.* "Traumatic dental injuries and associated factors among Brazilian preschool children aged 1-5 years". *Acta Odontológica Latinoamericana* 23.1 (2010): 47-52.
43. Norton E and O'Connell AC. "Traumatic dental injuries and their association with malocclusion in the primary dentition of Irish children". *Dental Traumatology* 28.1 (2012): 81-86.
44. Flores MT., *et al.* "Injuries to the primary dentition. In: Andreasen JO, Andreasen FM, Andresson L, editors. Text Book and color atlas of traumatic injuries to the teeth, 4th edn, chapter 19. Oxford: Blackwell Munksgaard (2007): 516-541.
45. Siqueira MB., *et al.* "Predisposing factors for traumatic dental injury in primary teeth and seeking of post-trauma care". *Brazilian Dental Journal* 24.6 (2013): 647-654.
46. Malikaew P., *et al.* "Prevalence and factors associated with traumatic dental injuries (TDI) to anterior teeth of 11-13 year old Thai children". *Community Dental Health* 23.4 (2006): 222-227.

**Volume 2 Issue 5 May 2018**

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