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## Gender differences in caries status of the first permanent molars in Libyan children

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### Abstract

**Aims:** To assess the prevalence and sex disparities for caries in the first permanent molars (FPMs) in Benghazi city, Libya.

**Methods:** A cross-sectional study was conducted of 375 children (206 girls and 169 boys) of age 6-12 at pediatric clinic of Faculty of Dentistry. Data were analyzed using SPSS version 16, Chi square tests.

**Results:** Caries prevalence in FPMs amongst all of the age groups 6-12 year-old was 675 teeth (45%). Contrary to national and international trends, there was no significant difference in caries prevalence of FPMs between boys and girls, in the upper right and left quadrant ( $P > 0.05$ ). However, in the lower right quadrant significant differences ( $P < 0.05$ ) were found between the two genders in their FPMs carious status.

**Conclusions:** A high rate of caries in FPMs 6-12 years old Libyan children. The high level of caries prevalence is a cause for concern. In all the quadrants, a higher experience of caries was observed amongst girls than boys except for the lower left quadrant caries was higher in boys. It is recommended that it necessary to start efficient plans to promote the dental health of the children, and the plans should be comprised of the education and the motivation for the parents, children, dental health services, and the preventive measures.

**Keywords:** Gender, caries, first permanent molar, children, Libya

### Introduction

Despite the fact that caries is the commonest dental disease in children and FPM is most caries prone of all permanent teeth, there are few studies in Libya regarding the prevalence and sex differences of caries in FPMs. Gender differences in dental caries have been observed among different populations, with females observed to have higher prevalence and more affected teeth. The first permanent molar tooth (FPM) is the first permanent tooth that erupts, and has been considered as the most caries-susceptible tooth in the permanent dentition<sup>[1, 2]</sup>. In 2003 43% of children in UK aged 12 years old had carious molars<sup>[3]</sup>. Dental caries has been considered as the most common disease in the world<sup>[4]</sup>. Gender differences in caries prevalence had been widely observed; with most studies showed that females have more caries experience than males<sup>[5, 6]</sup>. This is may be due to many factors: women have a different salivary composition and flow rate, hormonal fluctuations, dietary habits and genetic variations<sup>[7]</sup>. The FPMs were selected for evaluation as they are the first permanent teeth appear in the oral cavity, as well as they are exposed to maximum occlusal load. A study conducted in Nigeria showed that FPMs represented 42% of all extractions due to caries, which is the highest when compared to other teeth<sup>[8]</sup>. There are insufficient studies in Libya concerning the prevalence of caries in FPMs. Therefore, the purpose of present study was to increase the documentary researches on FPMs and to assess the prevalence and sex differences of dental caries in the FPMs among 6-12 years old Libyan children in Benghazi.

### Materials and Methods

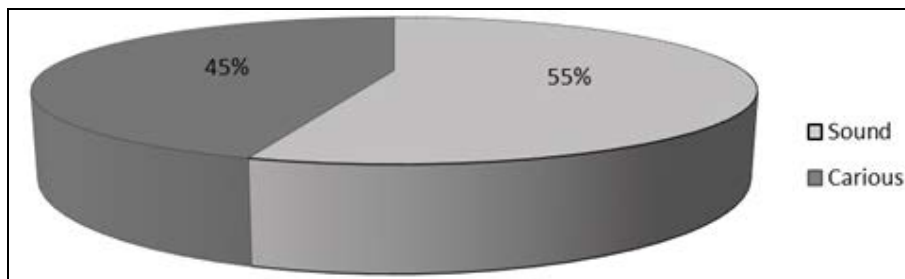
A cross sectional study with dental examination was conducted of 375 children aged 6 to 12 years (206 girls and 169 boys).

All children selected for the study were healthy and free of medical problems. Dental examination was done in pediatric clinic of Faculty of Dentistry in Benghazi. A consent form was signed from the parents of children who involved in the study. Ethical approval was given from the Ethics Committee of Faculty of Dentistry. The diagnostic criterion for dental caries as recommended by the World Health Organization [9] was conducted. All subjects were examined using sterile mirror, explorer, cotton rolls, and good illumination. All maxillary and mandibular first permanent molars were examined for dental caries. Data analysis was performed

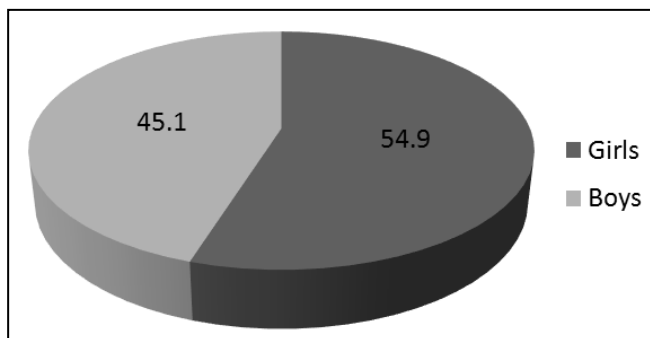
using SPSS version 16, the chi-square test, whereas, the significance level was considered as ( $P < 0.05$ ).

**Results**

The overall prevalence of carious and sound first permanent molars amongst all of the age groups was 675 teeth (45%) and 825 teeth (55%) respectively as shown in Figure 1. The sample was classified into two groups according the gender; girls were 54.9% of total sample and boys was 45.1% as can be observed in figure 2.



**Fig 1:** The distribution of carious and sound first permanent molars in the sample



**Fig 2:** The distribution of sample according to the gender

In the upper right segment, no significant differences have found between boys and girls ( $P > 0.05$ ). Whereas, 57.3% of the girls had carious FPMs, and 42.7% had caries free FPMs. In contrast with boys, who had 59.8% carious FPMs and caries free FPMs was 40.2% as can be observed in Table 1.

**Table 1:** Comparative analysis of caries incidences of FPMs in the upper right segment of the dental arch

Gender		Count	Upper Right		Total
			Free Caries	carious	
Girls		118	88	206	
	% within Gender	57.3%	42.7%	100.0%	
	% of Total	31.5%	23.4%	54.9%	
		101	68	169	
Boys		101	68	169	
	% within Gender	59.8%	40.2%	100.0%	
	% of Total	26.9%	18.2%	45.1%	
		219	156	375	
Total	% within Gender	58.4%	41.6%	100.0%	
	% of Total	58.4%	41.6%	100.0%	

Pearson Chi-Square=0.235<sup>a</sup> p value =0.628

Table 2 showed that the upper left segment 61.2% of the girls had no caries and 38.8% had carious FPMs. while 62.1% of the boys had carious free FPMs and 37.9% had caries in their FPMs without gender differences between them ( $P > 0.05$ ).

**Table 2:** Comparative analysis of caries incidences of FPMs in the upper left segment of the dental arch

Gender		Upper Left			Total
		Count	Free Caries	Carious	
Girls		126	80	206	
	% within Gender	61.2%	38.9%	100.0%	
	% of Total	33.6%	21.3%	54.9%	
		105	64	169	
Boys		105	64	169	
	% within Gender	62.1%	37.9%	100.0%	
	% of Total	28.0%	17.1%	45.1%	
		231	144	375	
Total	% within Gender	61.6%	38.4%	100.0%	
	% of Total	61.6%	38.4%	100.0%	

Pearson Chi-Square=.0037<sup>a</sup> p value =0.848.

The result represented in table 3 showed that the lower right segment, 52.9% of the girls had carious FPMs, while 43.2% of the boys had carious molars.

**Table 3:** Comparative analysis of caries incidences of FPMs in the lower right segment of the dental arch

Gender		Lower Right			Total
		Count	Free Caries	carious	
Girls		97	109	206	
	% within Gender	47%	53%	100.0%	
	% of Total	25.8%	29.1%	54.9%	
		96	73	169	
Boys		96	73	169	
	% within Gender	56.8%	43.2%	100.0%	
	% of Total	25.6%	19.5%	45.1%	
		193	182	375	
Total	% within Gender	51.5%	48.5%	100.0%	
	% of Total	51.5%	48.5%	100.0%	

Pearson Chi-Square=3.510<sup>a</sup> p value =0.061.

For the lower left, no gender significant was found between them ( $P > 0.5$ ), FPMs 50.5% of the girls and 52.7% of the boys had carious (Table 4). Table 5 demonstrated the caries frequency of FPMs in the upper and lower dental arches.

**Table 4:** Comparative analysis of caries incidences of FPMs in the lower left segment of the dental arch

Gender * Lower Left Cross tabulation				
Gender		Lower Left		Total
		Free Caries	carious	
Girl	Count	102	104	206
	% within Gender	49.5%	50.5%	100.0%
	% of Total	27.2%	27.7%	54.9%
	Count	80	89	169
Boy	% within Gender	47.3%	52.7%	100.0%
	% of Total	21.3%	23.7%	45.0%
	Count	182	193	375
Total	% within Gender	48.5%	51.5%	100.0%
	% of Total	48.5%	51.5%	100.0%

Pearson Chi-Square=0.176p value =0.675

**Table 5:** Comparative analysis of caries incidences of FPMs in the upper, lower right and left segments of the dental arch

Gender	Girls	Boys
	N Caries %	N Caries %
Upper right segment	88 42.7	68 40.2
Lower right segment	109 53.0	73 43.2
Upper left segment	80 38.9	64 37.9
Lower left segment	104 50.5	89 52.7

## Discussion

The present study has provided useful information about the prevalence and sex differences of dental caries in 6-12 year-old Libyan schoolchildren in Benghazi. The first permanent molars were exclusively examined because they play a key role in maintaining the dental health of an individual. This study showed that out of 1500 FPMs, 675 teeth (45%) were carious, which is far from the WHO global aim that by 2020 the carious PFMs should have decreased to 11% [10]. A high rate of caries in FPMs 6-12 years old Libyan children. The prevalence of dental caries in this study might be due to high consumption of sugared-acidic drinks and foods, lack of dental awareness and unhealthy dietary habits may have worsened the situation [11, 12]. However, the present results were lower than results of a study done in Iran showed that out of 2256 FPMs, 1323 teeth were carious (greater than 50%) [13], results reported among 6-14 years old Sudanese children [14], showed that prevalence of dental caries of FPM was 61%. But higher than results in a study in Karachi, Pakistan, out of 1808 FPMs evaluated in 8-12 year-old children, 568 teeth were carious [15].

Comparing the present study with previous studies in Libya, the present results was lower than 57.8% reported in Benghazi [16]. Also lower than 56.9% for 10-13 year-olds [17], and with relatively lower than 50% in 12 year-olds [18] and 50% for 6-12 year-old children [19]. Though we should be consider that these Libyan studies were assessed the prevalence of dental caries in all teeth. So the compression may not be an ideal. The slight differences of prevalence of dental caries in these different studies might be attributed to cultural, nutritional habits, in the amount of fluoride in drinking water, hygienic and age differences and also cultural, socioeconomic factors in different cities that directly and indirectly affect caries prevalence.

The present study assessed gender difference in caries prevalence of FPM in children aged 6 to 12 years old in Benghazi, Libya. It can be observed from the results of this study that there was a little difference between the genders in caries prevalence of FPMs, as caries in girls were little bit higher than in boys. Another similar study carried out in

Sudan by Abuaffanetal reported that FPMs in Sudanese children aged 6-14years are 60.1% carious in girls and 39.9% carious in boys [20]. The current study was agreed with the finding reported by Khan *et al.*, in studied children aged 8-12 years old. His study showed statistically significant link between prevalence of carious FPMs and gender, as caries prevalence of FPMs in girls was (52.7%) which was a little higher than boys (50%) in Dammam, Saudi Arabia [21]. This study, caries in mandibular FPMs was higher than caries in maxillary FPMs which was similar to the results of a study carried out in Abha, Saudi Arabia [22]. Another study reported almost twice the number of females affected by caries compared with males [23]. The probable reason for mandibular FPMs being more affected could be their earlier eruption time, or the presence of deep pits and fissures. Khalid H.M. *et al.* had results similar to our results were there was no significance difference between caries in molars of girls and boys, as they found that of a total 432 children, 199 (46%) were male and 233(54%) were females [24]. In addition, the current study were comparable to the results reported by Sudhakaran *et al.*, showed no significant difference was found between caries of FPMs in both genders as caries in girls represented 84.33% and caries in boys represented 83.35% [25]. Some studies recommended that, the use of fluoride and application of fissure sealants on newly erupted FPMs could lead to reduction of the prevalence of caries [26]. Another studied was conducted in Benghazi by Elfseyie *et al.*, showed that in overall caries-free in the permanent dentition was (132 subject, 63.76%), while caries was (75 subject, 36.24%), in boys caries free in the permanent dentition was higher (31.40%) than in the primary dentition (7.24%) [27].

## Conclusion

The high level of caries prevalence in Libyan schoolchildren is a cause for concern. The prevalence of carious FPMs was almost the same in both genders, with caries in girls being a little bit higher than in boys. Strong recommendation for oral health education programs are needed for school children to prevent caries, with at least one oral hygienist should be employed to visit the schools, refer if necessary, and initiate appropriate oral hygiene and dental educational programmers.

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## Conflict of Interests

None declared.

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