

# Prevalence of Dental Pain and Its Relationship with Socioeconomic Status among 6- to 12-Year-Old Children in Kerman, Iran

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## Abstract

**Background and aims:** Unmanaged tooth caries is known as the most important causes of dental pain exerting significant effects on individuals' daily activities, such as eating, studying, and concentrating. The identification of children's oral health status and therapeutic needs is of paramount importance. The present study aimed to measure the prevalence of dental pain and its relationship with socioeconomic status among children aged 6-12 years in Kerman, Iran. **Materials and Methods:** This cross-sectional study was conducted on 473 primary school children aged 6-12 years, who were enrolled in public and private schools of Kerman. The data were collected using a demographic form and Visual Analogue Scale (VAS). Pain-initiating factors and pain severity were measured by means of the VAS. Data analysis was performed in SPSS software (version 20) using Chi-square test and multivariate regression. P-value less than 0.05 was considered statistically significant. **Results:** According to the results, 244 (51.6%) participants were female. The minimum and maximum ages of the subjects were 6 and 12 years, respectively, with the mean age of  $8.7 \pm 2$  years. The 6- to 12-year-old children had the dental pain prevalence rate of 89.6%. The girls had the highest prevalence of dental pain ( $n=222$ , 91%). The age group of 12 years had the highest frequency of dental pain, while the lowest frequency was observed in the age group of 9 years. However, this difference was not statistically significant ( $P=0.03$ ). The results demonstrated an association between brushing status and dental pain. In this regard, the children who never brushed or performed it once a day were four times more probable to have dental pain than those brushing twice a day or more ( $OR=2.4$ ,  $P=0.001$ ). **Conclusion:** Given the high prevalence of dental pain in this study, the implementation of preventive treatments and development of oral health training programs in schools and social media should be emphasized.

**Keywords:** Dental pain, Children, Prevalence, Dental caries

## INTRODUCTION

Dental caries is the most common chronic disease in children and adolescents <sup>[1]</sup> that mostly affects both oral and general health <sup>[2]</sup>. Dental pain is the most common cause of pain in the oral cavity <sup>[3]</sup>. Unmanaged dental caries is known as the most important causes of dental pain exerting a significant effect on individual's daily activities, such as eating, reading, and concentration <sup>[4]</sup>.

According to the literature, nearly all countries have reported diverse statistics of dental caries in different age groups. In the United States, early childhood caries has been reported to be the most common chronic disease in children. Dental caries is five times more common than asthma and seven times more common than hay fever <sup>[5]</sup>. Accordingly, different

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statistics have been reported for the prevalence of dental caries in various regions of Iran. In this regard, the prevalence of early childhood dental caries in Tehran has been reported as 17.3% and 21.1% [6].

In Kerman city, Iran, childhood dental caries has been reported to have a prevalence rate of 44% [7], which is very high in comparison with those of other cities and countries. This issue necessitates the implementation of more studies regarding this oral condition and examination of the ways to deal with it. There are a number of recent studies having examined the effects of dental caries on children. In this respect, Jackson *et al.* believed that dental pain has a significant impact on the child's school performance and attendance [8].

Persistent and severe pains, such as dental pain, in young children will have serious and occasionally irreversible effects on child development [9]. The children's oral health plays a role in their eating, sleeping, laughing, talking, and socializing. Moreover, the face appearance affects mental health, and subsequently social relationships [10]. According to the literature, weighing and other parameters related to child development are normal in children with healthy dental conditions. This issue can be attributed to the effectiveness of chewing and proper nutrition [11]. Moreover, early childhood caries predicts more severe dental diseases in the future [12] and increases children's sensitivity to somatic pains [13].

Despite the importance of knowledge regarding oral health status, therapeutic needs of the children, and prevalence of dental pain in this age group, no specific study has investigated this issue among the children within the age group of 6-12 years in Kerman. Regarding the importance of unmanaged dental caries in the induction of dental pain and given the complications of dental caries in children, the present study was conducted to determine the prevalence of dental pain and its relationship with socioeconomic status in 6- to 12-year-old children in Kerman.

## MATERIALS AND METHODS

This cross-sectional study was conducted on primary school students aged 6-12 years studying at public and private schools to evaluate the prevalence of dental pain in Kerman, the largest province in the southeastern Iran. According to the statistics, at the time of the study, there were about 68,000 children aged 6-12 years in the primary schools of Kerman.

The study population was selected using multistage sampling technique. At first, the primary schools in Kerman were divided into two districts of 1 and 2. Subsequently, three boys' and three girls' schools were randomly selected from each district (i.e., six schools per district) using cluster sampling. In the next stage, 40 students in the age group of 6-12 years were randomly selected from each school.

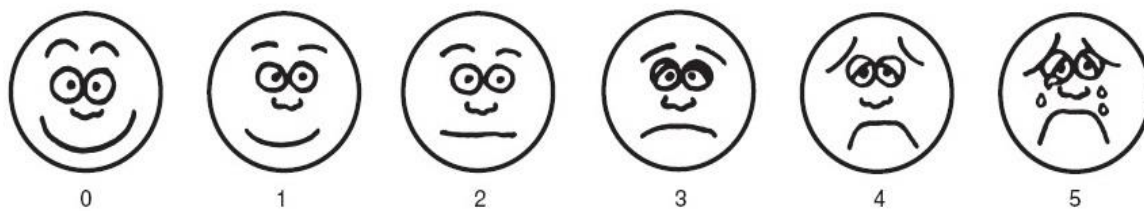
Subsequently, informed consent was obtained from the school director, child, and parents for participation in the study. To this end, the consent form was sent to the participants' homes to receive full consent from the parents. All interviews were conducted by a dentistry student. The parents of all the participants were also interviewed based on a researcher-made checklist. This study was approved by the Ethics Committee of Kerman University of Medical Sciences with the ethics code of IR.kmu.REC.1395.365.

The inclusion criteria were: 1) age group of 6-12 years, 2) adequate physical and mental development, and 3) necessary cooperation. On the other hand, the exclusion criteria included the consumption of corticosteroids or sedatives in the past 24 h and parental dissatisfaction or child's noncooperation (7 checklist cases were not completed) in oral examination.

A total of 473 children were enrolled in the study. The investigated variables included gender, age, parental educational status, insurance coverage, household size, brushing habits, use of dental floss, use of mouthwash, number of dental visits, history of dental pain over the past 6 months, socioeconomic status, pain-initiating factors, and pain intensity (based on the Visual Analogue Scale [VAS]) [14].

## Research instruments

Based on the observations, the VAS is one of the most reliable measurement tools for child pain self-report (Figure 1). Usually, VAS is an approximate line of 100 mm in length, with the extreme limits of pain at each end, such as pain-free state against severe pain, or a happy face versus a sad face. After explaining the emoticons to the children, they were required to mark the degree of pain they felt on the line [14]. Subsequently, the checklist was completed with the aid of the parents and the child.



0 = VERY HAPPY, NO HURT  
 1 = HURTS JUST A LITTLE BIT  
 2 = HURTS A LITTLE MORE  
 3 = HURTS EVEN MORE  
 4 = HURTS A WHOLE LOT  
 5 = HURTS AS MUCH AS YOU CAN IMAGINE  
 (Don't have to be crying to feel this much pain)

Figure 1. Visual Analogue Scale(VAS)that can be used to measure the degree of discomfort in children

### Statistical analysis

Data analysis was performed in SPSS software (version 20) using Chi-square test and multivariate regression. P-value less than 0.05 was considered statistically significant.

### RESULTS

Out of the 473 children, 244 (51.6%) cases were female. The minimum and maximum ages of the children were 6 and 12 years, respectively, with the mean age of  $7.8 \pm 2$  years. In this study, the prevalence of dental caries was obtained as 89.6% among the 6- to 12-year old children. Table 1 tabulates the frequency distribution of 6- to 12-year-old children based on their demographic characteristics.

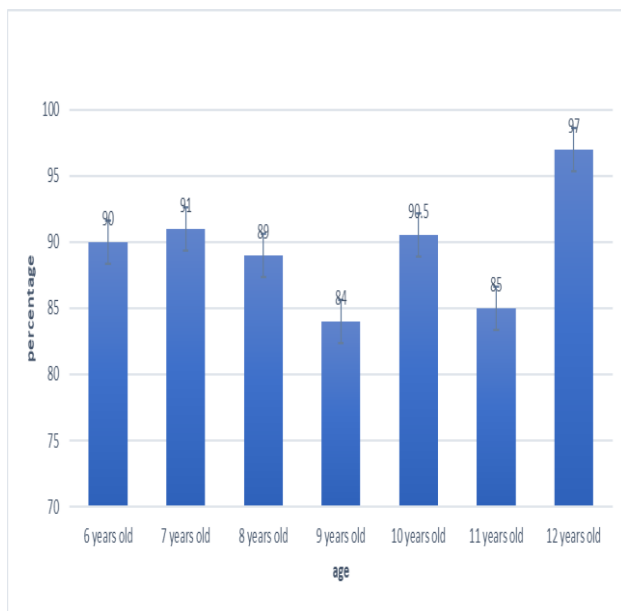
The girls had the highest frequency of dental caries (n=222, 91%). Among the pain-initiating factors, coldness was the most common cause of dental pain; on the other hand, spontaneous pain was the least frequently reported pain. Furthermore, in terms of the pain intensity, the moderate pain and pain-free state had the highest and lowest frequency, respectively. Regarding the parental occupation, the children whose fathers were self-employed and those with employed mothers had the highest frequency distribution.

**Table 1.** Frequency distribution of 6- to 12-year-old children based on demographic data

Variable	n (%)
<b>Gender</b>	Male 229 (48.4)
	Female 244 (51.6)
<b>Birth order</b>	First 259 (54.8)
	Second 191 (40.4)
	Third 16 (3.4)
	Fourth and above 6 (1.3)
<b>Systemic disease</b>	Yes 12 (2.5)
	No 461 (97.5)
<b>Paternal education level</b>	Diploma or lower 108 (22.8)
	Bachelor's degree 258 (54.5)
	Master's degree 87(18.4)

	PhD	20 (4.2)
<b>Maternal education level</b>	Diploma or lower	157 (33.2)
	Bachelor's degree	214 (45.2)
	Master's degree	81 (17.1)
<b>Paternal occupation</b>	PhD	21 (4.4)
	Employed	232 (49)
	Self-employed	235 (49.7)
<b>Maternal occupation</b>	Others	6 (1.3)
	Employed	211 (44.6)
	Self-employed	157 (33.2)
<b>Insurance coverage</b>	Housekeeping	103 (21.8)
	Others	2 (0.4)
	Yes	343 (72.5)
<b>Number of brushing during a day</b>	No	130 (27.5)
	Never	7 (1.5)
	Once	340 (71.9)
<b>Number of using dental floss during a day</b>	Twice	120 (25.4)
	More than twice	6 (1.3)
	Never	225 (47.6)
<b>Use of mouthwash</b>	Once	241 (51)
	Twice	6 (1.3)
	Yes	268 (56.7)
<b>Person responsible for child's tooth brushing</b>	No	205 (43.3)
	Child	340 (71.9)
	Parents	13 (2.7)
<b>Number of dental visits per year</b>	Both	120 (25.4)
	Never	119 (25.2)
	Once	298 (63)
<b>Dental pain-initiating factors</b>	Twice	56 (11.6)
	Coldness	166 (39.2)
	Heat	111 (26.2)
<b>Spontaneous</b>	Chewing	114 (26.9)
	Spontaneous	30 (7.1)

<b>Presence or absence of dental pain</b>	Presence of dental pain	424 (89.6)
	Lack of dental pain	49 (10.4)
<b>Pain severity</b>	Pain-free	49 (10.4)
	Mild	116 (24.5)
	Moderate	274 (57.9)
	Severe	34 (7.2)
<b>Age group</b>	6	78 (16.5)
	7	77 (16.3)
	8	88 (16.9)
	9	63 (13.3)
	10	63 (13.3)
	11	46 (9.7)
	12	64 (13.7)



**Figure 2.** Frequency distribution of dental pain in children based on age group

**Table 2.** Comparison of dental pain frequency in 6- to 12-year-old children based on their demographic characteristics

Variable		Presence of dental pain	Lack of dental pain	P-value
Gender	<b>Male</b>	202 (88.2)	27 (11.8)	0.32
	<b>Female</b>	222 (91)	22 (9)	
Birth order	<b>First</b>	236 (91.1)	23 (8.9)	0.49
	<b>Second</b>	167 (87.4)	24 (12.6)	
	<b>Third</b>	14 (87.5)	2 (12.5)	

Systemic disease	<b>Fourth and above</b>	6 (100)	0	0.83
	<b>Yes</b>	11 91 (7)	1 (8.3)	
Paternal education level	<b>No</b>	413 (89.8)	47 (10/2)	0.86
	<b>Diploma or lower</b>	97 (89.8)	11 (10.2)	
Maternal education level	<b>Bachelor's degree</b>	229 (88.8)	29 (11.2)	0.97
	<b>Master's degree</b>	80 (92)	7 (8)	
Paternal occupation	<b>PhD</b>	18 (90)	2 (10)	0.12
	<b>Diploma or lower</b>	142 (90.4)	15 (9.6)	
Maternal occupation	<b>Bachelor's degree</b>	191 (89.3)	23 (10.7)	0.93
	<b>Master's degree</b>	72 (88.9)	9 (11.1)	
Insurance coverage	<b>PhD</b>	19 (90.5)	2 (9.5)	0.60
	<b>Employed</b>	206 (88.8)	26 (11.2)	
Number of brushing during a day	<b>Self-employed</b>	214 (91.1)	21 (8.9)	0.00
	<b>Others</b>	4 (66.7)	2 (33.3)	
Number of using dental floss during a day	<b>Employed</b>	188 (89.1)	23 (10.9)	0.15
	<b>Self-employed</b>	142 (90.4)	15 (9.6)	
Use of mouthwash	<b>Housekeeping</b>	92 (89.3)	11 (10)	0.11
	<b>Others</b>	2 (100)	0 (0)	
Person responsible for child's tooth brushing	<b>Yes</b>	309 (90.1)	34 (9.9)	0.44
	<b>No</b>	115 (88.5)	15 (11.5)	
Number of dental visits per year	<b>Never</b>	7 (100)	0 (0)	0.58
	<b>Once</b>	318 (93.5)	22 (6.5)	
	<b>Twice</b>	94 (78.3)	26 (21.7)	
	<b>More than twice</b>	5 (83.3)	1 (16.7)	
	<b>Never</b>	204 (90.7)	21 (9.3)	
	<b>Once</b>	215 (89.2)	26 (10.8)	
	<b>Twice</b>	4 (66.7)	2 (33.3)	
	<b>Yes</b>	235 (87.7)	33 (12.3)	
	<b>No</b>	189 (92.2)	16 (7.8)	
	<b>Child</b>	303 (89.1)	37 (10.9)	
	<b>Parents</b>	13 (100)	0 (0)	
	<b>Both</b>	108 (90)	12 (10)	
	<b>Never</b>	107 (89.9)	12 (10.1)	
	<b>Once</b>	269 (90.3)	29 (9.7)	
	<b>Twice</b>	48 (85.7)	8 (14.3)	

The age groups of 12 and 9 years had the highest and lowest rates of dental pain, respectively; however, this difference was not statistically significant ( $P=0.30$ ) (Figure 2). In terms of the parental education, dental pain had the highest frequency in the children whose parents had a bachelor's degree. Furthermore, the lowest rate of dental caries was observed in the children with the parents holding a PhD degree. Nonetheless, this difference was not statistically significant ( $P=0.86$  and  $P=0.97$ , respectively) (Table 2).

In terms of the paternal occupation, the highest frequency of dental caries was observed in the children whose fathers were self-employed; however, this difference between paternal occupation was not statistically significant (Table 2) ( $P=0.12$ ). Regarding the maternal occupation, dental caries had the highest frequency in the children with employed mothers; nevertheless, this difference was not statistically significant ( $P=0.93$ ) (Table 2). Based on the insurance coverage, the children with insurance coverage had the highest frequency of dental caries; nevertheless, this difference was not statistically significant ( $P=0.60$ ) (Table 2).

In the logistic regression analysis, among the examined variables, only brushing status was associated with dental pain. In this regard, the children who never brushed or performed it once a day were four times more prone to dental pain than those brushing twice or more ( $OR=2.4$ ,  $P=0.001$ ) (Table 2). Table 2 presents the frequency distribution of dental caries in 6- to 12-year-old children in terms of all demographic variables (Table 2).

## DISCUSSION

This study was targeted toward the evaluation of the frequency and characteristics of dental pain among 6- to 12-year-old children in Kerman. Out of the 473 children investigated in this study, 89.6% of the cases reported dental pain. The improvement of the quality of life is one of the goals of medical professionals and policymakers. Given the adverse effects of oral diseases, including dental pain, on the quality of life of individuals, especially children, it seems reasonable to consider the incidence of oral diseases in the community [15, 16].

Previous studies have reported contradictory results on the effects of various factors, such as economic and social issues, gender, and age, on dental pain experience [17, 18]. Some studies have also evaluated orofacial pain [19, 20]. This study only involved the dental pain-initiating factor to obtain more accurate information in this regard. The prevalence of dental pain in children has been reported in various studies conducted in different societies [21, 22]. In this regard, this rate has been reported as 5-88% in the studies investigating adults [23-25]. In a study conducted in Iran, the prevalence of dental pain was reported as 55.1% in patients over the age of 18 years [26].

Dental pain has a higher prevalence, compared to other orofacial pains, such as headache, neuralgia, and mouth ulcers [27, 28].

The reported pain in this study was much higher than those obtained for other regions [21, 22]. However, no similar study was found in our electronic search investigating children in Kerman. Given the significant effects of dental problems and dysfunction on children's quality of life [8-13], it seems essential to perform extensive research in Iran investigating this issue.

Out of the 473 children examined in this study, girls reported a higher prevalence of dental pain as compared to boys. However, in a study performed in Iran, no association was observed between gender and dental pain [26]. On the other hand, in a number of studies carried out in other countries, the number of women reporting dental pain within a specified period of time was more than that of males [24].

In the literature, dental pain has been more frequently observed in families with a household size of 5 or more. The possible justification for this is that in large families, people are less concerned with their oral health due to socioeconomic issues; therefore, they are more prone to dental caries and have a higher dental pain prevalence [26]. Due to the recent changes in population with the aim of reducing its size, in our study, the number of children with the birth order of 3 or more (i.e., a household size of 5 or more) was low. Accordingly, dental pain prevalence showed no significant relationship with the household size and birth order of the child.

The previous studies have revealed a significant relationship between the level of education and prevalence of dental pain [25, 26]. Likewise, in our study, the children whose parents were more educated (i.e., PhD) had the lowest rate of dental pain. The results of the present study indicated no significant relationship between dental pain prevalence and insurance coverage. Few insurance companies in Iran cover all dental costs; accordingly, even many insured people cannot use dental care services under insurance coverage.

In a study performed by Adeniy *et al.* (2017) on 414 children aged 8-12 years, it was shown that the dental pain trend increased in this age group based on each year of age. In this regard, the researchers believe that with aging, the non-treatment of the teeth affected by caries in the child enhances the risk of caries development to the pulp resulting in increased pain [21]. Accordingly, in the current study, the 12-year-old children had the highest prevalence of dental pain.

Tooth brushing is a fully accepted component of everyday life activities and routine health habits. It has been shown that twice daily tooth brushing guarantees the periodontal health. Although the important thing in periodontal health is the quality of plaque control, the low quality of tooth brushing can be compensated by performing this practice twice daily [29].

Tooth brushing and flossing play an important role in the prevention of dental caries [30]. In the current study, 71.9% of the children under study used toothbrushes once a day to



clean their teeth. The results of our study showed that the children who never brushed their teeth or did it once a day were 4 times more prone to dental pain than those brushing twice a day or more. In line with our findings, the other studies have recommended at least twice daily tooth brushing as the most effective oral hygiene method [31].

The literature on the effect of dental floss has shown that the use of dental floss is effective at least as much as tooth brushing in the elimination of interdental debris, which can cause dental caries in the future [32, 33]. Nonetheless, in our study, no significant relationship was obtained between the frequency of using dental floss and the incidence of dental pain. This can be indicative of the inadequacy of dental flossing in children. Therefore, it seems that oral health education programs, including dental flossing, have not been sufficiently effective.

Oral health is neglected in the majority of developing countries [34]. Despite all efforts in the country, it seems necessary to emphasize the implementation of preventive therapies and enhancement of oral and dental health education programs at schools and mass media.

## CONCLUSION

According to high prevalence of toothache reported in the present study, the implementation of preventive policies and support the planning of local oral health services should be considered.

## Suggestions

1. Review of the National Health Plan for the prevention of oral and dental diseases
2. Supporting insurance companies to provide dental care facilities
3. Implementation of preventive treatments, such as fissure sealant and fluoride
4. Identification of high-risk groups for dental caries and timely action for the diagnosis and treatment of caries
5. Mandatory oral health protocols at schools, such as the proper use of toothbrush and dental floss

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## Conflicts of Interest

None declared.

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