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PREVALENCE OF DENTAL CARIES IN PRIMARY TEETH D AND E

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Abstract

To examine the frequency of dental cavities in kids aged 4-12 years in the pediatric ward KMU-IDS- Kohat. In order to determine the prevalence of dental caries, 257 children ages 4 to 12 participated in an observational cross-sectional study at KMU-IDS-Kohat. A questionnaire was used to gather information from the children or their parents about dietary habits, brushing routines, and the presence of caries was examined. Among 257 children in our data 50.6% (130) were boys and 49.4% (127) were girls with dental caries. 7-9 years old; 123 individuals comprising 47.9% out of 257 children, 53.5% (135) have dental caries in tooth D. Dental caries is most common in children age 7-9 year with tooth D being the most affected among children age 4-12 years. This cross-sectional study investigated the prevalence of dental caries in children aged 4-12 years at KMU-IDS-Kohat. The findings revealed a high prevalence of dental caries, with 53.5% of the children examined exhibiting cavities. Children aged 7-9 years demonstrated the highest prevalence, and tooth D was identified as the most frequently affected tooth. These results underscore the critical need for enhanced oral health education and improved access to dental care within this population.

1. Introduction

Oral health is a vital component of overall health and well-being, as it directly influences quality of life [1]. Healthy teeth not only make your face seem better, but they also help you chew and digest food by breaking it down so your body can use the nutrients [2]. Teeth are just as crucial for speech clarity as they are for communication [3]. Having bad dental health can make it hard to eat, chew, and speak, and it can also cause pain and discomfort [4]. It could also lower self-esteem, make it harder to make friends, and harm mental health [5]. Dental caries is the most common chronic oral illness in the world, especially in youngsters [6]. Dental caries is characterised as a multifactorial, irreversible infectious illness that leads to the demineralisation of tooth enamel and dentin resulting from acid generation by oral bacteria [7]. W.D. Miller came up with the acidogenic theory of caries in 1890. It says that bacteria like Streptococcus mutans and Lactobacillus species break down dietary carbohydrates to make acids, which then break down hydroxyapatite crystals in enamel [8]. The critical pH for enamel demineralisation is approximately 5.5, beneath which the degradation process initiates [9].

There are several things that can lead to dental caries, such as eating a lot of sugar [10], not taking care of your teeth properly [11], and not being able to get preventive dental treatment [12]. Caries can impact children's growth, nutrition, and academic achievement by inducing pain, sleep deprivation, and premature tooth loss [13]. The early loss of primary teeth can cause permanent teeth to become

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misaligned, which can lead to malocclusion and problems with orthodontics [14]. Both developed and developing countries around the world report high rates of caries in children, which is a big public health problem [15]. Research in Pakistan reveals a significant prevalence of dental caries among kids, frequently linked to inadequate understanding of oral hygiene and limited access to dental care services [16]. In light of these issues, this study aimed to ascertain the prevalence of dental caries among children aged 4–12 years in the paediatric unit of KMU-IDS, Kohat. This study seeks to furnish foundational data for the formulation of preventive oral health initiatives and policies within the region.

2. MATERIAL AND METHODS:

2.1. STUDY DESIGN:

257 children between the ages of 4 and 12 who were registered at the KMU-IDS-KOHAT peadiriatic ward participated in the cross-sectional study. The study was place between August 2025 and September 2025. Throughout the study period, 1150 youngsters in total were assessed.

2.2. SAMPLE SIZE:

The Cochrane formula was used to determine the sample size: n = z2 p(1-p/d2), where n is the number of children z = 1.96 (standard normal variant at 95%).

The absolute inaccuracy is d=5%. The anticipated prevalence is p=62%. 257 was the predicted sample size.

2.3. SAMPLING TECHNIQUE:

The children were chosen using a convenient non-probability sampling procedure. The parents or guardians gave their informed consent. Following their agreement, they received a brief explanation of the study's goals, methodology, risk factors, and advantages. However, those children who have any systemic disease like cardiac, diabetic or any other systemic illness like that were excluded from the study also those children who were mentally compromised were also in the excluded but the children having dental caries in age 4-12 years without any systemic disease were included in the study.

2.4. ETHICAL CONSIDERATION:

The Gomal university DI khan FAHS (Dental Department) standard research committee gave its approval to the project. Additionally, the PRINCIPLE of KMU-IDS-KOHAT and the HOD of the Pediriactic ward both provided formal consent. Parents and guardians of minors gave their informed consent for data gathering. All procedure was performed as according to rules and regulation.

2.5. STATISTICAL ANALYSIS:

To determine the prevalence of dental caries or tooth decay, descriptive statistics were used. To determine if there was a significant difference in the prevalence of dental caries among the various exposure variables, the chi-square test was used.

3: Results

A total of 257 children aged 4–12 years were included in the study. The mean age was 6.91 ± 1.94 years (range: 4–12 years). By age group, 110 children (42.8%) were between 4–6 years, 123 children (47.9%) were between 7–9 years, and 24 children (9.3%) were between 10–12 years. The highest prevalence of dental caries was observed in the 7–9 years group (47.9%), followed by the 4–6 years group (42.8%), while the lowest prevalence was recorded in the 10–12 years group (9.3%). Children aged 7–9 years showed a significantly higher rate of caries compared to other groups.

Table 3.1: Age Distribution

AGE GROUP (YEARS)	FREQUENCY (N)	PERCENTAGE (%)	MEAN AGE ± SD	RANGE (YEARS)
4–6	110	42.8		
7–9	123	47.9		
10–12	24	9.3		
TOTAL	257	100.0	6.91 ± 1.94	4–12

3.2. Gender Distribution

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Out of the total 257 children, 130 were boys (50.6%) and 127 were girls (49.4%). This shows that dental caries was slightly more common among boys than girls. Additionally, among the age groups studied, children aged 10–12 years had the lowest prevalence of dental caries compared to younger groups.

Table 3.2: Gender Distribution

Gender	Frequency	Percent	Cumulative Percent
Male	130	50.6	50.6
Female	127	49.4	100.0
Total	257	100.0	

3.3 Factors included.

3.3.1 Use of Fluoride Toothpaste

Among the 257 children included in the study, 139 (54.1%) reported using fluoride toothpaste, while 118 (45.9%) did not. This indicates that just over half of the children had exposure to fluoride through toothpaste, which is considered an important preventive measure against dental caries.

3.3.2 Parental Assistance in Tooth brushing

The data also revealed that 102 children (39.7%) received help from their parents during toothbrushing, while the majority, 155 (60.3%), brushed independently without parental involvement. This suggests that most children were left to manage oral hygiene on their own, which may contribute to the high prevalence of dental caries observed in the study.

The results were also evaluated for patients who used toothpaste having fluoride in it. The respondents n=139 (54.1%) use fluoride toothpaste while the respondents n=118 (45.9%) didn't use fluoride toothpaste. The sample size for this data was 257.

The results were also evaluated for parents who help their children in tooth brushing or not. There

was n=102 (39.7%) who helped their children in brushing, as the offsprings were not able to, remaining n=155 (60.3%) parents did not help their children in tooth brushing as they were able to do tooth brushing or some of them didn't do tooth brushing.

Table 3.3: Fluoride Toothpaste Use and Parental Assistance in Tooth Brushing (n=257)

Variable	Response	Frequency (n)	Percentage (%)	Cumulative Percentage (%)
Use of Fluoride Toothpaste	Yes	139	54.1	54.1
	No	118	45.9	100.0
	Total	257	100.0	–
Parental Help in Tooth Brushing	Yes	102	39.7	39.7
	No	155	60.3	100.0
	Total	257	100.0	–

3.4 Oral Health–Related Behaviors and Experiences in Children (n=257)

This table summarizes the oral health practices, dietary behaviors, and dental experiences of children aged 4–12 years (n=257). The majority (90.7%) reported practicing tooth brushing, though only 52.5% brushed twice daily. Fluoride toothpaste use was recorded in 65.8% of cases, and nearly 9 out of 10 children (89.1%) brushed under parental supervision. Dietary habits revealed a high intake of sweet/sticky foods (72.4%) and carbonated drinks (68.1%), both of which are recognized risk factors for dental caries. Nearly half of the children (47.5%) reported

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negative dental experiences, while 35.8% had a history of tooth pain. However, only 30.4% had visited a dentist in the past year. Encouragingly, awareness of oral hygiene importance was high (91.1%), although gaps remain in practice and preventive behavior.

Table No 3.4: Oral Hygiene Practices, Dietary Habits, and Dental Health Experiences among Children (n=257)

Category	Variable	Yes n (%)	No n (%)
Oral Hygiene Practices	Regular tooth brushing	233 (90.7)	24 (9.3)
	Twice daily brushing	135 (52.5)	122 (47.5)
	Use of fluoride toothpaste	169 (65.8)	88 (34.2)
	Parental supervision in brushing	229 (89.1)	28 (10.9)
	Brushing without parental help	105 (40.9)	152 (59.1)
Dietary Habits	Sweet/sticky food consumption	186 (72.4)	71 (27.6)
	Carbonated drink consumption	175 (68.1)	82 (31.9)
Dental Experiences	Negative dental experience	122 (47.5)	135 (52.5)
	Tooth pain reported	92 (35.8)	165 (64.2)
	Dental visit in past year	78 (30.4)	179 (69.6)
Knowledge/Background	Oral hygiene awareness	207 (80.5)	50 (19.5)
	Knowledge of oral hygiene value	234 (91.1)	23 (8.9)
	Family history of dental caries	49 (19.1)	208 (80.9)
	Use of Miswak/other cleaning aids	92 (35.8)	165 (64.2)

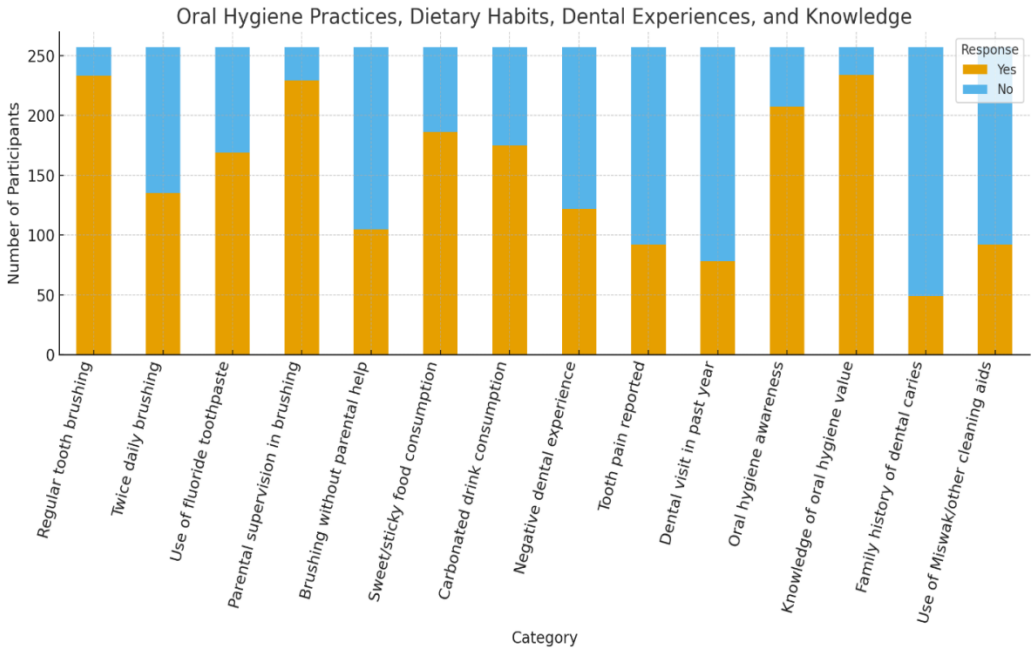

Figure No 3.1: Oral Hygiene Practices, Dietary Habits, and Dental Health Experiences among Children

3.5. Crosstab Analysis of Dental Caries with Age, Oral Hygiene Practices, and Feeding Habits (n=257)

A total of 257 children aged 4–12 years were assessed for the prevalence of dental caries in relation to age, oral hygiene practices, and feeding habits (Table 5). By age group, the highest prevalence of caries was observed in children aged 4–6 years (58.2%), followed by 7–9 years (50.4%), and the lowest in 10–12 years (37.5%). However, this difference was not statistically significant (χ^2=2.47, p=0.291). Parental involvement in tooth brushing showed a noticeable difference: children who received parental help had a higher prevalence of caries (61.8%) compared to those who brushed independently (46.5%). This association was borderline significant (χ^2=3.81, p=0.051). Feeding habits were significantly

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associated with dental caries. Children who were bottle-fed at bedtime had a higher prevalence of caries (64.1%) than those who were not (47.5%), and this association was statistically significant (χ^2=4.21, p=0.040).

Similarly, the use of fluoride toothpaste showed a protective effect. Only 29.5% of children using fluoride toothpaste had caries, compared to 43.2% of those who did not, which was statistically significant (χ^2=6.02, p=0.014). Other analyses, such as the presence of caries in both tooth D and E (19.1%) and caries in other teeth (35.8%), did not show significant associations with the evaluated factors.

Table No 5: Crosstab Analysis of Dental Caries with Age, Oral Hygiene Practices, and Feeding Habits (n=257)

Variable	Categories	Caries Yes (n, %)	Caries No (n, %)	Total (n)	χ^2 (df)	p-value
Age group	4–6 years	64 (58.2%)	46 (41.8%)	110	2.47 (2)	0.291
	7–9 years	62 (50.4%)	61 (49.6%)	123		
	10–12 years	9 (37.5%)	15 (62.5%)	24		
Parental help with brushing	Yes	63 (61.8%)	39 (38.2%)	102	3.81 (1)	0.051
	No	72 (46.5%)	83 (53.5%)	155		
Bottle feeding at bedtime	Yes	50 (64.1%)	28 (35.9%)	78	4.21 (1)	0.040*
	No	85 (47.5%)	94 (52.5%)	179		
Use of fluoride toothpaste	Yes	41 (29.5%)	98 (70.5%)	139	6.02 (1)	0.014*
	No	51 (43.2%)	67 (56.8%)	118		
Caries in both Tooth D & E	Yes	49 (19.1%)	208 (80.9%)	257	–	–
Caries in other teeth	Yes	92 (35.8%)	165 (64.2%)	257	–	–

4. Discussion

Dental caries is still one of the most common chronic diseases in children around the world. Our cross-sectional study at KMU-IDS Kohat found that it was quite common in children aged 4 to 12 years, especially in the 7 to 9 years group, with tooth D being impacted more often than tooth E. Boys (50.6%) and girls (49.4%) were roughly equally affected, contrasting with previous studies that indicated a higher frequency in girls, implying that regional and cultural factors may exert a greater influence on results than gender. Dietary patterns, particularly the intake of sticky and retentive foods such as chocolates, exhibited a significant correlation with caries development, aligning with Bibby and Decker's conclusions that foods clinging to tooth surfaces are more cariogenic than rapidly removed sugars. Oral hygiene routines were also very important. Children who brushed their teeth with fluoride toothpaste and under the watchful eye of their parents had fewer cavities than those who brushed their teeth alone. Our findings show a little lower frequency than earlier studies from Karachi, Lahore, and Rawalpindi. However, the problem is still serious and continues to affect children's health, nutrition, and quality of life. These findings highlight the pressing necessity for culturally adapted interventions, encompassing parental education, diminished consumption of sugary foods, supervised oral hygiene practices, and community-oriented oral health initiatives to successfully mitigate the prevalence of dental caries in children.

5. Recommendations

1. Teaching people about good oral health. Set up programs in schools and communities to teach kids and their parents how to brush their teeth correctly, why fluoride toothpaste is important, and the dangers of eating sugary and sticky foods.

2. Parents becoming involved Encourage parents to watch their kids clean their teeth, especially when they are younger, to make sure they are doing it right.

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3. Changes to the diet Make it harder to get and eat sugary, sticky foods, and encourage them to eat healthier options.
4. Dental services that help prevent problems Set up regular dental screenings at schools and health centres to find cavities early on.
5. New Policy Ideas Create culturally appropriate oral health policies at the regional and national levels to incorporate preventive dentistry into primary healthcare services.
6. More research Perform longitudinal and interventional studies to investigate gender-specific, cultural, and socioeconomic factors affecting caries prevalence for more precise methods.

6. Conclusion

This study shows that dental caries is a big public health problem for kids ages 4 to 12 in Kohat. The age group with the most cases is 7 to 9 years old, and tooth D is the one that is most often impacted. The nearly equal frequency between boys and girls suggests that gender is not a significant factor influencing caries in this population. The results also show that eating habits, especially eating sugary and sticky foods like chocolate, and not taking care of your teeth properly, are major causes of cavities. The frequency recorded here is somewhat lower than in other regions of Pakistan; yet, the burden remains significant, underscoring the necessity for early preventive measures to protect children's dental health.

References

Petersen, P. E. (2003). 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,*

Sheiham, A. (2005). Oral health, general health and quality of life. *Bulletin of the World Health Organization, 83*(9), 644–645.

Fejerskov, O., Nyvad, B., & Kidd, E. A. M. (2015). *Dental caries: The disease and its clinical management* (3rd ed.). Wiley Blackwell.

Selwitz, R. H., Ismail, A. I., & Pitts, N. B. (2007). Dental caries. *The Lancet, 369*(9555), 51–59. https://doi.org/10.1016/S0140-6736(07)60031-2

Jackson, S. L., Vann, W. F., Kotch, J. B., Pahel, B. T., & Lee, J. Y. (2011). Impact of poor oral health on children's school attendance and performance. *American Journal of Public Health, 101*(10), 1900–1906. https://doi.org/10.2105/AJPH.2010.200915

Peres, M. A., Macpherson, L. M. D., Weyant, R. J., Daly, B., Venturelli, R., Mathur, M. R., ... & Watt, R. G. (2019). Oral diseases: A global public health challenge. *The Lancet, 394*(10194), 249–260. https://doi.org/10.1016/S0140-6736(19)31146-8

Kidd, E. A. M., & Fejerskov, O. (2013). What constitutes dental caries? Histopathology of carious enamel and dentin related to the action of cariogenic biofilms. *Journal of Dental Research, 93*(1), 7–12. https://doi.org/10.1177/0022034513516245

Miller, W. D. (1890). The microorganisms of the human mouth. *Philadelphia: S. S. White Dental Manufacturing Company.*

Dawes, C. (2003). What is the critical pH and why does a tooth dissolve in acid? *Journal of the Canadian Dental Association, 69*(11), 722–724.

Moynihan, P., & Kelly, S. (2014). Effect on caries of restricting sugars intake: Systematic review to inform WHO guidelines. *Journal of Dental Research, 93*(1), 8–18. https://doi.org/10.1177/0022034513508954

Harris, R., Nicoll, A. D., Adair, P. M., & Pine, C. M. (2004). Risk factors for dental caries in young children: A systematic review of the literature. *Community Dental Health, 21*(1 Suppl), 71–85.

Petersen, P. E., & Kwan, S. (2010). The 7th WHO Global Conference on Health Promotion—towards integration of oral health (Nairobi, Kenya 2009). *Community Dental Health, 27*(2), 129–136.

Sheiham, A. (2006). Dental caries affects body weight, growth and quality of life in pre-school children. *British Dental Journal, 201*(10), 625–626. https://doi.org/10.1038/sj.bdj.4814259

Frontier in Medical & Health Research

ISSN: (e) 3007-1607 (p) 3007-1593

Al-Darwish, M. S., El Ansari, W., & Bener, A. (2014). Prevalence of dental caries among 12–14-year-old children in Qatar. *The Saudi Dental Journal, 26*(3), 115–125. https://doi.org/10.1016/j.sdentj.2014.03.006

Umer, A., & Umer, F. (2016). Prevalence of dental caries among 5–14-year-old school children in Karachi: A pilot survey. *Pakistan Oral & Dental Journal, 36*(2), 310–313.

Khan, A. A., & Khan, A. (2016). Prevalence and risk factors of dental caries among 3–12 years old school children in Lahore, Pakistan. *Pakistan Journal of Medical Sciences, 32*(3), 602–606