

# Prevalence and Risk Factors of Dental Caries among Patients Seeking Care at Tertiary Hospitals

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## ABSTRACT

**Objective:** To study the prevalence and risk factors of dental caries among patients seeking care at tertiary hospitals

**Study Design:** A observational cross-sectional study

**Place and Duration of Study:** This study was conducted at the Tertiary Care Hospitals, Peshawar January to May 2023.

**Methods:** A sample of 2000 patients was enrolled who visited the dental OPD of tertiary care hospitals using a non-random convenient sampling technique.

**Results:** Dental caries was prevalent in 63.60% of the population. Dental caries classified in the study based on their causes, showed that among the male population the most prevalent cause was malnutrition (34.68%), and followed by increased sweet consumption (29.78%). These also occurred to be the prevalent causes among female population i.e., 56.08% due to malnutrition, followed by 27.65% of the female population having dental caries due to increased sweet consumption.

**Conclusion:** The study reveals the substantial burden of dental caries among patients seeking treatment at tertiary institutions. The high prevalence rates emphasize the urgent need for effective interventions.

**Key Words:** Dental Caries, prevalence, risk factors, dental hygiene

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## INTRODUCTION

For people all around the world, dental caries remains a serious global health problem.<sup>1</sup> It is acknowledged as an ailment of ancient times.<sup>2,3</sup> In spite of the general drop in caries prevalence in industrialized nations,<sup>4</sup> the majority of developing nations continues to deem caries as a serious problem. It is still a significant issue for young and the adult population in both emerging and industrialized nations.<sup>5</sup> According to studies, age, sex, ethnic group, dietary patterns, and oral care practices are few of the factors that can affect the prevalence of dental caries in a community.<sup>6</sup>

Adults have not been the primary focus of the most of epidemiological research projects on dental caries;

instead, children have; studies on adults tend to be even rarer and confined solely to certain age groups.<sup>4</sup> Also, per reports, 50–60% of Indians are reported to have dental caries.<sup>7</sup> Since dental caries is a lifestyle illness that can be avoided via the development of effective policies and long-term planning, the WHO advises conducting frequent national oral health surveys at least once every ten years.<sup>8</sup> From the literature, we deduced that the majority of research has taken children's dental conditions into consideration. Additionally, little has been done to address dental caries in the adults. The results of this study will aid physicians in creating plans to prevent and treat dental caries in the surrounding communities.

## METHODS

This observational cross-sectional research was undertaken in tertiary care facilities from January to May 2023. Based on these assumptions: The sample size was obtained using a single population proportion calculation with 5% error margin, 99.999% confidence level, and 50% prevalence. The sample size was 1954. To limit error, we used non-random convenient sampling to collect data from 2000 dental OPD patients at a tertiary care facility. After hearing the study's goals, all participants provided oral informed permission before collecting data. Participant willingness determined inclusion. The research excluded systemic illness and trauma patients.

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Consultant dentists took patient histories and examined their teeth to obtain data. The International Caries Detection and Assessment System (ICDAS), DMFT index, and Significant Caries Index were used to diagnose dental caries. When necessary, the oral exam included the following investigations:

1. Examine teeth with a dental mirror and probe for cavities, discolorations, and deterioration.
2. Bitewing and periapical radiography to identify lesions not detectable visually.
3. Dental transillumination to identify lesions not apparent to the naked eye.
4. Sensitivity testing for dentinal hypersensitivity, a dental caries sign.

A systematic questionnaire modified from the WHO dental health survey collected socio-demographic, nutritional, and dental health parameters. Age, sex, education, domicile, and marital status are socio-demographic factors. Diet includes sugar. Smoking, oral hygiene, and tooth brushing may impair dental health. The Northwest School of Medicine Peshawar committee approved the research. Data was imported into MS Excel and analyzed using SPSS (Version 26). The variables were evaluated using descriptive statistics including means, standard deviation, frequencies, and percentages.

## RESULTS

This study included 2000 participants as the project sample. Out of which 639 (31.95%) were males and 1361 (68.05%) were females.

**Table No. 1: Marital Status of the Participants**

Marital Status	Males (%)	Females (%)	Total (%)
Married	158 (24.70%)	632 (46.43%)	790 (39.50%)
Unmarried	410 (64.10%)	551 (40.48%)	961 (48.05%)
Other (Divorced, Widowed)	71 (11.11%)	178 (13.09%)	249 (12.45%)
<b>Total</b>	<b>639 (100.00%)</b>	<b>1361 (100.00%)</b>	<b>2000 (100.00%)</b>

**Table No. 2: Working Status of the Participants**

Occupation	Males (%)	Females (%)	Total (%)
Working Class	260 (40.69%)	292 (21.45%)	552 (27.60%)
Un-employed (Children, Retired)	379 (59.31%)	1069 (78.55%)	1448 (72.40%)
<b>Total</b>	<b>639 (100.00%)</b>	<b>1361 (100.00%)</b>	<b>2000 (100.00%)</b>

The mean participant's age involved in this study was 25.47 ± 31.54 years, with majority belonging to the age group 11-20 years (34.60%), followed by the age group 21- 30 years (20.70%), 1- 10 years (19.00%) and 41- 50 years (10.70%) respectively (Table 6). Among the male participants 158 (24.70%) were married, 410 (64.10%) were unmarried whereas 632 (46.43%) of females' participants out of the total 1361 were married (Table 1).

**Table No. 3: Education of the Participants**

Education	Males (%)	Females (%)	Total (%)
No Education	155 (24.25%)	819 (60.18%)	974 (48.70%)
Primary Education	306 (47.89%)	279 (20.50%)	585 (29.25%)
Secondary Education	145 (22.69%)	222 (16.31%)	367 (18.35%)
Higher Education	33 (5.16%)	41 (3.01%)	74 (3.70%)
<b>Total</b>	<b>639 (100.00%)</b>	<b>1361 (100.00%)</b>	<b>2000 (100.00%)</b>

**Table No. 4: Residence of the Participants**

Residence	Males (%)	Females (%)	Total (%)
Urban	211 (33.02%)	382 (28.06%)	593 (29.65%)
Rural	428 (66.98%)	979 (71.94%)	1407 (70.35%)
<b>Total</b>	<b>639 (100.00%)</b>	<b>1361 (100.00%)</b>	<b>2000 (100.00%)</b>

**Table No. 5: Prevalence of Dental Caries**

Participants	Males (%)	Females (%)	Total (%)
With Caries	349 (54.62%)	922 (67.80%)	1271 (63.60%)
No Caries	290 (45.38%)	439 (32.20%)	729 (36.40%)
<b>Total</b>	<b>639 (100.00%)</b>	<b>1361 (100.00%)</b>	<b>2000 (100.00%)</b>

**Table No. 6: Age and Gender based Prevalence of Dental Caries among patients visiting tertiary care hospital**

Age (years)	Male Patients (%)	Female Patients (%)	Total Number of Patients (%)
1 – 10	41 (11.75%)	201 (21.80%)	242 (19.00%)
11 – 20	144 (41.26%)	297 (32.21%)	441 (34.60%)
21 – 30	65 (18.63%)	199 (21.59%)	264 (20.70%)

31 – 40	28 (8.02%)	96 (10.41%)	124 (9.70%)
41 – 50	31 (8.89%)	105 (11.39%)	136 (10.70%)
51 – 60	34 (9.74%)	19 (2.06%)	53 (4.10%)
61 – 70	06 (1.71%)	05 (0.54%)	11 (0.80%)
<b>Total</b>	349 (100.00%)	922 (100%)	1271 (100.00%)

**Table No. 7: Risk Factors of Dental Caries among study participants**

Dental Caries Risk Factors	Male Patients (%)	Female Patients (%)	Total Number of Patients (%)
Poor Oral Hygiene (Inadequate Brushing)	87 (24.93%)	111 (12.04%)	198 (14.85%)
Diet (Increased Sweet Consumption)	104 (29.78%)	255 (27.65%)	359 (25.15%)
Malnutrition (Poor Diet)	121 (34.68%)	517 (56.08%)	638 (53.10%)
Smoking	23 (6.60%)	4 (0.43%)	27 (2.70%)
Teeth Arrangement	14 (4.01%)	35 (3.80%)	49 (4.20%)
<b>Total</b>	349 (100.00%)	922 (100.00%)	1271 (100.00%)

## DISCUSSION

The purpose of this extensive research was to look into the incidence of dental caries and the risks related to it among patients seeking treatment at tertiary institutions. Dental caries, often known as tooth decay or cavities, is a serious health issue that has an effect on the entire world. Dental health is a vital element of general health and is viewed as an attribute of high quality of life. According to the WHO, dental caries is the 4<sup>th</sup> most expensive chronic medical condition to manage. The prevalence of dental caries has fallen in most developed nations over the previous 20 years. Conversely, the rate of dental caries has been growing in numerous developing countries in recent years.<sup>9</sup> For the purpose of creating efficient preventative measures and enhancing oral healthcare services, it is essential to comprehend the risk factors and prevalence of dental caries in individuals utilizing tertiary care facilities. A sizable sample of patients who sought treatment at tertiary hospitals was included in the study, guaranteeing a representative sample for analysis. Using standardized diagnostic criteria, such as the DMFT (Decayed, Missing, and Filled Teeth) index, the

prevalence of dental caries was evaluated.<sup>10</sup> Comprehensive interviews, dental examinations, and analysis of data helped identify risk variables.

Most of the epidemiological data from Pakistan have focused on children more than adult population. This cross-sectional descriptive study was conducted in the community among individuals ranging in age from children to adults from various areas of Peshawar, Pakistan. In this study, the dental caries's prevalence was found to be 63.60% in both temporary and permanent dentition. Studies on school-aged children revealed that other nations, such as the United States (37%),<sup>11</sup> India (36.5%),<sup>12</sup> Ethiopia (40.9%),<sup>13</sup> and Kenya (43.3%),<sup>14</sup> had a lower frequency of dental caries than the present study. However, the prevalence of dental caries recorded by this study was less than a study carried in Nepal (83%)<sup>15</sup>. The findings of the current study were in accordance with all the local literature reporting high prevalence,<sup>16</sup> however in comparison to global research, our community had a greater rate of dental caries. This could be attributed to socioeconomic differences and lifestyle variations.

The current study focuses on participants of different age groups; it was observed that female participants had more caries prevalence than males, this was in line with a study by jinghao Hu et al.<sup>9</sup> One possible explanation is that females are more health concerned and visit the hospital more frequently than males. According to the literature, some of the causes of high prevalence, also identified by the study are poor dental hygiene, diet, smoking, sweet consumption, malnutrition, and teeth misalignment.<sup>17,18</sup>

The prevalence reported in the current study was lower than the prevalence of 72% discovered in a study conducted in Kosovo by Kamberi B et al.<sup>19</sup> In new Delhi a study focused to find the prevalence of dental caries among adult and old population<sup>20</sup>. For the age range of 35 to 44 years, dental caries was found to be prevalent in 82.4% of cases. The findings, however, were greater than those of studies done in Nagpur by Doifode et al<sup>21</sup> in the same age group (48.6%) and Siliguri by Chakraborty et al<sup>22</sup> in the 35–40-year age range (57.03%).

Among the male population the most prevalent cause was malnutrition (34.68%), followed by increased sweet consumption (29.78%) in this study. Similarly in a study by Lendrawai et al showed that the consumption of sugary foods was found to be a significant factor in the development of caries.<sup>23</sup> A high consumption of sugar found in foods and beverages is the main risk factor for caries and the main factor to be taken into account for the prevention, control, and treatment of caries. Cariogenic bacteria feed on sugar, which serves as a substrate for their production of acid and the demineralization of dental enamel.<sup>24</sup> In a four year prospective study a dose–response relationship

was found between frequency of consumption of sweet food and caries increment in adults.<sup>25</sup>

## CONCLUSION

The study findings showed that dental caries were prevalent among 63.60% of cases in the population. Among males, the leading cause was malnutrition (34.68%) followed by increased sweet consumption (29.78%). Similarly, among females, malnutrition (56.08%) and increased sweet consumption (27.65%) were the most prevalent causes. The study also identified common complaints associated with dental caries, including toothache, bleeding gums, halitosis, sensitivity, discoloration, and decay.

The thorough investigation into the risk factors and prevalence for dental caries among participants seeking treatment at tertiary institutions highlights the considerable burden this oral health issue imposes on patients. The findings showed that the significant prevalence of dental caries in this population requires immediate attention and efficient methods. According to the report, dental caries continues to be a common issue among patients seeking treatment at tertiary hospitals. The high incidence rates show that dental caries remains a public health issue, necessitating quick action to stop its development. Dental caries places a significant financial burden on healthcare systems in addition to harming people's oral health and quality of life.

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### Author's Contribution:

Concept & Design of Study:	Khansa Khan
Drafting:	Salman Zahir, Sarwat Jahan
Data Analysis:	Sarah Saleem, Susan Kakakhel, Sultan Zeb
Revisiting Critically:	Khansa Khan, Salman Zahir
Final Approval of version:	Khansa Khan

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