

Oral Health Practices and Dental Caries Experience among Transgender Adults in District Kohat, Pakistan: A Cross-Sectional Study

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ABSTRACT

Objective: To examine the level of oral hygiene practice among transgender adults and to evaluate Decayed, Missing, and Filled Teeth (DMFT) status of the population of District Kohat in Khyber Pakhtunkhwa Province of Pakistan.

Methods: This descriptive cross-sectional study was conducted in October 2025 to January 2026 in District Kohat in shelter houses. A Non-probability convenience sampling of 152 transgender adults (age ≥ 18) were selected. The data were obtained from a structured questionnaire, adapted from WHO Oral Health Questionnaire and Global Adult Tobacco Survey. The WHO DMFT index was used to assess the dental caries status. Data were analyzed using SPSS version 25, Descriptive statistics (frequency, percentage, mean, standard deviation) was used in summarization of data.

Results: The mean age was 28.6 years; majority (77.7%) were aged 18–33 years. Almost half (48.0%) did not have any educational qualification and 61.9% were unemployed or involved in begging. Oral hygiene practices were suboptimal, with 56.6% brushing their teeth once a day, 55.9% brushing for ≤ 2 minutes and 19.1% changing their toothbrush every three months. Preventive visits were infrequent (9.2%), 69.1% of participants were only seen when they were in pain. Stigma (56.6%) was the most reported barrier to care. Tobacco use (88.2%), use of betel nut, gutka/pan (75.0%) and consumption of sugary snack/soft drink (77.0%) were the common hazardous practices. Mean DMFT components were: Decayed=2.46 $\pm$ 1.21, Missing=2.16 $\pm$ 1.16, Filled=2.30 $\pm$ 1.23. The most common symptoms were tooth sensitivity (36.2%) and gum bleeding (27.0%).

Conclusion: Transgender people in District Kohat experience substantial oral health challenges, driven by poor hygiene, high-risk factors, and stigma, emphasizing the need for accessible, culturally competent, stigma-free preventive dental services.

Keywords: Transgender health, oral health practices, DMFT index, dental caries, stigma, Pakistan, oral health disparities.

INTRODUCTION

The health of the oral cavity is an important factor in human welfare that goes beyond its lack of pathology, and includes social, psychological and physical aspects.¹ According to the World Health Organization (WHO) oral health is the term used for when there is no oral and throat cancer, infection and sores, periodontal disease, tooth decay, tooth loss or other diseases that prevent a person from biting, chewing, smiling, talking or enjoying a full life socially.² Oral diseases are an epidemic public health problem, on a global scale. According to the Global Burden of Disease Study 2019, around 3.5 billion people suffer from oral disorders that is half of the total population of the world.³ One billion people are impacted by dental caries and 514 million children are impacted by primary teeth caries, while periodontal disease affects about 1 billion people around the world.⁴ Poor oral health is a disproportionate problem affecting vulnerable populations globally. Dental caries, periodontal disease, tooth loss and oral cancer are significantly more prevalent among the poor, ethnic

minorities, people from the rural areas, disabled people, refugee/migrant, sexual and gender minorities.⁵ The available research on the oral health of transgender people provides consistent findings regarding oral health disparities. In 2022, Ganzer et al. conducted a scoping review that identified 21 articles for inclusion of which the majority were from wealthy, western countries.⁶ Brown et al. (2020) reported that transgender individuals were more likely to have experienced total tooth loss compared to cisgender individuals, and less likely to have been to the dentist in the last year.⁷ Dragon et al. (2021) reported that transsexual people had more mean decayed and missing teeth than other people.⁸ The Transgender Persons (Protection of Rights) Act, 2018 was an important landmark in Pakistan against discrimination in healthcare, education and employment.⁹ But the social stigma, conservative attitudes and institutional resistance have posed a challenge in implementation.¹⁰ Transgender people in Pakistan suffer from severe discrimination, rejection by their families, economic marginalisation and violence.^{11,12} Most of the



literature pertaining to health research on transgendered Pakistanis has been on HIV/AIDS prevalence, and little there is on oral health.¹³ Although oral health is a critical part of nutrition, communication, social interaction and quality of life, there is limited published oral health data available for transgender populations in Pakistan. This glaring lack of evidence is a clear violation of the gender sensitizing provision of Pakistan's progressive transgender rights law and the 'leave no one behind' principle of the United Nations Sustainable Development Goals.¹⁴ The district of Kohat is a unique geographical and social-cultural setting marked by patriarchal culture and conservative social norms and tribal set-up which may increase the vulnerability of transgender people.¹⁵ Therefore, this study was conducted to assess the oral health practices, dental caries experience (DMFT) score among transgender adults in District Kohat, Pakistan.

METHODOLOGY

Study Design and Setting

A descriptive cross-sectional study was conducted among transgender adults in District Kohat, KP, Pakistan. The study took place for four months from October 2025 to January 2026.

Study Participants

Sample size was determined using the estimated population and OpenEpi, resulting in a sample size of 152 participants. The participants were selected by the Non-probability convenience sampling because of the convenience and feasibility. Inclusion criteria were: (1) individuals who identified as transgender, (2) who were 18 years or older and, (3) who were willing to provide informed consent and (4) who lived in shelter houses in District Kohat. Exclusion criteria were: individuals who had systemic conditions that had a major impact on oral health and participants who were not willing to have an oral exam.

Data Collection Tool

A structured questionnaire was used for data collection, which was adapted from the valid questionnaires used internationally: Oral Health Questionnaire for Adults, World Health Organization (WHO)¹⁶ and Global Adult Tobacco Survey (GATS).¹⁷ The questionnaire included questions on socio-demographic characteristics (age, gender identity, education, occupation); oral hygiene practices (frequency of brushing, type of brushing tool, length of time brushing, when to replace toothbrush, how often to clean tongue, additional aids for cleaning teeth); consumption of tobacco and betel nuts; utilization of dental services (frequency of visits, reasons for not visiting the dentist); and current oral symptoms and self-rated oral health.

Clinical Examination

The Dental Caries Status was evaluated by the WHO Decayed, Missing, and Filled Teeth (DMFT) index that is recognized and is validated globally for evaluating dental caries experience. All examinations were done by trained examiners following the criteria set by WHO.¹⁸

Statistical Analysis

Data were entered, cleaned and analyzed using the statistical package for social sciences (SPSS) version 25. Data were summarized by descriptive statistics. Categorical data were displayed as frequencies and percentages. For continuous variables, such as age and DMFT scores, the mean and standard deviation were calculated. Results were tabulated and graphed for easy interpretation. The present study was descriptive; thus, no inferential statistical test was used.

RESULTS

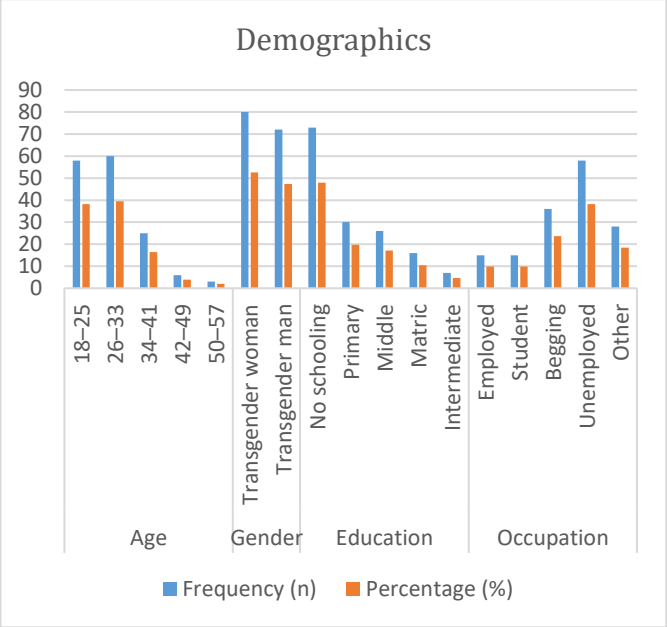
Socio-demographic Characteristics

The total number of transgender adults in the study was 152, the mean age was 28.6 years. There was a relatively high number of younger respondents 77.7% aged between 18 and 33 years. None of the participants identified with any other form of transgender identity; there were 72 transgender men 47.4% and 80 transgender women 52.6%. The level of education received was very low, almost half 48.0% had no formal education. The sample was highly impoverished economically. Unemployment 38.2% and begging 23.7% were the biggest occupations, while only 9.9% were formally employed (Table 1).

Table 1. Socio-demographic Characteristics

Variable	Category	Frequency (n)	Percentage (%)
Age	18–25	58	38.2
	26–33	60	39.5
	34–41	25	16.4
	42–49	6	3.9
	50–57	3	2.0
Gender	Transgender woman	80	52.6
	Transgender man	72	47.4
Education	No schooling	73	48.0
	Primary	30	19.7
	Middle	26	17.1
	Matric	16	10.5
	Intermediate	7	4.6
Occupation	Employed	15	9.9
	Student	15	9.9
	Begging	36	23.7
	Unemployed	58	38.2
	Other	28	18.4

Figure 1



Oral Hygiene Practices

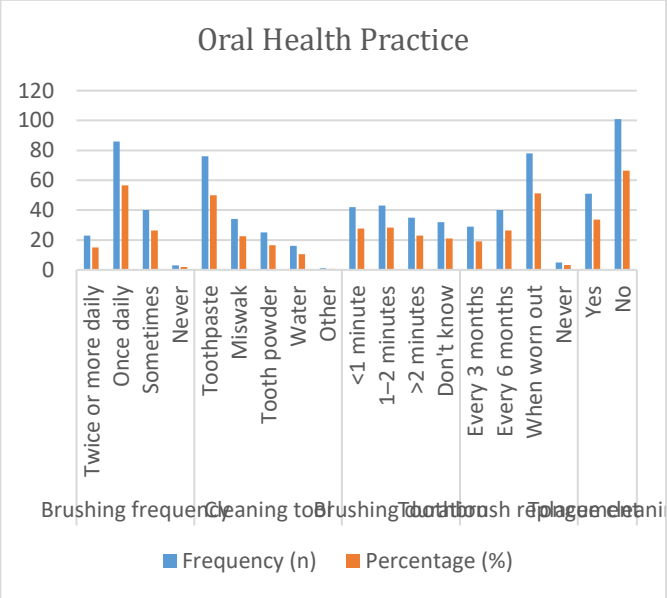
The majority (56.6%) brushed their teeth once a day, 26.3% brushed them occasionally and 2.0% never brushed their teeth. As for the tools used, 50.0% used toothpaste, 22.4% used Miswak, 16.4% used tooth powder and 10.5% just used water. Inadequate brushing time: 27.6% spent less than 1-minute brushing, 28.3% brushed 1-2 minutes (total 55.9% brushing ≤2 minutes), and 21.1% of them were not aware of their brushing time. The replacement practices of the toothbrush were not optimal: only 19.1% replaced every three months, 26.3% after six months replaced, 51.3% replaced when they were worn out and 3.3%

never replaced it. Most people 66.4% did not clean their tongue and 33.6% clean the tongue properly. The majority of individuals 77.6% used extra oral hygiene products, most frequently being mouthwash 26.3%, toothpicks 26.3% and dental floss 25.0% (Table 2).

Table 2. Oral Hygiene Practices

Variable	Category	Frequency (n)	Percentage (%)
Brushing frequency	Twice or more daily	23	15.1
	Once daily	86	56.6
	Sometimes	40	26.3
	Never	3	2.0
Cleaning tool	Toothpaste	76	50.0
	Miswak	34	22.4
	Tooth powder	25	16.4
	Water	16	10.5
Brushing duration	Other	1	0.7
	<1 minute	42	27.6
	1–2 minutes	43	28.3
	>2 minutes	35	23.0
Toothbrush replacement	Don't know	32	21.1
	Every 3 months	29	19.1
	Every 6 months	40	26.3
	When worn out	78	51.3
Tongue cleaning	Never	5	3.3
	Yes	51	33.6
		101	66.4

Figure 2



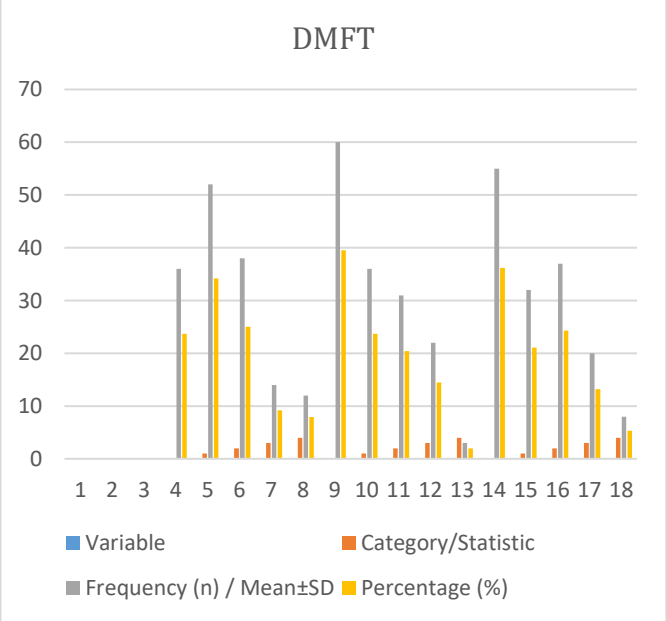
DMFT Scores

The mean DMFT components were: Decayed = 2.46 ± 1.21, Missing = 2.16 ± 1.16, and Filled = 2.30 ± 1.23. The distribution of decayed teeth revealed that 17.1 per cent of them had three or four decayed teeth and 57.9 per cent had one or no decayed tooth. For missing teeth, 16.5% reported with 3 to 4 missing teeth, 60.5% reported with at least one missing tooth and 39.5% reported as no missing tooth. Of all the filled teeth, 36.2% were without fillings and 63.8% had one or more fillings (Table 3).

Table 3. DMFT Scores

Variable	Category/Statistic	Frequency (n) /Mean±SD	Percentage (%)
Decayed teeth	Mean ± SD	2.46 ± 1.21	
Missing teeth	Mean ± SD	2.16 ± 1.16	
Filled teeth	Mean ± SD	2.30 ± 1.23	
Decayed teeth	0	36	23.7
	1	52	34.2
	2	38	25.0
	3	14	9.2
	4	12	7.9
Missing teeth	0	60	39.5
	1	36	23.7
	2	31	20.4
	3	22	14.5
	4	3	2.0
Filled teeth	0	55	36.2
	1	32	21.1
	2	37	24.3
	3	20	13.2
	4	8	5.3

Figure 3



DISCUSSION

This study is the first empirical study on oral health disparities among transgender adults in Pakistan, highlighting the multiple systemic neglect, stigma, and socioeconomic marginalization experienced by these individuals. The results show high levels of dental caries, low levels of oral hygiene practices, very high levels of barriers to dental care and alarmingly high levels of risk factors, with the stigma being the main barrier to dental care.

Oral hygiene practices noted in this sample are a result of the intersection of financial insecurity, poor health literacy, and survival priorities. Fewer than half (56.6%) brushed their teeth once a day and 26.3% brushed occasionally. This is consistent with international studies which show that poverty, emotional distress, and other needs, sometimes make it difficult for transgender people to take care of themselves.⁶ Although the use of traditional tools such as Miswak (22.4%) and tooth powder (16.4%) is entrenched in the culture, it also indicates that there is an economic restriction on the use of fluoridated toothpaste.² Low toothbrush replacement rate (19.1%) and short brushing time (55.9% brushing for ≤ 2 minutes per day) suggest a lack of intentional oral hygiene practices, which may be further affected by minority stress and depression that results in decreased self-efficacy in performing daily health practices.¹⁹ The very high prevalence of tobacco use (88.2%), and betel nut/gutka/pan use (75.0%) is a major public health concern and far higher than the national figures for Pakistan.¹⁷ These findings are consistent with the international literature that shows that transgender individuals are overrepresented in substance use as an attempt to cope with the stress of being a minority.^{20,21} High intake of sugary snacks/soft drinks (77.0% daily) sets up a very cariogenic oral environment. The trifecta of poor oral hygiene, high sugar intake, and large amounts of cariogenic substances is a strong marker for the clinical outcomes that were seen in this study. The quantitative measurement of the disease burden is given by the DMFT scores. The mean Decayed (D) score of 2.46 also reflects the high proportion of active but untreated carious lesions, reflecting the clinical consequence of delayed care seeking. This is comparable to Dragon et al. (2021), who identified a comparable decayed component ($D=3.2 \pm 2.8$) among TGNC in a community health center in the United States. The high Missing (M) component (2.16) indicates a history of tooth loss, which may be due to untreated decay culminating in extraction, a feasible treatment option for low-income people.¹⁶ or dental trauma from violence, a high risk for transgender people.²² This is consistent with Brown et al. (2020), who reported transgender individuals were 2.3 times more likely to be edentulous than cisgender individuals.⁷ The Filled (F) component (2.30) is a complicated one. Although there was high active disease, 63.8% had at least one filling. It means that the treatment is reactive and episodic and based on pain instead of preventive and proactive, and there is a "restorative deficit" in the dental care systems, which are unequal.⁵

The deep disparities in health care accessibility experienced by the participants further highlight the social determinants in play. Cost (13.2%) and fear (19.7%) of dentist visits were the next most common reasons, both of which were lower in magnitude than stigma. This discovery could have important implications for the literature on transgender healthcare discrimination worldwide, especially in a conservative and low-resource setting. This is consistent with a large literature indicating that both actual and perceived discrimination in the health care environment results in medical mistrust and care avoidance among transgender people.²³ The threat posed by discrimination in a dental clinic is a powerful barrier to accessing even basic dental care in the Pakistani context where institutional and social stigma towards transgender individuals is deep-rooted. This is compounded by the fact that there is likely to be a lack of cultural competency training for dental professionals.¹² as a result, 69.1% of respondents visited the dentist only when they were in pain, which means that oral diseases are diagnosed later, at an advanced stage and sometimes at an irreparable stage. The extreme economic exclusion (81.6% unemployed/begging), high educational disadvantage (48.0% no education) and housing instability of this sample is an excellent reflection of the Social

Determinants of Health (SDH) model.²⁴ They experience multiple axes of marginalization (gender identity, financial status, rural location) that restrict access to the resources they need to achieve good oral health, including access to fluoridated toothpaste, healthy food and dental care.²⁵ They tend to have lower education levels which leads to low health literacy, which affects their ability to understand health prevention messages or to navigate the health system.²⁶ From the perspective of the Minority Stress Model,¹⁹ social exclusion and dental health are understood.

Distal stressors (poverty, violence, employment discrimination, family rejection) create situations that inhibit access to treatment and healthy resources. The unhealthy coping strategies as a result of mental distress (tobacco, sugar) and constant vigilance in hostile environments (proximal stressors) all have a direct impact on oral health because of internalized stigma and fear of rejection. The oral cavity turns into a physical area in which social exclusion becomes a chronic stress that gets physiologically engraved.

Limitations

There are some limitations of this study. First, cross-sectional design is unable to establish causal relationships between transgender identity, social factors and oral health outcomes. Second, the non-probability convenience sampling technique is restricted to transgender people residing in the shelter houses in District Kohat which limits generalizability to transgender communities in general. The sample does not include non-binary or other gender diverse identities and it is also not representative of transgendered people who live alone, in families, or outside the areas of Pakistan from which it has been drawn. Third, self-reported measures of dietary patterns, smoking and oral hygiene practices could have recall and social desirability bias. The clinically assessed DMFT scores, however, are an objective indicator of oral health status. Finally, there was a lack of comprehensive medical history data to allow thorough investigation of possible biological effects of gender-affirming hormone therapy on oral health. To overcome these limitations, future research using mixed-method approaches, probability sampling and longitudinal designs is required.

Significance of the Study

This study is significant as it fills a crucial gap in the literature on oral health among transgender people, particularly in Pakistan where no similar studies exist. Transgender individuals, although a highly stigmatised minority with many social, economic and health care challenges, have been largely left unaddressed in the field of oral health. This study aims to present critical baseline data on dental health among the vulnerable population, their oral hygiene and risk factors associated with them. The findings of the study contribute to the understanding of public health problems, including the identification of stigma, fear of dental care and financial constraints as significant barriers to oral health, and can inform the development of culturally responsive, targeted and accessible oral health programs that will benefit stakeholders, including policy makers and healthcare providers.

CONCLUSION

The study provides the first empirical evidence of the extreme oral health inequalities transgender adults experience in Pakistan, an inter-sectional space of severe social exclusion and structural neglect. The results showed a high prevalence of dental caries, high DMFT scores which indicated high level of active disease, high risk factors (tobacco use, use of betel quid, consumption of sugary snacks) and overall poor oral hygiene practices. Stigma and financial constraints were among the major barriers to accessing dental care, with stigma being the most frequently reported barrier. The trend is consistent with international literature on the health inequities faced by

transgender people, but is further exacerbated in the Pakistani context, where economic precarity is very high, educational inequity is also very significant, and the sociocultural climate is replete with discrimination and violence against transgender people.

The findings reveal that the health of the mouth of transgender individuals in Pakistan is not just a dental problem, but a deeply concerning sign of the society's shortcomings. It captures the minority stress and the obvious way social determinants of health operate, from distal stressors like poverty and violence to proximal stressors like internalized stigma, resulting in physical illness. These results are robust to base interventions. They demand the effective implementation of the non-discrimination clause of the Transgender Persons (Protection of Rights) Act, 2018 and oral health be added to the national agenda for transgender right to health.

Recommendations

The results of this research show that there is a definite necessity to apply specific and comprehensive oral health measures to transgender adults in District Kohat. Shelter houses (deras) should have community-based oral health education programs to promote proper brushing habits, time spent brushing teeth, changing toothbrushes often and using fluoride toothpaste. Education programs must be easy, culturally sensitive, and aimed at enhancing health literacy. Engaging the community leaders can help improve participation and sustainability of these programs. Dental services that are stigma-free and gender-sensitive need to be given priority since stigma was found as the greatest cause of not seeking dental services. The Transgender Persons (Protection of Rights) Act should be well implemented to achieve non-discriminatory healthcare practices. Dental practitioners must be trained to provide cultural competency in a systematic way in order to establish a respectful and inclusive clinical atmosphere. Given the high rates of tobacco use, consumption of betel nut/gutka, and consumption of sugary snacks, there is a strong recommendation to implement risk-reduction and cessation initiatives. With such high rates of unemployment and economic vulnerability among this population, subsidized or free preventive dental services, such as regular check-ups and basic restorative care should be made available. Following the advice of the WHO on universal dental health coverage, the dental health needs to be incorporated into the larger transgender health policies to decrease inequities and enhance overall wellbeing.

Ethical Approval

The study was conducted after obtaining the ethical approval from the Ethical Review Committee, Institute of Health Sciences, Kohat. All participants gave informed consent before data were collected. The study was performed on a voluntary basis and participants were told that they could withdraw at any point without repercussion. Strict confidentiality and anonymity have been maintained and all data used for research purposes only.

Data Availability

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Author Contributions

Conceptualization: Mubassar Nazar, Nida Khan
Methodology: Mubassar Nazar, Nida Khan, Qaisar Iqbal
Data Collection: Nida Khan, Qaisar Iqbal, Ali Haider
Formal Analysis: Mubassar Nazar, Qaisar Iqbal
Writing – Original Draft: Mubassar Nazar
Writing – Review & Editing: All authors
Final Approval: All authors read and approved the final version of the manuscript.

Informed Consent

written informed consent was obtained from all the Participants included in the study.

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Conflict of Interest

The authors declare that they have no competing interests.

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Declaration of AI-Assisted Language Editing

The manuscript was prepared by the authors and underwent English language editing with the assistance of Google Gemini AI to improve grammar, clarity, and readability. The use of AI was limited to language editing only. All scientific content, data analysis, interpretations, and conclusions were developed, reviewed, and approved by the authors, who accept full responsibility for the manuscript in accordance with the ICMJE Recommendations.

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