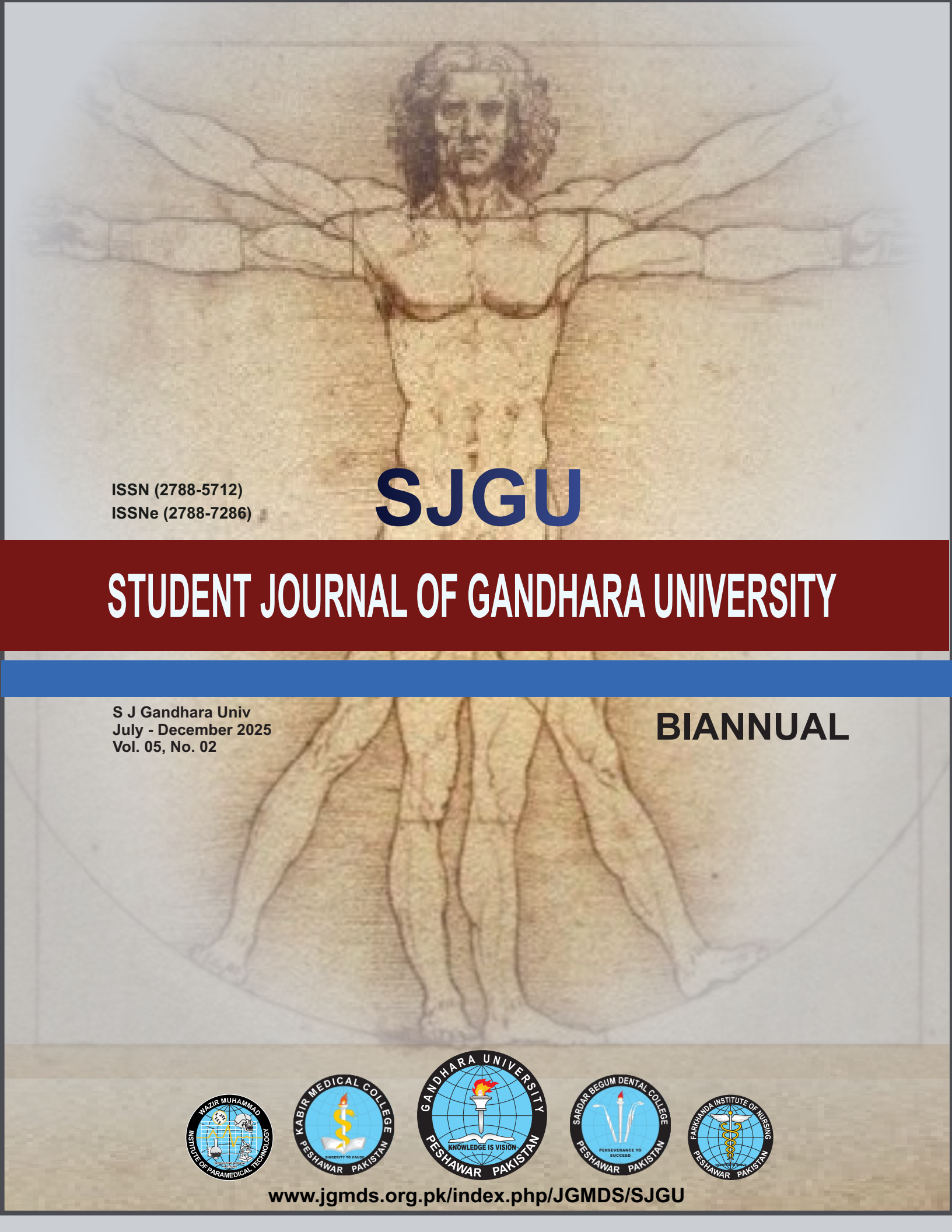

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EDITORIAL

ORIGINAL ARTICLES

ADVANCING CERVICAL CANCER PREVENTION THROUGH HPV VACCINATION; PAKISTAN'S COMMITMENT AND CHALLENGES

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Human papillomavirus (HPV) represents a group of more than 200 genetically related viruses, many of which infect the skin and mucous membranes of humans. It is recognized as one of the most prevalent sexually transmitted infections worldwide. The first isolation of HPV was achieved by Dr. Richard Shope in 1933, marking the beginning of extensive research into papillomaviruses and their association with epithelial lesions. A breakthrough in understanding HPV's oncogenic potential occurred in the 1970s and 1980s, when Dr. Harald zur Hausen and his team identified high-risk HPV types 16 and 18 in cervical cancer tissue, proving a causal relationship between persistent HPV infection and malignant transformation.[1] His pioneering work fundamentally altered cancer etiology and was recognized with the Nobel Prize in Physiology or Medicine in 2008. The development of the HPV vaccine represents a milestone in global public health and cancer prevention. The vaccine provides immunity against oncogenic HPV strains-especially HPV-16 and HPV-18-which account for approximately 70% of cervical cancer cases worldwide.[2] Clinical trials and population-based studies have demonstrated that vaccination prior to sexual debut significantly reduces the incidence of cervical intra epithelial neoplasia, genital warts, and other HPV-associated lesions, offering durable protection.[3] As a result, more than 150 countries have incorporated HPV vaccination into their national immunization programs as part of comprehensive strategies to eliminate cervical cancer as a public health threat. In alignment with the World Health Organization's (WHO) Global Strategy to Accelerate the Elimination of Cervical Cancer, launched in 2020, Pakistan has taken a historic step by integrating the HPV vaccine into its national immunization program.[4] This initiative, supported by WHO, Gavi-the Vaccine Alliance, UNICEF, and the International Agency for Research on Cancer (IARC), was officially launched on 15 September 2025. The Federal Directorate of Immunization (FDI) began a nationwide campaign targeting girls aged 9-14 years across Punjab, Sindh, Islamabad Capital Territory, and Pakistan-administered Kashmir. The campaign aims to immunize approximately 13 million girls and to integrate HPV vaccination into routine immunization for all nine-year-olds by 2027. Furthermore, the HPV vaccine is available free of cost at fixed EPI centers in all provinces, ensuring accessibility to those who missed initial doses. These actions demonstrate Pakistan's dedication to achieving the WHO's global target of vaccinating 90% of girls by 2030.

Despite these advances, several socio-cultural and structural barriers impede optimal vaccine coverage. Research conducted in Sindh revealed that only about 5% of caregivers were aware of HPV, highlighting the critical gap in public awareness.[5] Vaccine hesitancy in Pakistan is often influenced by misinformation, mistrust of international health initiatives, and social taboos surrounding sexual health. Economic challenges, the absence of local vaccine manufacturing, and logistical difficulties in vaccine distribution further exacerbate the problem. Without consistent funding and community engagement, sustaining vaccination momentum remains difficult. To overcome these barriers, a multi-pronged approach emphasizing health education, accessibility, and cultural sensitivity is imperative. Public awareness campaigns using television, radio, and social media can play a vital role in dispelling myths and promoting vaccine literacy. Engaging religious scholars and community leaders can enhance trust, particularly in conservative regions where discussions of sexual health remain taboo. The involvement of female physicians, teachers, and community workers in outreach activities will promote open dialogue and empower women to make informed health decisions. These efforts must be framed within culturally appropriate contexts to ensure societal acceptance. Sustainability of HPV immunization programs requires consistent financial support, efficient cold chain maintenance, trained vaccinators, and robust data monitoring systems. Collaboration among federal and provincial health departments, educational institutions, and civil society organizations can strengthen the institutional framework for vaccine delivery. Integrating HPV awareness and immunization into school health programs can further normalize vaccination and increase coverage rates. The long-term goal should be the development of local vaccine production capabilities and continuous monitoring of immunization outcomes through epidemiological data systems.

Pakistan's introduction of the HPV vaccine into its Expanded Programme on Immunization represents a significant milestone in the national fight against cervical cancer. However, achieving WHO's 2030 elimination target requires addressing socio-cultural barriers, ensuring vaccine accessibility, and fostering sustained public engagement. A concerted effort that integrates education, cultural awareness, and institutional commitment can ensure that future generations of Pakistani women are protected from the burden of cervical cancer.

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PREVALENCE OF TOBACCO USE AND VAPING AMONG STUDENTS AND ITS EFFECTS ON THEIR ORAL HEALTH

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ABSTRACT

OBJECTIVES

To determine the prevalence of tobacco use and vaping among medical and dental students of Peshawar, and to evaluate their effects on oral health status and hygiene practices.

METHODOLOGY

A cross-sectional study was conducted among 200 MBBS and BDS students between April and September 2025. Data were collected using a structured questionnaire assessing tobacco and vape use, oral hygiene practices, and self-reported oral health. Descriptive and inferential analyses were performed using SPSS v26.

RESULTS

The prevalence of tobacco use was 28%, while vaping use was 19%. Poor oral health was significantly more prevalent among tobacco and vape users ($p < 0.001$). Logistic regression revealed that current tobacco users were 3.1 times more likely to report gum disease (OR = 3.12, 95% CI = 1.60–6.07).

CONCLUSION

Tobacco and vaping use among students is notably high and associated with poorer self-reported oral health. Preventive strategies, including awareness campaigns and counseling services, should be integrated into university health programs.

KEYWORDS: *Tobacco, Vaping, Oral Health, Students, Peshawar, Prevalence, Smoking Behavior*

INTRODUCTION

Tobacco use continues to be one of the most preventable causes of morbidity and mortality worldwide, with more than eight million deaths annually attributed to tobacco consumption, including both smokers and passive smokers.[1] In recent years, vaping or the use of electronic nicotine delivery systems has gained popularity, particularly among adolescents and young adults, as an alternative to conventional cigarettes.[2] This behavioral shift poses new challenges, as emerging research suggests that vaping may produce similar detrimental effects on the oral cavity and general health.[3] Pakistan remains one of the major tobacco-consuming nations, with approximately 19% of adults and 11% of youth reportedly using tobacco products in various forms.[4] In academic institutions, stress, peer pressure, and social influences have been identified as major drivers of tobacco and vaping initiation among students.[5] University students, especially in medical and dental fields, often experience high academic demands and social stressors, leading to coping behaviors such as smoking or vaping.[6] The oral cavity serves as the primary entry point for tobacco smoke and vape aerosol, making oral tissues highly susceptible to harmful effects. Cigarette smoke contains over 7000 chemicals, many of which are carcinogenic, resulting in gingival inflammation, reduced salivary flow, halitosis, and delayed wound healing.[7] Similarly, vaping devices, though marketed as safer, deliver aerosols containing nicotine, propylene glycol, glycerol, and flavoring agents that irritate oral epithelium and disrupt the natural oral microbiome.[8] Studies have shown that long-term vaping can lead to oral mucosal dryness, gingival bleeding, and increased susceptibility to infection.[9] In a study among Malaysian dental students, 24% reported tobacco use, with a clear male predominance, while 18% reported occasional vaping.[10] Another survey from Saudi Arabia found that 32% of university students had tried vaping at least once, citing curiosity and peer influence as the primary motivators.[11] Locally, a study conducted in Lahore indicated that nearly one in four students smoked regularly, and over 10% had experimented with vaping.[12] The perception of risk also plays a role in these behaviors. Many students consider vaping a less harmful alternative to traditional smoking, despite evidence suggesting comparable risks in terms of nicotine dependency and mucosal irritation.[13] Dental

practitioners have increasingly reported cases of nicotine stomatitis, leukoplakia, and periodontal destruction in young individuals who vape regularly.[14] Oral health consequences of tobacco use include discoloration of teeth, loss of taste sensation, gingival recession, and oral malignancies.[15] The impact of vaping remains under study, but preliminary data indicate its association with increased plaque accumulation, altered microbial flora, and gingival inflammation.[16] Moreover, the presence of nicotine in both cigarettes and e-liquids affects fibroblast activity, leading to delayed tissue repair and poorer clinical outcomes.[17] Research conducted among Pakistani youth demonstrates limited awareness regarding the oral consequences of these habits. A 2023 study from Karachi reported that only 35% of students recognized the link between tobacco and oral cancer.[18] Despite medical education, many students themselves engage in these behaviors, underscoring the need for targeted awareness and preventive interventions.[19] The current study focuses on medical and dental students of Peshawar. These students represent a crucial group due to their future roles as healthcare providers and influencers of public health behavior. Understanding th e prevalence and impact of tobacco and vaping among them will provide valuable insight into the magnitude of the problem, guide prevention strategies, and promote oral health awareness across academic institutions.

METHODOLOGY

A cross-sectional study was conducted at Gandhara University, Peshawar, from April to September 2025. Using a prevalence estimate of 25%, a 95% confidence interval, and a 5% margin of error, the calculated sample size was 200 students. A purposive sampling technique was applied, dividing participants into MBBS and BDS categories. MBBS and BDS students, aged 18–26 years, and willing to provide informed consent were included in the study. Those students with systemic illnesses affecting oral health (e.g., diabetes), under nicotine replacement therapy, were excluded from the study. A structured self-administered questionnaire was used to collect demographic data, tobacco/vaping use patterns, oral hygiene practices, and self-rated oral health. Oral health self-assessment was categorized as Excellent, Good, Fair, or Poor. Data were analyzed using SPSS v26.

RESULTS

Table 1: Demographic Characteristics of Participants(n=200)

Variable		Frequency (n)	%age
Gender	Male	110	55
	Female	90	45
Program	MBBS	120	60
	BDS	80	40
Mean Age	22.4 ± 2.1 years		

Table 2: Prevalence of Tobacco and Vaping Use

Behavior	Users (n)	%age
Tobacco users	56	28
Vaping users	38	19
Dual users (both)	15	7.5

Table 3: Oral Health Status by Tobacco/Vaping Use

Oral Health Rating	Non-Users (n=106)	Users (n=94)	p-value
Excellent/Good	70 (66%)	28 (30%)	<0.001
Fair/Poor	36 (34%)	66 (70%)	

Table 4: Logistic Regression Predicting Poor Oral Health

Variable	Odds Ratio (OR)	95% CI	p-value
Tobacco use	3.12	1.60–6.07	0.001
Vaping use	2.48	1.10–5.58	0.028
Gender (male)	1.64	0.88–3.08	0.117

DISCUSSION

This study revealed a 28% prevalence of tobacco use and 19% of vaping among medical and dental students, indicating substantial engagement in nicotine-related behaviors. The findings align with regional data showing rising trends among Pakistani youth.[4,5,6,7,8,9,10,11,12] The higher rate among males reflects traditional gender norms observed in similar South Asian studies.[10,11,12,13,14,15,16,17,18,19] The significant association between tobacco/vaping use and poor oral health underscores the detrimental impact of these behaviors. Consistent with findings by Kellesarian et al.[16] our study supports that nicotine exposure alters oral microbiota, reduces salivary flow, and exacerbates gingival inflammation. Similarly, Bardellini et al.[8] reported that vaping aerosols contain aldehydes and metallic nanoparticles, producing oxidative stress in the oral mucosa. A comparable study among Saudi dental students demonstrated that vape users had twice the odds of self-reported gingival bleeding,[11] echoing our logistic regression results (OR = 2.48). Interestingly, both tobacco and vaping were found to independently predict poor oral health, emphasizing that vaping is not

a benign alternative. Peer pressure, curiosity, and stress relief emerged as key initiation factors, resonating with previous work from Malaysia and Pakistan.[5,6,7,8,9,10,11,12] Despite medical knowledge, the persistence of such habits among healthcare students highlights a concerning gap between awareness and behavior.[18] Our data also revealed that only 45% of users reported receiving information on oral risks, mirroring Al-Mutairi et al.'s[19] finding that health education interventions are insufficient in universities. It is imperative that targeted prevention programs, emphasizing behavioral counseling and oral health education, be integrated into medical curricula. Physiologically, nicotine-induced vasoconstriction and reduced oxygenation in gingival tissues hinder healing and promote microbial growth.[15] Vape liquids, though devoid of tar, still contain cytotoxic components affecting fibroblast regeneration.[17] Thus, both modalities compromise oral integrity through distinct yet overlapping mechanisms. Our results demonstrated that dual users (7.5%) exhibited the poorest oral health perception. Similar findings were observed by Gotfredsen et al.[13] who linked dual exposure to compounded periodontal damage. While self-assessed oral health may introduce subjective bias, it remains a reliable indicator of perceived oral function and aesthetics. Globally, the increasing acceptance of vaping among youth reflects aggressive marketing strategies portraying it as "clean" or "safe." However, mounting evidence, such as Javed et al.[9] confirms that long-term vaping alters oral immunity and inflammatory profiles. In our population, frequent users reported dryness and halitosis, symptoms frequently described in vaping-associated oral disorders. This study, although limited to a single institution, provides important baseline data for policymakers and educators in Khyber Pakhtunkhwa. The correlation between usage patterns and oral health demonstrates that awareness alone is insufficient behavioral modification programs are needed. Future research should incorporate clinical oral examinations and biochemical verification of nicotine exposure to validate self-reported data. Moreover, comparative longitudinal studies could better elucidate causal relationships.

LIMITATIONS

There are some limitations to self-reported questionnaire data, which may introduce recall and social desirability bias. Clinical oral assessments were not included and were conducted in a single institution, reducing generalizability.

CONCLUSIONS

Tobacco and vaping use among students is prevalent and significantly associated with poor self-perceived oral health. Despite awareness, behavioral adoption persists due to social and psychological factors. Educational and preventive measures, including anti-tobacco campaigns and counseling, are crucial to mitigate these health risks in young adults.

CONFLICT OF INTEREST: None

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ASSESSMENT OF KNOWLEDGE, ATTITUDES, AND BARRIERS TOWARD DENTAL HEALTH - SEEKING BEHAVIOR AMONG ADULTS IN URBAN AND RURAL AREAS OF PESHAWAR

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ABSTRACT

OBJECTIVES

To assess oral health awareness, dental care-seeking behavior, and the barriers influencing access to dental services among adults in Khyber Pakhtunkhwa, Pakistan.

METHODOLOGY

A cross-sectional study was conducted among 400 adults (aged 18–60 years) from both urban and rural areas between January and June 2024. A structured questionnaire assessed demographic variables, dental visit frequency, awareness, and barriers to dental care. Data were analyzed using SPSS version 25, employing descriptive and inferential statistics (chi-square test) with $p < 0.05$ considered significant.

RESULTS

Among 400 participants, females were slightly predominant (51.5%). Only 27% visited a dentist every six months, while 47% sought care only when in pain. About 59.5% reported delaying dental treatment despite problems. The most significant reasons for delay included high cost (55%), fear of dental procedures (43%), and lack of time (33.5%). Accessibility barriers were more prevalent among rural residents, including absence of nearby facilities (34% vs. 19%, p=0.002) and transportation issues (28% vs. 11%, p<0.001). Awareness regarding the importance of dental checkups was 63%.

CONCLUSION

Dental health-seeking behavior in Khyber Pakhtunkhwa remains largely problem-driven, with financial, psychological, and accessibility barriers significantly influencing care utilization. Targeted oral health awareness campaigns, affordable dental programs, and improved rural access are imperative for promoting preventive dental care.

KEYWORDS: *Oral Health, Dental Care-Seeking Behavior, Barriers, Awareness, Accessibility, Pakistan*

INTRODUCTION

Oral health is an integral component of general health and significantly contributes to the overall quality of life. Poor oral hygiene can lead to a range of dental diseases, including caries, gingivitis, and periodontitis, which may subsequently affect systemic health.[1] The World Health Organization (WHO) emphasizes oral health as a fundamental right, yet disparities persist in access and utilization of dental services, especially in low- and middle-income countries.[2] In Pakistan, dental diseases are widespread due to limited awareness, inadequate healthcare infrastructure, and cultural misconceptions surrounding oral health.[3] The Pakistan National Oral Health Survey reported that over 70% of adults suffer from dental caries and periodontal disease, yet less than 30% seek regular dental care.[4] Preventive dental visits are often overshadowed by a curative approach, where individuals seek treatment only when symptoms become severe. Previous studies have identified multiple barriers contributing to poor dental attendance. These include fear or anxiety related to dental procedures, high treatment costs, lack of time, and limited access to dental facilities.[5,6] Psychological barriers such as embarrassment about oral condition and fear of pain also play a significant role.[7] In addition, sociocultural factors and gender dynamics influence health-seeking behavior. Rural residents, particularly women, may face greater difficulty accessing dental services due to social restrictions, lower income, and fewer healthcare facilities.[8] Urban populations generally exhibit greater awareness of and access to dental services than rural communities.[9] A study in Lahore found that urban participants were twice as likely to visit a dentist annually as rural participants.[10] In Khyber Pakhtunkhwa, rural areas

remain underserved, with limited availability of qualified dental practitioners and poor transportation networks further restricting access.[11] Awareness and attitude toward oral health strongly determine preventive practices. Regular brushing, routine dental checkups, and dietary control are essential for maintaining oral hygiene.[12] However, misconceptions such as ―toothache is normal with age‖ or ―tooth extraction is the only cure‖ persist in developing nations.[13] Educational interventions and community-based oral health programs have been found effective in improving awareness and reducing disease burden.[14] Despite the growing burden of dental diseases, limited research has been conducted in Peshawar to explore how social, psychological, and structural factors influence dental health-seeking behavior. This study fills this gap by assessing knowledge, attitudes, and barriers among adults in both urban and rural areas. The findings will aid policymakers and healthcare providers in designing targeted oral health promotion strategies.

METHODOLOGY

A descriptive cross-sectional study was conducted from March to June 2025 in selected urban and rural regions of Peshawar, Khyber Pakhtunkhwa. A total of 400 adults (200 urban, 200 rural) were selected using stratified random sampling. Adults aged ≥18 years, residents of Peshawar for ≥2 years, and participants who consented were included. A structured 21-item questionnaire assessed demographics, oral hygiene practices, awareness, and barriers. Reliability was confirmed with Cronbach's $\alpha = 0.82$. SPSS version 25 was used for analysis. Descriptive statistics (frequencies, percentages, means, SDs) were computed for the demographics. Chi-square tests examined associations between education, location, awareness, and frequency of dental visits. $p < 0.05$ was considered statistically significant.

RESULTS

Table 1: Demographic Distribution of Participants

Variable	Category	Frequency (n)	%age
Gender	Male	194	48.5
	Female	206	51.5
Age (years)	18–30	152	38.0
	31–45	148	37.0
	46–60	80	20.0
	>60	20	5.0
Educational Level	No Formal education	52	13.0
	Primary	74	18.5
	Secondary	108	27.0
	Graduate	104	26.0
	Postgraduate	62	15.5
Occupation	Employed	146	36.5
	Unemployed	94	23.5
	Student	124	31.0
	Retired	36	9.0
Location	Urban	200	50.0
	Rural	200	50.0
Marital Status	Married	238	59.5
	Unmarried	142	35.5
	Divorced	20	5.0

Table 2: General Oral Health Behaviors and Awareness

Variable	Category	Frequency (n)	%age
Frequency of dental visits	Every 6 months	108	27.0
	Once a year	104	26.0
	Only when in pain	188	47.0
Awareness of the importance of checkups	Yes	252	63.0
	No	148	37.0
Delaying treatment despite a dental issue	Yes	238	59.5
	No	162	40.5
Primary reasons for delay (multiple responses)	High cost	220	55.0
	Fear of dental procedures	172	43.0
	Lack of time	134	33.5
	No nearby facility	106	26.5
	Transportation issues	78	19.5
	Lack of awareness	112	28.0
Perceived affordability of services	Affordable	136	34.0
	Not affordable	204	51.0
	Not sure	60	15.0
Frequency of brushing teeth	Once a day	164	41.0
	Twice a day	208	52.0
	Never	28	7.0

Table 3: Barriers to Dental Health-Seeking Behavior (n = 400)

Barrier Type	Frequency (n)	%age
Fear of dental procedures	172	43.0
High cost of treatment	220	55.0
Lack of time	134	33.5
No nearby dental facility	106	26.5
Transportation issues	78	19.5
Lack of awareness about oral health	112	28.0
Previous bad experience	92	23.0
Shyness or embarrassment about oral condition	86	21.5
Long waiting times at clinics	140	35.0
Other (e.g., mistrust, family restrictions)	38	9.5

Table 4: Association between Location and Accessibility-Related Barriers

Barrier	Urban (n=200)	Rural (n=200)	χ^2	P-value
No nearby dental facility	38(19.0%)	68(34.0%)	9.32	0.002*
Transportation issues	22(11.0%)	56(28.0%)	13.71	<0.001*
Long waiting times	84(42.0%)	56(28.0%)	7.26	0.007*
High cost	108(54.0%)	112(56.0%)	0.16	0.688

DISCUSSION

The findings of this study highlight that a considerable proportion of adults in Khyber Pakhtunkhwa demonstrate poor dental attendance patterns, with most visiting dentists only when in pain rather than for preventive care. This reactive approach aligns with prior studies in Pakistan and other developing countries, where cost, fear, and accessibility remain the dominant deterrents to timely dental care.[15] In the present study, only 27% of participants reported visiting a dentist every six months, whereas nearly half (47%) sought treatment solely during dental pain episodes. Similar results were shown, with over 60% of respondents delaying seeking care due to financial or emotional barriers.[16] The present data reinforce that preventive dental behavior is limited, suggesting a need for stronger oral health education at the community level. Financial constraints emerged as the leading barrier (55%), consistent with Petersen (2019) and Al-Ansari (2020), who reported that dental treatment costs are a significant factor limiting service utilization in low- and middle-income populations.[17,18] In Pakistan, most dental services are paid out of pocket, which discourages regular checkups. Similarly, fear of dental procedures (43%) was prominent, consistent with Humphris et al. (2021), who associated dental anxiety with avoidance behaviors and deteriorating oral health.[19] Accessibility-related barriers were significantly higher among rural respondents. The absence of nearby dental facilities (34%) and transport issues (28%) indicates infrastructural inequities. The chi-square analysis confirmed statistically significant differences between urban and rural participants for accessibility-related factors ($p < 0.01$), underscoring disparities in healthcare distribution. These findings support earlier observations by Ali et al. (2021) that rural populations in Khyber Pakhtunkhwa face logistical and geographic challenges that hinder access to preventive care.[20] Although 63% of participants were aware of the importance of dental checkups, this awareness did not necessarily translate into preventive visits. This gap between knowledge and practice mirrors findings from Adekoya et al. (2022), highlighting that behavioral change requires more than awareness; it demands affordability, trust, and accessible care environments.[21] Overall, the study underscores that barriers to dental health-seeking behavior are multidimensional - encompassing economic, psychological, and systemic factors. Addressing these requires integrated strategies: Government-subsidized preventive dental programs, Public oral health campaigns to reduce fear and misconceptions, and Expansion of community-based dental facilities, particularly in rural settings.

LIMITATIONS

The study design limits causal inference between variables such as awareness and behavior. The study did not include dental examination data to correlate perceived needs with actual oral health status.

CONCLUSIONS

This study concludes that dental care-seeking behavior among adults remains inadequate, with most individuals visiting dentists only when symptomatic. The most prominent barriers are high treatment costs, fear of dental procedures, and limited accessibility to dental services, especially in rural regions. Despite moderate awareness, preventive dental visits are uncommon, indicating a need for behavioral and structural interventions. Improving affordability through subsidized care, enhancing dental literacy, and expanding rural dental outreach programs can significantly improve oral health outcomes and promote a culture of preventive care in Peshawar.

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DETERMINANTS OF DRUG ADDICTION AMONG PATIENTS ADMITTED TO REHABILITATION CENTERS IN PESHAWAR

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ABSTRACT

OBJECTIVES

To identify the sociodemographic characteristics and determinants contributing to drug addiction among patients admitted to rehabilitation centers in Peshawar.

METHODOLOGY

A descriptive, cross-sectional study was conducted at three rehabilitation centers in Peshawar: Da Haq Awaz, New Life Foundation, and Rehabilitation Center from May to October 2024. A total of 202 participants were selected through non-probability convenience sampling. Data were collected through structured, interviewer-administered questionnaires covering demographic information, drug use history, accessibility, relapse, and factors influencing cessation. Inclusion criteria encompassed individuals residing in rehabilitation centers without infectious or psychiatric illnesses. Data were analyzed using SPSS version 23.0, applying descriptive statistics including frequencies, percentages, means, and standard deviations.

RESULTS

All 202 participants were male, with a mean age of 25.2 ± 1.07 years. The majority belonged to the middle socioeconomic class (44.1%) and resided in Khyber Pakhtunkhwa (63.3%). Cannabis (Charas) was the most frequently abused drug (39.6%), followed by methamphetamine (15.8%) and multiple substance use (38.1%). Most participants initiated drug use between the ages of 15 and 20 (44.6%) and had used substances for less than five years (49.5%). Peer influence (39.6%) emerged as the leading cause of addiction, followed by enjoyment (25.7%) and familial conflict (24.8%). The primary motivating factors for quitting included family desire (54.0%) and loss of social honor (35.1%).

CONCLUSION

Peer influence and recreational enjoyment were the predominant determinants of substance use among rehabilitation patients in Peshawar. The onset of addiction during adolescence emphasizes the need for preventive education, early intervention, and family-based rehabilitation models. Addressing social and environmental factors can play a pivotal role in mitigating the rising incidence of drug addiction in Pakistan.

KEYWORDS: *Drug Users, Rehabilitation Centers, Peer Influence, Risk Factors*

INTRODUCTION

Substance addiction represents a significant global public health challenge, affecting the physical, psychological, and social well-being of individuals. The United Nations Office on Drugs and Crime (UNODC) estimates that approximately 5.2% of the global population aged 15 to 64 years-equivalent to more than 360 million people-use illicit drugs annually, with a continuous upward trend over the past decade.[1] Substance use disorders have been identified across all socioeconomic and cultural boundaries, posing a substantial burden on healthcare systems worldwide.[2] In the United States, recent national surveys revealed that 53 million Americans aged 12 years or older have used an illicit drug in the past year, while 73 million use tobacco and 179 million consume alcohol.[3] Among these, 5.4 million individuals reported dependence on illicit drugs but not alcohol, whereas 12.1 million were addicted to alcohol but not illicit drugs.[3] Such statistics underscore the pervasive nature of addiction as a complex biopsychosocial phenomenon. In developing countries, including Pakistan, substance abuse continues to emerge as a growing concern. Pakistan is ranked among the top ten tobacco-producing nations, with production increasing by nearly 5% annually,

contributing to the rising availability of psychoactive substances.[4] According to the UNODC's most recent national assessment, 6.4 million adults in Pakistan (approximately 5.8% of the adult population) engage in substance use, with significant variations in type, frequency, and socioeconomic context.[5] Commonly abused substances include charas (hashish), heroin, opium, and pharmaceutical opioids, while emerging trends indicate a gradual shift from traditional opium use toward synthetic narcotics and amphetamine-type stimulants.[6,7] The initiation of drug use typically occurs during late adolescence to early adulthood (18–25 years), a developmental stage characterized by experimentation, curiosity, and susceptibility to peer influence.[8] Psychosocial and environmental determinants-such as family instability, poor emotional regulation, underfunded educational institutions, unemployment, loneliness, and easy drug availability-play a significant role in addiction vulnerability.[9,10] Conversely, protective factors like parental supervision, moral upbringing, academic engagement, and social support have been shown to mitigate the risk of substance misuse.[11] The Transtheoretical Model of Behavior Change (TTM) conceptualizes addiction as a cyclic process involving stages of precontemplation, contemplation, action, maintenance, and relapse.[12] Relapse remains an intrinsic component of recovery, often influenced by psychiatric comorbidities, craving intensity, stress, and social reinforcement.[13] Research indicates that relapse rates among individuals with substance use disorders can range from 40% to 60%, depending on the drug and psychosocial context.[14] Despite ongoing national initiatives and the establishment of rehabilitation centers in Pakistan, the psychosocial determinants and behavioral patterns of drug addiction remain insufficiently explored, particularly within the sociocultural framework of Peshawar. Understanding these patterns is essential to developing evidence-based prevention and rehabilitation strategies tailored to local contexts. Hence, this study aims to identify the determinants and behavioral patterns of drug addiction among patients admitted to rehabilitation centers in Peshawar. The findings are expected to provide critical insights for clinicians, policymakers, and community-based intervention programs focusing on addiction management and relapse prevention in Pakistan.

METHODOLOGY

A descriptive, cross-sectional study was conducted at three rehabilitation centers in Peshawar, namely the Rehabilitation Center, Da Haq Awaz, and New Life Foundation. A total of 202 individuals participated in the study. Data collection was carried out over five months, from May 31 to October 30, 2024. These centers admit individuals from all four provinces of Pakistan and the federal capital. The primary reasons for admission in Khyber Pakhtunkhwa (KP) included the growing influence of social media platforms, particularly TikTok, and family interventions intended to restrict patients' mobility by admitting them to distant centers. The study included 202 participants selected through a non-probability convenience sampling technique. The sample size was estimated using the World Health Organization (WHO) sample size calculator, assuming a population proportion of 28%, a 95% confidence level, and a 6.2% margin of error, resulting in a required sample of 202 participants. Inclusion criteria encompassed individuals currently residing in rehabilitation centers who had spent a defined period in treatment, were not diagnosed with any infectious or psychiatric diseases, and were admitted voluntarily or by family members. Exclusion criteria included individuals forcibly admitted, those diagnosed with infectious diseases such as HIV/AIDS or Hepatitis B/C, and individuals identified as homeless or street addicts. Data were collected using a structured questionnaire administered through face-to-face interviews. Informed consent was obtained from all participants before data collection. Participants who declined to participate were excluded from the study. The questionnaire collected comprehensive information, including sociodemographic characteristics, initiation of drug use, duration and pattern of use, accessibility of drugs in society, family history of addiction, staff attitudes, relapse frequency, health conditions at the rehabilitation centers, and factors influencing drug cessation. All data were entered into IBM SPSS Statistics version 23.0 for analysis. The dataset was reviewed for completeness, accuracy, and consistency. Descriptive statistics were computed for all variables, and frequency distributions were generated to summarize categorical data.

RESULTS

A total of 202 male participants were included in the study. The mean age of participants was 25.2 ± 1.07 years. In terms of socioeconomic distribution, 44.1% belonged to the middle class, 40.6% to the lower class, and 15.3% to the upper class. Regarding relapse history, 126 (62.4%) participants were first-time admissions, 61 (30.2%) reported 2–6 relapses, 9 (4.5%) had relapsed 7–10 times, and 6 (3.0%) experienced more than 10 relapses.

Table 1: Sociodemographic Characteristics of Participants (n = 202)

Variable	Frequency (n)	%age
Gender		
Male	202	100
Female	0	0
Province/Region		
Khyber Pakhtunkhwa	134	63.3
Punjab	58	28.7
Sindh	06	3.0
Balochistan	01	0.5
Islamabad	03	1.5
Education Level		
Primary	62	30.7
Middle	40	19.8
Secondary	44	21.8
Bachelor's	17	8.4
Higher than a Bachelor's	31	15.3
Family History of Addiction		
Yes	71	35.1
No	131	64.9
Marital Status		
Married	110	54.5
Unmarried	92	45.5

Table 2: Drug-Related Variables of the Study (n = 202)

Variable	Category	Frequency (n)	%age
Age at First Drug Use	15–20 years	90	44.6
	21–25 years	52	25.7
	26–30 years	24	11.9
	31–35 years	36	17.8
Duration of Drug Use	<5 years	100	49.5
	5–10 years	46	22.8
	11–15 years	26	12.9
	>15 years	30	14.9
Type of Drug Used	Charas (Cannabis)	80	39.6
	Ice (Methamphetamine)	32	15.8
	Tablets	08	4.0
	Alcohol	05	2.5
	Multiple Substances	77	38.1
Accessibility of Drugs	Very difficult	32	15.8
	Difficult	08	4.0
	Easily available	77	38.1
	Very easy	05	2.5
Primary Factor Leading to Addiction	Enjoyment	52	25.7
	Peer Influence	80	39.6
	Family Conflict	50	24.8
	Passionate Relationships	20	9.9
Mode of Drug Intake	Smoking	178	88.1
	Syringe	05	2.5
	Both	08	4.0
	Nasal	11	5.4
Factors Promoting Drug Cessation	Family Desire	109	54.0
	Loss of Social Honor	71	35.1
	Adverse Health Effects	18	8.9
	Others	04	2.0

DISCUSSION

This study identified four principal determinants contributing to drug addiction among rehabilitation center patients in Peshawar: peer influence, recreational use, familial conflicts, and romantic relationships. Among these, negative peer influence was the predominant factor, corroborating the findings of a 2022 study conducted at the BNN Baddoka Makassar Rehabilitation Center, which reported that dysfunctional family dynamics and adverse environmental influences were primary contributors to substance dependence.[4] Further literature supports the multifactorial nature of addiction, associating it with psychiatric comorbidities, early exposure to substances, maladaptive coping behaviors, and personality traits such as sensation-seeking.[9,10,11] Notably, the element of enjoyment identified in this study aligns with multiple previous investigations emphasizing pleasure-seeking behavior as a recurrent motivator for substance use.[12,13,14,15] The study's all-male sample reflects patterns observed in other regional investigations, such as one conducted at the E.J. Drug Addiction Center, where 95% of opioid users were male.[16] This gender skew may be attributed to sociocultural constraints limiting female admission to rehabilitation centers, as well as gender-based stigma surrounding drug abuse. Charas (cannabis) was found to be the most frequently used substance, consistent with the findings from Abdul Wali Khan University, Charsadda District, which reported cannabis as the predominant substance among young users.[17] Interestingly, most participants possessed at least a basic education, with a notable proportion holding higher degrees. This observation mirrors findings from Gomal Medical College, Peshawar[18] and COMSATS Institute of Information Technology, Islamabad,[19] both of which highlighted the prevalence of addiction among educated individuals, challenging the assumption that substance abuse is confined to low-literacy populations. Participants in this study were primarily residents of Khyber Pakhtunkhwa, followed by Punjab and Sindh, differing slightly from a previous study conducted at Hamdard University, Karachi, which demonstrated a more even provincial representation.[5] The initiation of drug use was predominantly observed during adolescence and early adulthood, aligning with evidence from multiple studies emphasizing that individuals aged 15–25 years are at the highest risk for substance initiation.[20,21,22,23] Family structure and dynamics emerged as significant influences on both addiction onset and recovery. According to Sudarsono,[24] adequate parental

supervision and a supportive family environment are critical in nurturing moral development and preventing deviant behavior. Furthermore, stable family systems contribute to emotional regulation and resilience, essential for rehabilitation and sustained abstinence.[25] Hence, family-based interventions and psychosocial support systems are indispensable components of successful rehabilitation strategies.

LIMITATIONS

This study was limited by its cross-sectional design, which restricts the ability to establish causal relationships between sociodemographic factors and drug addiction. The use of non-probability convenience sampling may have introduced selection bias, limiting the generalizability of the findings beyond the selected rehabilitation centers in Peshawar. Additionally, data were self-reported through interviewer-administered questionnaires, which may be subject to recall and social desirability biases. The exclusion of female participants and individuals with psychiatric comorbidities further limits the comprehensiveness of the results, as gender and mental health factors could significantly influence addiction patterns

CONCLUSIONS

This study underscores that drug addiction among rehabilitation patients in Peshawar is primarily influenced by peer pressure, recreational curiosity, and familial conflict. Most individuals initiate drug use during adolescence, highlighting the urgent need for early preventive interventions. The predominance of educated and middle-class participants challenges common misconceptions about addiction being confined to lower socioeconomic strata. Rehabilitation efforts must therefore adopt a holistic, family-centered approach focusing on prevention, early detection, and social reintegration. Policy-level initiatives targeting adolescent education, peer mentoring, and accessible counseling services are essential to curb the rising trend of drug use in Pakistan. Future research should explore gender dynamics, long-term relapse outcomes, and psychological correlates to inform more comprehensive rehabilitation strategies.

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KNOWLEDGE AND ATTITUDE OF MOTHERS TOWARDS IMMUNIZATION OF CHILDREN UNDER FIVE YEARS IN PESHAWAR

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ABSTRACT

OBJECTIVES

To assess the knowledge and attitude of mothers toward immunization of children under five years and to determine the association between maternal factors and immunization status in Peshawar.

METHODOLOGY

A descriptive cross-sectional study was conducted at Naseer Teaching Hospital, Peshawar, from January to July 2025. A total of 300 mothers of children under five were selected using systematic random sampling. Data were collected using a structured, pretested questionnaire that covered sociodemographic details, knowledge, and attitudes regarding immunization. Statistical analysis was performed using SPSS version 26. Frequencies and percentages were calculated, and chi-square tests were applied; $p < 0.05$ was considered statistically significant.

RESULTS

Most respondents (46%) were aged 26–35 years, 54% resided in urban areas, and 62% had secondary or higher education. About 71% of mothers had good knowledge, and 68% showed a positive attitude toward immunization. A significant association was found between maternal education ($p = 0.001$), antenatal care visits ($p = 0.003$), and children's immunization status.

CONCLUSION

The findings revealed satisfactory knowledge and positive attitudes among mothers; however, gaps persist among less educated and rural mothers. Strengthening health education programs through primary healthcare and antenatal counseling can enhance immunization coverage.

KEYWORDS: *Immunization, Mothers, Knowledge, Attitude, Under-five Children, Peshawar*

INTRODUCTION

Immunization is recognized globally as one of the most effective and cost-effective public health strategies for preventing infectious diseases in children.[1] The World Health Organization (WHO) estimates that immunization prevents nearly 2-3 million deaths annually.[2] Despite its proven benefits, vaccine-preventable diseases continue to threaten child survival in developing nations due to incomplete or delayed vaccination.[3] In Pakistan, the Expanded Programme on Immunization (EPI) was introduced in 1978 to provide free vaccines against major infectious diseases, including tuberculosis, polio, diphtheria, pertussis, tetanus, hepatitis B, and measles.[4] However, national surveys indicate that full immunization coverage remains suboptimal, particularly in underprivileged and rural areas.[5] The Pakistan Demographic and Health Survey (PDHS) 2017–2018 reported that only 66% of children aged 12–23 months were fully immunized.[6] These figures underscore persistent barriers such as maternal illiteracy, limited access to healthcare facilities, and lack of awareness.[7] Mothers play a critical role in child health and immunization uptake.[8] Their level of education, socioeconomic background, access to information, and exposure to healthcare determine their willingness and ability to ensure complete immunization.[9] Studies in South Asia have consistently shown that maternal education is a strong predictor of child vaccination.[10] In a study from Karachi, Pakistan, mothers with higher education were 3 times more likely to complete their child's immunization schedule than illiterate mothers.[11] A mother's attitude also significantly influences immunization practices.[12] Positive attitudes often stem from trust in healthcare providers, exposure to vaccination campaigns, and understanding of vaccine benefits.[13] Conversely, misconceptions such as beliefs that vaccines cause illness, infertility, or are unnecessary lead to hesitancy and missed doses.[14]

Social and cultural influences, particularly in rural communities, can also perpetuate vaccine avoidance.[15] A study in Lahore observed that 68% of mothers had adequate knowledge of immunization, while 32% demonstrated misconceptions about side effects and vaccine efficacy.[16] Another study in the Swat district found that despite awareness campaigns, 41% of rural mothers had incomplete knowledge of immunization schedules.[17] Similarly, research from Nigeria and India corroborated that maternal education and antenatal care attendance were key determinants of complete immunization.[18] Antenatal care (ANC) visits provide an essential platform for counseling mothers on child immunization. Mothers who attended regular ANC visits were more likely to possess better knowledge and demonstrate positive attitudes toward immunization.[19] Hence, strengthening maternal health services can significantly improve vaccination coverage. In Peshawar, limited research has explored maternal knowledge and attitudes toward immunization, despite being a densely populated and diverse urban center. Understanding local perceptions is vital to address barriers and design targeted interventions to improve vaccination compliance. Therefore, this study aimed to assess the knowledge and attitude of mothers toward immunization of children under five years and to identify factors associated with immunization status in Peshawar. The findings will contribute to policy formulation, strengthen maternal education programs, and help achieve Sustainable Development Goal 3 (SDG-3), focused on child health and well-being.

METHODOLOGY

A descriptive cross-sectional study was conducted at the Naseer Teaching Hospital, Peshawar, from January to July 2025. Using the formula $n = Z^2pq/d^2$, with a 95% confidence interval, expected prevalence of adequate knowledge (p = 70%), and margin of error (d = 0.05), the calculated sample size was 323. Accounting for non-response, 300 participants were included. A convenient sampling technique was used. Those mothers aged 18-45 years, having at least one child <5 years, and willing to participate were included. Healthcare professionals and mothers with children suffering from chronic illness were excluded. A structured, pretested questionnaire consisting of three sections: Sociodemographic, Knowledge items (10 questions), and Attitude items (10 Likert-scale statements) was used for data collection, after obtaining ethical approval and informed consent, via face-to-face interviews in Pashto and Urdu. Data were analyzed using SPSS version 26. Descriptive statistics (frequencies, percentages, means ± SD) summarized the data. Chi-square tests examined associations between maternal factors and immunization status, with $p < 0.05$ as significant.

RESULTS

Table 1: Demographic Characteristics of Respondents (n = 300)

Variable	Category	Frequency (n)	%age
Age (years)	18–25	90	30.0
	26–35	138	46.0
	36–45	72	24.0
Education	Illiterate	78	26.0
	Primary	36	12.0
	Secondary	102	34.0
	Graduate or above	84	28.0
Residence	Urban	162	54.0
	Rural	138	46.0
Occupation	Housewife	222	74.0
	Employed	78	26.0
No. of children	1–2	96	32.0
	3–4	132	44.0
	≥5	72	24.0
ANC Visits	None	48	16.0
	1–3	108	36.0
	≥4	144	48.0

Table 2: General Oral Health Behaviors and Awareness

Variable	Category	Frequency (n)	%age
Knowledge level	Good	213	71.0
	Poor	87	29.0
Attitude toward immunization	Positive	204	68.0
	Negative	96	32.0
Child fully immunized	Yes	222	74.0
	No	78	26.0

Table 3: Association between Location and Accessibility-Related Barriers

	Factor	Immunized	Not Immunized	χ^2	P-value
Education	Illiterate	48 (61.5)	30 (38.5)	16.42	0.001
	Primary	27 (75.0)	09 (25.0)		
	Secondary	81 (79.4)	21 (20.6)		
	Graduate+	66 (78.6)	18 (21.4)		
Residence	Urban	129 (79.6)	33 (20.4)	4.21	0.040
	Rural	93 (67.4)	45 (32.6)		
ANC Visits	None	24 (50.0)	24 (50.0)	11.73	0.003
	1-3	75 (69.4)	33 (30.6)		
	≥4	123 (85.4)	21 (14.6)		

DISCUSSION

The present study revealed that most mothers had good knowledge (71%) and a positive attitude (68%) toward childhood immunization, with 74% of their children being fully immunized. These findings indicate progressive awareness yet highlight persistent gaps among uneducated and rural mothers. Educational level emerged as a strong predictor of immunization status, consistent with previous literature. A study from Karachi found that literate mothers were significantly more likely to complete their child's vaccination schedule.[11] Similarly, in Bangladesh (20) reported that maternal education had a positive correlation with

immunization completeness ($p < 0.01$). Educated mothers often possess better access to health information and interpret medical advice accurately. Antenatal care visits were another significant determinant ($p = 0.003$). Mothers who had ≥4 ANC visits were more likely to have fully immunized children, aligning with studies from Nepal (21) and Ethiopia (22). ANC sessions provide health education opportunities that enhance mothers' awareness of immunization schedules. Urban mothers demonstrated better immunization compliance than rural mothers ($p = 0.04$). Urban residence offers better access to healthcare facilities, information, and exposure to vaccination campaigns (9). Similar trends were observed in studies conducted in Lahore (23) and Quetta (24). However, 26% of mothers in this study still had incomplete immunization records. Significant barriers identified during informal interviews included misconceptions about side effects, lack of time, and fear of pain or fever post-vaccination. Studies from Nigeria (25) and India (26) also reported that fear of vaccine-induced illness contributed to missed doses. Although a majority held positive attitudes, 32% demonstrated reluctance, especially concerning newer vaccines like rotavirus and pneumococcal. Trust in government health systems and religious beliefs played roles in shaping these perceptions (27). Overall, these findings reaffirm that maternal knowledge, attitude, and health-seeking behavior are critical determinants of child immunization. Interventions should focus on continuous education through mass media, community health workers, and integration of immunization counseling into ANC programs.

LIMITATIONS

The study was limited to a single tertiary care hospital and may not represent the entire population of Peshawar. Self-reported data may involve recall bias.

CONCLUSIONS

The study concludes that mothers in Peshawar generally possess good knowledge and favorable attitudes toward immunization, yet gaps exist among uneducated and rural groups. Maternal education, urban residence, and ANC visits were significant determinants of immunization status. Strengthening community-level awareness campaigns and integrating maternal education into routine ANC services are crucial for improving full immunization coverage in children.

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PREVALENCE AND FACTORS OF ABSENTEEISM AMONG MEDICAL STUDENTS OF PESHAWAR

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ABSTRACT

OBJECTIVES

To determine the prevalence of absenteeism and identify the associated factors among medical students of Peshawar.

METHODOLOGY

A cross-sectional study was conducted from January to December 2024 among MBBS students enrolled in three medical colleges in Peshawar. The sample size (n=380) was calculated using a 50% estimated prevalence, 95% confidence level, and 5% margin of error. Stratified random sampling was used based on academic year. A structured self-administered questionnaire assessed sociodemographic characteristics, frequency of absenteeism, academic motivation, mental health indicators, and institutional factors. Data were analyzed using SPSS v.26. A p-value <0.05 was considered statistically significant.

RESULTS

The prevalence of absenteeism was found to be 58.1%, indicating a considerable burden within medical institutions in Peshawar. Significant factors associated with absenteeism included poor teaching quality (p=0.003), academic stress (p=0.001), lack of interest in lectures (p=0.002), depressive symptoms (p=0.014), long commuting time (p=0.027), heavy academic load (p=0.009), health issues (p=0.003), family issues (p=0.005), financial difficulties (p=0.002), and conflict with administration (p=0.008). Environmental factors such as overcrowded classrooms, poor ventilation, excessive noise, uncomfortable seating, and poor campus cleanliness also demonstrated strong associations.

CONCLUSION

Absenteeism is highly prevalent among medical students in Peshawar and is driven by complex academic, psychological, and institutional factors. Improving teaching methodologies, providing mental-health support, optimizing curriculum load, and enhancing student engagement may substantially reduce absenteeism.

KEYWORDS: *Absenteeism, Medical Students, Peshawar, Academic stress, Medical Education, Predictors of Absenteeism*

INTRODUCTION

Attendance in medical education is widely recognized as a vital component of successful academic performance and professional development. Medical students rely on classroom teaching, clinical exposure, and interactive learning to build a strong foundation for future clinical practice. Absenteeism, defined as the intentional or habitual failure to attend scheduled academic activities has therefore become an important topic of investigation in medical education systems worldwide. High levels of absenteeism have been linked to poor academic outcomes, reduced engagement, ineffective learning, and weakened clinical competence.[1] This issue has gained attention in many Asian and South Asian contexts, yet it remains underexplored within the medical institutions of Peshawar, Pakistan. Studies in medical education have consistently emphasized that attendance positively correlates with academic performance. Evidence from institutions in the UK, Saudi Arabia, and India shows that students with higher class attendance achieve better examination results and clinical skill proficiency.[2,3,4] Conversely, absenteeism often predicts academic

failure, poor retention of knowledge, and difficulties during clinical rotations.[5] In Pakistan, several medical colleges have reported concerns about poor student attendance, though comprehensive local data remain limited.The factors contributing to absenteeism are multifaceted and embedded within personal, academic, psychosocial, and institutional domains. Personal factors such as lack of motivation, mental health challenges, and poor time management have been repeatedly cited in international studies.[6,7] A study from Saudi Arabia found that psychiatric distress, particularly anxiety and depressive symptoms, significantly increased absenteeism among medical students.[8] Similarly, research from India highlighted that low intrinsic motivation and poor study habits were key contributors.[9] Academic factors are also central to absenteeism. Students often report heavy curriculum load, stressful examination schedules, and insufficient flexibility within the academic structure. Many describe burnout and fatigue as barriers to regular attendance. A systematic review conducted in 2021 concluded that academic overload, ineffective teaching strategies, and poor classroom engagement are major determinants of absenteeism in medical education.[10] A study in Lahore reported that students often skip classes when the teaching style is monotonous or when lectures lack clear learning objectives.[11] Institutional factors such as faculty behavior, classroom environment, long teaching hours, inadequate facilities, and rigid assessments also affect attendance. A study from Nepal found that poor teaching quality and lack of motivation from faculty were significant predictors of absenteeism.[12] Meanwhile, research in Malaysia identified long commuting distances and transportation difficulties as contributing factors.[13] Psychological and mental health issues are increasingly recognized for their role in absenteeism. The prevalence of stress, anxiety, and depressive symptoms is significantly higher among medical students compared to their non-medical peers. Studies from Pakistan have shown high levels of psychological distress among medical students, which adversely impacts academic functioning and attendance.[14,15] Mental-health related stigma, lack of institutional support, and limited counseling services further aggravate the issue. Absenteeism is not merely an academic concern; it carries long-term implications for future medical practice. Students who miss foundational basic-science content often demonstrate inadequate clinical reasoning later in training.[16] Furthermore, habitual absenteeism may erode professional responsibility, a core competency expected from healthcare providers. Medical education bodies emphasize that regular class attendance shapes discipline, self-regulation, and ethical conduct - qualities that influence patient care quality in the future.[17] In Peshawar, the phenomenon of absenteeism is influenced by the unique cultural, socioeconomic, and educational context. Public and private medical colleges experience disparities in infrastructure, learning styles, and student expectations. Many students commute long distances, juggle family responsibilities, or face financial instability, which may contribute to irregular attendance. Despite the relevance of the issue, empirical studies specifically examining absenteeism among medical students in Peshawar are scarce. Given these gaps, the present study seeks to assess the prevalence of absenteeism and explore its associated factors among medical students in Peshawar. This research integrates academic, psychosocial, and institutional dimensions to provide comprehensive insights and guide policy interventions to promote better attendance and stronger academic engagement within medical colleges.

METHODOLOGY

This study employed a descriptive cross-sectional design to determine the prevalence of absenteeism and identify the associated factors among medical students enrolled in three medical colleges of Peshawar. The research was conducted over a one-year period, from January to December 2024, allowing adequate time for data collection across different academic phases and examination schedules. The study setting included one public and two private medical institutions, selected to ensure diversity in academic environment, institutional policies, and student demographics, thereby enhancing the representativeness of the findings. The sample size was calculated using the standard formula for prevalence studies: $n = Z^2 \times p(1–p) / d^2$, with Z set at 1.96 for a 95% confidence interval, an assumed prevalence (p) of 0.50 due to lack of recent regional data, and a margin of error (d) of 0.05. This yielded a minimum sample requirement of 384, which was adjusted to 380 after accounting for anticipated non-response. Stratified random sampling was employed to ensure proportional representation from all academic years of MBBS and BDS programs. Within each stratum, students were randomly selected to minimize selection bias and maintain methodological rigor. Participants were eligible for inclusion if they were currently enrolled MBBS students, present during the data collection period, and willing to provide informed consent. Students on extended medical leave, suspension, or those with documented chronic medical conditions that inherently caused unavoidable absenteeism were excluded to prevent confounding. Students were assured of confidentiality and anonymity, and participation was voluntary. Data collection was conducted using a structured self-administered questionnaire developed after reviewing existing literature on absenteeism in medical education. The instrument comprised multiple sections, including

sociodemographic information, academic workload, psychosocial variables, mental health indicators, institutional environment, and the frequency and reasons for absenteeism. Validated items were incorporated where applicable, particularly for assessing academic stress and depressive symptoms, ensuring content validity. The questionnaire also included items evaluating teaching quality, classroom environment, transportation-related difficulties, financial stress, and interpersonal conflicts within the institutional environment. Before the full-scale survey, the tool was pilot-tested on a small group of students (n=20), and minor revisions were made to improve clarity and relevance. The data collection process was organized by visiting classrooms at pre-arranged times in coordination with institutional faculty. After explaining the study purpose, questionnaires were distributed and collected during the same session to reduce missing information and minimize recall bias. Completed forms were coded and entered into SPSS version 26 for analysis.

RESULTS

Table 1: Demographic Characteristics of Participants (n = 380)

Variable	Category	Frequency (n)	%age
Gender	Male	154	40.5
	Female	226	59.5
Age Range (years)	18–20	112	29.5
	21–23	193	50.8
	24–26	75	19.7
Mean Age ± SD	-	21.8 ± 2.1	-
Academic Year	1st Year	72	19.0
	2nd Year	83	21.8
	3rd Year	78	20.5
	4th Year	74	19.5
	Final Year	73	19.2
Residence	Urban	242	63.7
	Rural	138	36.3
Commuting >1 Hour	Yes	109	28.7
	No	271	71.3

Table 2: Prevalence of Absenteeism

Category	Frequency (n)	%age
Absent ≥3 classes per month	221	58.1
Absent <3 classes per month	159	41.9

Table 3: Factors Associated with Absenteeism

Factor	Category	Absenteeism Yes n (%)	Absenteeism No n (%)	χ^2	p - value
Poor Teaching Quality	Yes	148 (67.0)	74 (46.5)	8.92	0.003
	No	73 (33.0)	85 (53.5)		
Academic Stress	Yes	162 (73.3)	89 (56.0)	11.21	0.001
	No	59 (26.7)	70 (44.0)		
Lack of Interest in Lectures	Yes	144 (65.1)	77 (48.4)	9.87	0.002
	No	77 (34.9)	82 (51.6)		
Depressive Symptoms	Yes	118 (53.4)	63 (39.6)	6.03	0.014
	No	103 (46.6)	96 (60.4)		
Long Commute (>1 hour)	Yes	78 (35.3)	31 (19.5)	4.89	0.027
	No	143 (64.7)	128 (80.5)		
Heavy Academic Load	Yes	158 (71.5)	91 (57.2)	7.01	0.009
	No	63 (28.5)	68 (42.8)		
Health Issues	Yes	103 (46.6)	49 (30.8)	9.11	0.003
	No	118 (53.4)	110 (69.2)		
Family Issues	Yes	74 (33.5)	30 (18.9)	8.04	0.005
	No	147 (66.5)	129 (81.1)		
Financial Reasons	Yes	69 (31.2)	27 (17.0)	9.25	0.002
	No	152 (68.8)	132 (83.0)		
Conflict with Administration	Yes	56 (25.3)	21 (13.2)	7.02	0.008
	No	165 (74.7)	138 (86.8)		

Table 4: Classroom and Campus Environment as Contributors to Absenteeism

Environment Factor	Absenteeism Yes	Absenteeism No	χ^2	p-value
Overcrowded Classrooms	139 (62.9)	74 (46.5)	10.34	0.001
Poor Classroom Ventilation & Temperature	128 (57.9)	63 (39.6)	11.12	0.001
Excessive Noise & Disturbance on Campus	114 (51.6)	53 (33.3)	12.21	0.000
Uncomfortable Seating Arrangements	121 (54.8)	55 (34.6)	14.03	<0.001
Lack of Cleanliness & Hygiene	105 (47.5)	49 (30.8)	9.14	0.002

DISCUSSION

The present study examined the prevalence and determinants of absenteeism among medical students in Peshawar and found a high absenteeism rate of 58.1%. This aligns with international research indicating that absenteeism is a pressing concern in medical education, often linked to academic disengagement, declining performance, and reduced clinical competency.[1] Studies from India, Saudi Arabia, and Nepal have reported absenteeism rates ranging between 40% and 60%, suggesting that absenteeism is a widespread issue across culturally diverse medical institutions.[2,3,4] The similarity in prevalence underscores the broader structural and academic pressures inherent in rigorous medical curricula. One of the major findings of this study was the significant association between poor teaching quality and absenteeism. Students who rated teaching quality as poor had a higher likelihood of missing classes (p=0.003). This is consistent with findings from Lahore, where ineffective teaching methodologies and monotonous lectures were consistently cited as strong contributors to absenteeism.[5] Similarly, a study conducted in India emphasized that students are more likely to avoid classes that lack interactive teaching strategies or fail to offer clinically relevant content.[6] Globally, research confirms that active learning, structured lesson plans, and student-centered instruction significantly enhance attendance and engagement.[7] Academic stress emerged as another significant predictor of absenteeism (p=0.001). Medical training is academically demanding, involving extensive coursework, frequent assessments, and the pressure to excel. A study from Saudi Arabia reported that over 70% of medical students experience moderate to severe stress, which is directly linked to absenteeism and poor mental well-being.[8] Similarly, research from Pakistan has documented high stress levels among medical students, with academic overload being a major contributing factor.[9] Our findings align with these studies, suggesting that the academic burden placed upon students is a key driver of absenteeism. Lack of interest in lectures was also strongly associated with absenteeism (p=0.002), aligning with previous literature indicating that students often skip classes they perceive as unproductive or irrelevant.[10] Engagement in medical education is closely tied to instructional approaches, clarity of learning objectives, and faculty enthusiasm. According to a systematic review published in 2021, student disengagement is one of the strongest predictors of chronic absenteeism in health sciences education.[11] When teaching fails to stimulate curiosity or provide practical value, students resort to independent study or rely on alternative learning materials. Psychological determinants also played a crucial role. Depressive symptoms showed a statistically significant association with absenteeism (p=0.014). This is consistent with studies from Europe and the Middle East documenting a strong correlation between psychological distress and poor attendance among medical students.[12] Research from Karachi reported that approximately one-third of medical students exhibited depressive symptoms that impacted their academic participation.[13] These findings highlight the pressing need for mental health support systems within medical institutions, including counseling services and early screening programs. Environmental determinants were also highly relevant in this study. Classroom and campus conditions such as overcrowding (p=0.001), poor ventilation (p=0.001), noise disturbances (p<0.001), uncomfortable seating (p<0.001), and poor cleanliness (p=0.002) were significantly associated with absenteeism. Similar observations were reported in a study from Nepal, where inadequate infrastructure and poorly maintained classrooms discouraged students from attending sessions.[14] Another study from Malaysia found that environmental discomfort significantly reduced student engagement and attendance.[15] The findings from the present study reaffirm that conducive learning environments directly influence student satisfaction and attendance patterns. Socioeconomic and personal factors also emerged as important determinants. Financial difficulties were significantly associated with absenteeism (p=0.002). Research from India also found that students experiencing financial strain were more likely to miss classes due to part-time work commitments, stress, or logistical barriers.[16] In Pakistan, financial instability has been linked to increased stress and poor academic outcomes among students in professional programs.[17] Family issues (p=0.005) and health issues (p=0.003) were other significant contributors. A study conducted in Bangladesh found that family conflicts, caregiving responsibilities, and health problems reduced class attendance among university students.[18] Similar results were documented in an Iranian study highlighting chronic illness as a strong predictor of absenteeism among medical trainees.[19] Our findings align with this body of literature, suggesting that absenteeism is not solely an academic issue but also shaped by personal life circumstances. Conflict with administration was another significant factor (p=0.008). Research from African medical schools indicates that administrative issues, perceived injustice, and communication gaps contribute to student dissatisfaction and disengagement.[20] This parallels findings from Pakistan, where perceived lack of administrative support has been shown to reduce class attendance and student motivation.[21] Commuting time also showed a strong association with absenteeism (p=0.027). International studies from Malaysia, India, and Egypt confirm that

long commutes reduce student satisfaction and attendance due to fatigue and time constraints.[22] Overall, the study's findings demonstrate that absenteeism among medical students in Peshawar is shaped by a combination of academic, psychological, personal, socioeconomic, and environmental factors. Importantly, many of these determinants are modifiable. Improving instructional quality, enhancing classroom environments, strengthening mental health services, offering administrative transparency, and addressing student financial concerns could significantly reduce absenteeism. The study provides valuable insights for medical educators, policymakers, and administrators. Addressing absenteeism requires a multifaceted approach that integrates curriculum restructuring, supportive learning environments, faculty development programs, and improved campus resources. Interventions such as early identification of at-risk students, mentorship programs, flexible teaching methods, and active-learning strategies can promote better engagement. Furthermore, institutions should ensure that learning environments meet ergonomic and infrastructural standards to support student comfort and participation.

LIMITATIONS

The sample was limited to three institutions in Peshawar, which may affect generalizability. Psychological variables were assessed using screening items rather than full diagnostic tools. Environmental assessments were based on student perception rather than objective measurements.

CONCLUSIONS

Absenteeism among medical students in Peshawar is highly prevalent and is influenced by a broad interplay of academic, psychological, environmental, and personal factors. The study highlights poor teaching quality, academic stress, depressive symptoms, long commuting hours, financial difficulties, and poor classroom environment as major contributors. Addressing these issues requires institutional commitment to strengthening teaching practices, improving learning environments, providing mental health support, and enhancing administrative responsiveness. Implementing structured interventions may significantly improve attendance, academic performance, and overall student well-being.

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