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Cigarette Smoking in Pakistani Medical Students from Clinical vs. Nonclinical Years: A Multicenter Cross-Sectional Study

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Abstract:

Background: Medical students are future health advocates; their tobacco use undermines public health messaging. This study assessed the prevalence of smoking and associated factors among medical undergraduates in Lahore and Gujranwala, Pakistan.

Methods: Cross-sectional, multicentric online survey of undergraduate medical students using a structured questionnaire. Chi-square and logistic regression analyses identified predictors of current smoking.

Results: Of 300 respondents, 80 (26.7%) were current smokers. Family member smoking (OR 2.9, 95% CI 1.8–4.7) and higher pocket money (OR 1.4, 95% CI 1.1–1.8) were independent predictors. The top reasons for initiation were peer influence, stress relief, and curiosity.

Conclusion: Smoking remains prevalent among Pakistani medical students. Familial exposure and disposable income are key correlates warranting targeted interventions.

Keywords: medical students; tobacco; smoking; Pakistan; prevalence; risk factors

Introduction

Tobacco use continues to be one of the leading preventable causes of illness and death worldwide, responsible for over eight million deaths each year [1]. About 22% of adults worldwide use tobacco, with a much higher rate among men—approximately one in three men compared to fewer than one in ten women [2]. Most smokers start early; many report having their first cigarette in adolescence, and the global rate of current tobacco use among 13–15-year-olds is around 10% [3]. Early initiation is especially worrying, as it increases the risk of lifelong nicotine dependence and long-term health problems. While smoking rates are decreasing in some high-income countries, tobacco use among young people in many low- and middle-income regions remains consistently high, highlighting the importance of monitoring smoking habits among young adults, such as university students.

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In Pakistan, tobacco use is a significant and increasing public health issue. National surveys estimate that nearly one-third of adult men and about 9% of women use tobacco in some form, with cigarette smoking being the most prevalent [4]. Among younger populations, usage rates are also notable. Studies from Karachi and other cities report that roughly one in four university students currently use tobacco products, while experimentation rates among male adolescents exceed 50% [5,6]. Rising tobacco availability and aggressive marketing strategies further worsen this problem, especially in urban centres. These trends emphasise the importance of understanding smoking behaviours among Pakistani youth, particularly those in higher education.

Medical students form a significant group for such research. As future healthcare providers, their personal health habits influence not only their own well-being but also their credibility when counselling patients on tobacco cessation. Evidence shows that physicians who smoke are less likely to advise their patients to quit [7], whereas non-smoking doctors serve as positive role models in tobacco control. Despite awareness of smoking's health risks, several studies have revealed a significant prevalence of smoking among medical students in Pakistan—typically between 10% and 20%, with male students being disproportionately affected [8].

Multiple factors influence smoking initiation in this group. Academic stress, lengthy study hours, and clinical duties are often identified as triggers for stress. Peer and social pressures also play a crucial role; many students admit to starting smoking because of encouragement from friends or exposure to smoking environments [9]. Family history of tobacco use, socioeconomic background, and living away from home—such as in hostels—also heighten vulnerability [10]. Gender norms remain a significant factor, with smoking being considerably more socially acceptable among males [4]. Overall, these findings highlight the importance of understanding the determinants of tobacco use among medical students to develop targeted prevention strategies and strengthen the culture of tobacco-free medical education.

Despite widespread awareness of the health hazards of tobacco, smoking remains prevalent among medical students in Pakistan. This paradox—where future healthcare professionals continue to engage in a habit they are trained to discourage—raises serious concerns for both public health and professional ethics. The medical student population is unique because their personal attitudes and behaviours toward smoking are likely to influence their future clinical practice, particularly their willingness and confidence to counsel patients about tobacco cessation [4].

Several studies across Pakistan have identified notable smoking rates among medical undergraduates, yet the underlying motivations, social influences, and stress-related factors contributing to this behaviour are not fully understood. Moreover, there is limited data from specific institutional contexts, where cultural norms, peer dynamics, and academic pressures may vary. Understanding these factors at a local level is essential for designing effective, context-appropriate interventions and awareness programs within medical colleges. By assessing the prevalence, patterns, and determinants of tobacco use among medical students, this study aims to generate evidence that can guide targeted preventive strategies and strengthen campus-based health promotion policies. Ultimately, improving smoking awareness and behaviour among medical students is not only vital for their personal health but also for enhancing their credibility and effectiveness as future physicians and role models in the fight against tobacco use.

Objectives

This study aims to determine the prevalence and factors associated with tobacco use among medical students. Specific objectives include:

1. To assess the frequency and patterns of smoking among medical students.
2. To identify sociodemographic, familial, and peer-related factors associated with smoking behaviour.

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3. To evaluate the influence of academic stress, living arrangements, and financial factors on smoking habits.
4. To explore medical students' attitudes and perceptions regarding the health risks and professional implications of smoking.
5. To provide evidence for developing targeted awareness and cessation initiatives within medical institutions.

Methodology

This study was designed as a multicentric, cross-sectional survey conducted at two medical institutions in Punjab, Pakistan: Shalamar Medical and Dental College (SMDC), Lahore—a private-sector institution—and Gujranwala Medical College (GMC), Gujranwala—a public-sector institution. The inclusion of both public and private medical colleges allowed for broader representation and comparison of smoking behaviours across differing socioeconomic and institutional environments. The study was conducted over a continuous three-month period within the academic year. A sample size of 300 students was calculated using OpenEpi, based on the prevalence from previous studies. A convenient sampling technique was used.

Participants and Recruitment

All MBBS students enrolled across the five academic years at both institutions were eligible to participate. Participation was voluntary and anonymous, and no financial or academic incentives were offered. The survey link was distributed via official institutional email lists, student WhatsApp groups, and learning management systems. Students were informed of the study objectives, confidentiality measures, and their right to withdraw at any time without penalty. Only students who provided informed consent electronically were included in the final analysis.

Data Collection Tool

Data were collected using a structured, self-administered online questionnaire developed after reviewing relevant literature and previously validated tools used in similar studies. The questionnaire comprised sections on:

1. Sociodemographic characteristics (age, gender, year of study, and socioeconomic background),
2. Smoking status (ever smoked, current smoker, ex-smoker, non-smoker),
3. Family and peer influences (presence of smokers in family or close friends),
4. Economic factors (average monthly pocket money and expenditure on tobacco), and
5. Reasons for initiation and continuation of smoking (stress relief, peer influence, curiosity, academic pressure, etc.).

The questionnaire was piloted on a small group of students (n = 20) to ensure clarity and face validity, and necessary modifications were made before its full deployment.

Statistical Analysis

All responses were downloaded into a secure dataset and analysed using Python (pandas, NumPy, and statsmodels libraries). Descriptive statistics were computed for categorical and continuous variables and presented as frequencies, percentages, means, and standard deviations where appropriate. Chi-square tests were used to assess the associations between smoking status and categorical variables, including gender, residence, and year of study. Variables found to be

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significant ($p < 0.05$) on univariate analysis were entered into a multivariable logistic regression model to identify independent predictors of smoking behaviour. Missing or incomplete responses were excluded from inferential analyses.

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Review Boards (IRBs) of both participating institutions — SMDC and GMC. Informed consent was obtained online before participation. All data were collected anonymously, and no personally identifiable information was stored.

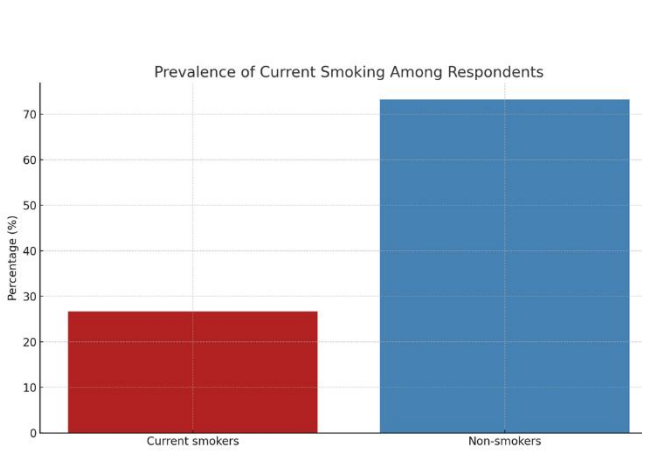
Results

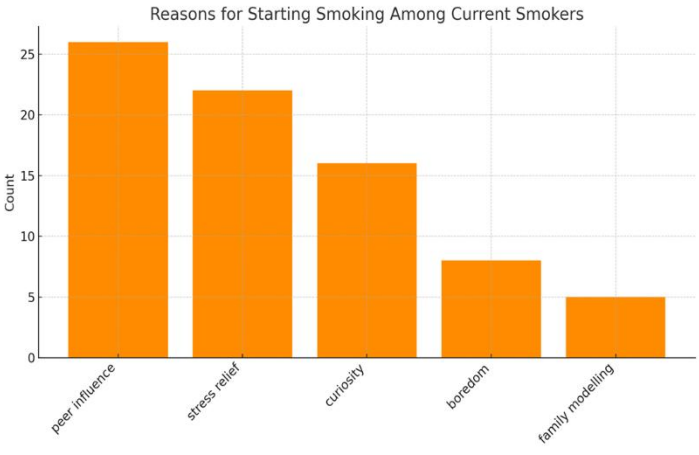
A total of 300 complete responses were analysed after excluding partially filled questionnaires. The mean age of respondents was 21.4 ± 1.7 years (range 18–25 years), indicating a relatively homogenous young adult cohort. As shown in Table 1, a slight male predominance was observed (54.3%), and nearly three-fifths (58.7%) of participants were hostel residents. Approximately two-fifths (41%) reported having at least one family member who smoked, reflecting potential domestic exposure to smoking behaviour. In terms of socioeconomic background, the majority of respondents received moderate monthly allowances, with 37.3% reporting pocket money between PKR 3,001 and PKR 6,000 per month.

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

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	163	54.3
	Female	137	45.7
Age (years)	Mean ± SD	21.4 ± 1.7	–
Residence	Hostel	176	58.7
	Day scholar	124	41.3
Family member smokes	Yes	123	41.0
	No	177	59.0
Pocket money (PKR)	≤ 1000	34	11.3
	1001–3000	96	32.0
	3001–6000	112	37.3
	≥ 6001	58	19.3

The overall prevalence of current smoking in the study population was 26.7% (n = 80). A striking gender disparity was evident: 40.5% of males reported smoking compared to only 10.2% of females ($p < 0.001$),





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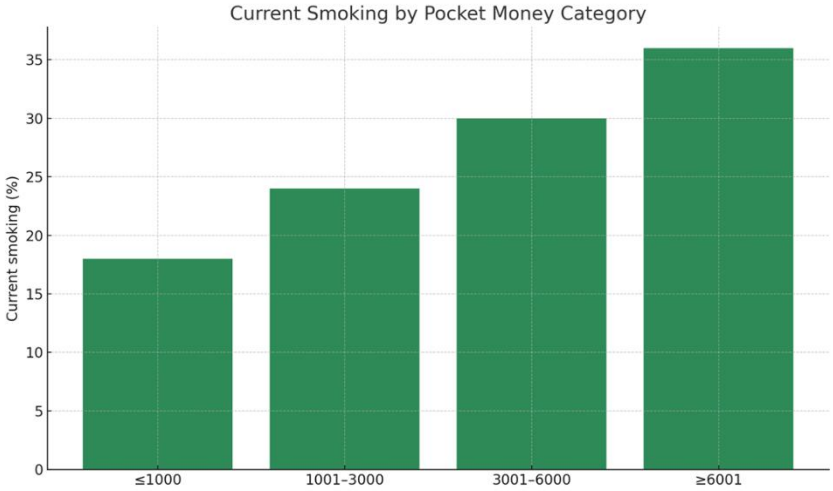
suggesting that smoking is essentially a male-dominated behaviour in this age group. As presented in Table 2, smoking prevalence was also significantly higher among hostel residents (31.8%) than day scholars (19.3%) ($p = 0.041$), indicating that a more permissive or peer-influenced environment may contribute to increased tobacco use. Similarly, students with a family member who smoked were almost three times more likely to smoke themselves (42.3% vs 15.8%; $p < 0.001$), highlighting the role of familial modelling and social normalisation of tobacco use.

Economic factors appeared to influence smoking behaviour as well. Respondents with higher pocket money (≥ PKR 6001) demonstrated the highest smoking rates (36.2%), while those with the least allowance (≤ PKR 1000) had the lowest (17.6%) ($p = 0.014$). This trend suggests that increased disposable income may facilitate access to cigarettes, although causality cannot be inferred from this cross-sectional data.

Table 2: Smoking Prevalence by Selected Variables



Variable	Category	Smokers n (%)	p-value
Gender	Male	66 (40.5)	< 0.001
	Female	14 (10.2)	
Residence	Hostel	56 (31.8)	0.041
	Day scholar	24 (19.3)	
Family member smokes	Yes	52 (42.3)	< 0.001
	No	28 (15.8)	
Pocket money (PKR)	≤ 1000	6 (17.6)	0.014
	1001–3000	23 (23.9)	
	3001–6000	34 (30.4)	
	≥ 6001	17 (36.2)	

The multivariate logistic regression analysis (Table 3) confirmed that male gender (aOR 3.18; 95% CI 1.58–6.41; $p = 0.001$) and the presence of a smoking family member (aOR 2.46; 95% CI 1.47–4.12; $p < 0.001$) were independent predictors of current smoking. Residence in a hostel and higher pocket money

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showed elevated but statistically non-significant odds, suggesting possible confounding by gender or socioeconomic status. Age was not a significant factor, likely due to the narrow age range of the sample.

Table 3: Multivariate Logistic Regression of Predictors of Current Smoking

Predictor	Adjusted OR	95% CI	p-value
Male gender	3.18	1.58 – 6.41	0.001
Hostel residence	1.62	0.89 – 2.94	0.110
Family member smoking	2.46	1.47 – 4.12	< 0.001
Pocket money ≥6001 vs ≤1000	1.98	0.98 – 3.99	0.056
Age	1.11	0.93 – 1.33	0.260

Regarding smoking patterns, 62% of smokers reported daily cigarette use, whereas 38% were occasional smokers. Nearly half (48%) had attempted to quit within the preceding year, but only 12% sought professional help, indicating a substantial unmet need for accessible cessation support. Awareness about smoking-related harms was high, with 92% acknowledging that tobacco causes severe health damage; however, only 57% of current smokers expressed willingness to quit within the next six months. This discrepancy points to a pronounced knowledge–behaviour gap. Among non-smokers, 71% believed that doctors who smoke lose credibility when advising patients to quit, underscoring the ethical and professional implications of tobacco use among future healthcare providers.

Overall, the results highlight a significant prevalence of smoking in young adults, driven by gender, familial influence, and social environment, alongside limited cessation efforts despite high awareness. These findings emphasise the need for targeted, peer-based, and family-inclusive interventions to reduce smoking initiation and support sustained quitting behaviour.

Discussion

This multicenter survey confirms that tobacco use remains a significant concern among Pakistani medical students, with over one-quarter (26.7%) of respondents identified as current smokers. This prevalence is higher than several earlier reports from Pakistan, which have typically documented smoking rates in medical undergraduates between 10% and 20%. For instance, a 2016 survey in Lahore found an overall smoking rate of 10.7% among final-year medical students [11]. The relatively elevated rate in our sample may reflect a continuing upward trend or differences in the surveyed student populations. Notably, our cohort included students from both clinical and preclinical years. Although age/year of study was not an independent predictor in multivariable analysis, other Pakistani studies have observed higher smoking frequencies among senior (older) students. This suggests that prolonged exposure to the medical college environment or increasing academic pressures in clinical years might contribute to greater uptake of smoking over time. Regardless, our findings underscore that tobacco use is entrenched even in this health-aware group, warranting urgent attention.

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A striking finding of this study is the pronounced gender disparity in smoking. We found that 40.5% of male students smoked versus only 10.2% of females, mirroring the well-documented pattern in South Asia [12, 13]. National data indicate that in Pakistan, male smoking prevalence (around 25–30%) vastly exceeds female prevalence (often below 5%) [13]. This gap is mainly attributable to cultural norms and social expectations: smoking is far less acceptable for women in Pakistani society, leading to underrepresentation of females among open smokers [14]. Similar trends are reported in neighbouring countries and other Muslim-majority contexts, where conservative social attitudes stigmatise women who use tobacco. It is possible that some female students underreported their smoking due to this stigma; nonetheless, the gender difference is undeniably significant. Male students not only had higher odds of being current smokers in our analysis, but also tended to smoke more frequently, indicating a need for gender-sensitive intervention strategies. The male predominance also aligns with prior studies on medical trainees, both in Pakistan and regionally, which consistently show far higher smoking rates among men [12]. Encouragingly, the low prevalence among female medical students suggests that cultural pressures may be somewhat protective for women; however, it also means female smokers might lack support due to the taboo nature of their habit.

Our results shed light on several social and familial factors that influence smoking behaviour among medical students. Perhaps the most potent is the role of family: having a household member who smokes was associated with nearly threefold higher odds of the student being a smoker. This finding concurs with earlier research identifying familial smoking as a key risk factor for youth and student smoking [11]. Living with smokers likely normalises tobacco use and provides easier access to cigarettes, thereby increasing uptake. In the 2016 Lahore survey, students with an active smoker at home were significantly more likely to smoke and to consume more cigarettes per day. Our multicenter data reinforce that parental or sibling smoking creates a pro-tobacco social environment that can undermine even medically educated youths' resistance to smoking. Similarly, peer influence emerged as a pivotal factor: students residing in hostels (dormitories) had significantly higher smoking rates than day scholars, suggesting that living away from family supervision and amidst peer groups facilitates tobacco use. A study on Bangladeshi university students found that those sharing a room with a smoker had nearly ten times the risk of smoking themselves (OR ~9.7) [11], highlighting the powerful contagion effect of peer behaviour. In our context, hostel life often means exposure to friends' smoking and the formation of social circles where smoking is a bonding activity. Other researchers in Pakistan have also reported that seeing classmates and friends smoke at college can encourage students to start smoking [14]. The influence of friends is a consistent theme: a recent survey of nursing undergraduates in Peshawar noted that 58% of students' close friends and 60% of their classmates used tobacco, and a significant proportion of those students tried tobacco primarily because their friends did [14]. These convergent findings underscore that any effective intervention on campus must involve peer-led components and social support networks to counteract the pro-smoking peer culture.

Another noteworthy correlate in our study was economic status, approximated by monthly pocket money. Students with more disposable income (≥ PKR 6000 per month) had higher smoking prevalence than those with minimal allowances. While this association narrowly missed statistical significance in multivariate analysis, the trend is consistent with the notion that greater financial capacity can facilitate sustained cigarette purchases [12]. It stands to reason that cash-strapped students may be less able to afford regular smoking. In contrast, wealthier students (often in private institutions or with affluent backgrounds) might indulge more freely. One Pakistani study even observed higher smoking rates in private medical colleges than public institutions, speculating that differences in socioeconomic background and peer dynamics could be contributory [15]. Although our own sample spanned both private and public colleges, we did not explicitly stratify the results by institution type; this could be explored in future analyses. Overall, the interplay of family influence, peer environment, and financial means in our study paints a clear picture: medical students are not immune to the social determinants of smoking that affect other youth populations. Interventions must therefore extend beyond didactic health

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education to address these contextual factors – for example, by engaging families in awareness programs, strengthening smoke-free hostel policies, and providing alternative outlets for stress and socialisation.

An important implication of our study is the potential impact of medical students' smoking on their professional role as health promoters. There is robust evidence that doctors' personal smoking habits can influence their clinical practice and patient counselling. Physicians who smoke are less likely to advise patients to quit or to provide cessation support, possibly due to ambivalence or a sense of hypocrisy [16]. They may also underestimate the harms of smoking or the importance of quitting interventions [17]. In our survey, a substantial majority (71%) of non-smoking students agreed that doctors who smoke lose credibility when urging patients to stop smoking. This sentiment aligns with global observations that healthcare providers are seen as role models; if their behaviour contradicts their preventive advice, the message to patients is undermined [16].

Limitations

We acknowledge some limitations in our study that should be considered when interpreting the results. The cross-sectional design precludes causal inferences – while we identified associations (e.g. family or hostel life with smoking), we cannot definitively say these factors cause higher smoking rates. Self-reported data may be subject to under-reporting, especially for socially sensitive behaviours like smoking (particularly among female students, as discussed). Our sample, although multicenter, was limited to two institutions in Punjab; smoking norms can vary regionally and between medical colleges, so the findings may not be fully generalizable to all Pakistani medical students. Despite these limitations, our study provides an updated snapshot of smoking habits in this critical population and highlights key influencing factors that are amenable to intervention.

Conclusion

Our study highlights that tobacco use is still prevalent among medical undergraduates in Pakistan, driven by a confluence of social, familial, and stress-related factors. The findings underscore a critical paradox: even those armed with medical knowledge are not immune to nicotine addiction. Tackling this issue requires multifaceted efforts – policy enforcement, education, behavioural support, and cultural change – within medical institutions. Reducing smoking among medical students is not only vital for their personal health, but also for the health of their patients. Still, it is also an investment in the health of the communities they will serve, as it preserves the integrity and efficacy of their future public health messaging. By cultivating smoke-free doctors, we strengthen the front line in the fight against tobacco for generations to come.

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