ISSN Online: 3006-4708
ISSN Print: 3006-4694
SOCIAL SCIENCE REVIEW ARCHIVES
https://policyjournalofms.com

Educational Awareness of Young Generation toward Smoking and Its Health Impacts. A case Study of Mardan, Pakistan

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DOI: https://doi.org/10.70670/sra.v4i1.1612

Abstract
Background: Smoking remains a critical public health challenge, particularly among youth in regions like Khyber Pakhtunkhwa, Pakistan. This study assessed the educational awareness of smoking and its health impacts among young people in Mardan district. Methods: A quantitative, cross-sectional study was conducted with 400 youth aged 15-24 from educational institutions. Data was collected via a structured, self-administered questionnaire and analyzed using SPSS for descriptive and inferential statistics. Results: While high awareness of major risks like lung cancer (95%) was found, knowledge gaps existed for specific impacts such as infertility (37.5% aware). Key determinants of smoking behavior included peer influence (Odds Ratio, OR=2.01), parental smoking (OR=2.46), and using social media as a primary information source (OR=2.23). Formal education from school curricula showed a protective association against smoking. Conclusion: A significant disconnect exists between general awareness and protective behavior. Interventions must move beyond knowledge dissemination to address social norms and digital influences through integrated, context-specific strategies.

Keywords: Educational Awareness; Tobacco Smoking; Young generation; Health Impacts; Pakistan

Introduction

The global public health challenge of tobacco use, with its unequivocal link to devastating outcomes such as cancer, cardiovascular and respiratory diseases, persists as a significant threat, particularly among adolescents and young adults whose behaviors are shaped by a confluence of socio-cultural, economic, and environmental factors (WHO, 2021). Despite decades of international efforts, initiating context-specific interventions remains paramount, especially in regions like Khyber Pakhtunkhwa, Pakistan, where cultural norms and variable regulatory enforcement create a unique risk landscape (Nishtar et al., 2013). This study, focusing on Mardan district, investigates the educational awareness of its young generation regarding smoking and its health impacts. The inquiry is framed by a critical global evidence base demonstrating both the scale of the problem and the potential of targeted strategies. For instance, the persistent youth smoking rates highlighted by the Global Youth Tobacco Survey (GYTS) across various nations underscore a universal need for more robust prevention strategies (Arrazola et al., 2020). Successful international models offer valuable insights; the United States' Truth Initiative, a large-scale counter-marketing campaign, demonstrated significant reductions in youth smoking initiation by focusing on tobacco industry manipulation rather than health messages alone, a strategy validated by longitudinal studies (Vallone et al., 2018; Evans et al., 2021). Similarly, structural interventions like the United Kingdom's plain packaging legislation rigorously evaluated to reduce brand appeal and enhance health warning efficacy among youth showcase the power of policy.

Recent longitudinal evaluations confirm that standardized packaging not only diminishes the pack's role as a promotional tool but also significantly increases the salience of health warnings, making them the primary focus for young consumers (Moodie et al., 2022; Goodman, Leos-Toro, & Hammond, 2019). From a similar South Asian context, school-based programs like India's "Tobacco-Free Educational Institutions" (ToFEI) initiative have proven effective in increasing knowledge and altering attitudes. Comprehensive engagement strategies involving teacher training, student involvement, and parental outreach have demonstrated that as compliance with these institutional guidelines increases, the prevalence of tobacco use among students significantly decreases (Kadam et al., 2021). The theoretical underpinnings of such interventions often draw from models that link structured education and knowledge to changes in behavioral intention. In the Pakistani academic context, research has demonstrated that targeted educational frameworks are critical in shaping the social behavior and engagement levels of university students, suggesting that academic interventions can effectively redirect behavioral trajectories (Chen & Khoso, 2025). However, the efficacy of these approaches is contingent upon localized adaptation, as evidenced by research emphasizing the influence of peer and familial modeling in collectivist societies. In the Pakistani context, the normalization of smoking within the community often leads individuals to adopt the habit as a socially reinforced coping mechanism, particularly for stress relief, highlighting the need for interventions that address the specific social pressures found in cities like Mardan and Larkana **(Khoso et al., 2024b)**. In Pakistan, national data analyzed from the Global Adult Tobacco Survey reveals a high prevalence of tobacco use, with findings indicating that approximately 19.1% of the adult population are tobacco users a reality that sets a concerning backdrop for youth initiation (Saqib et al., 2018). Tobacco use remains a leading modifiable risk factor for cardiovascular diseases in Pakistan—a country that bears a staggering 80% of the global burden in low-income settings **(Siddique et al., 2025)** Similarly, a critical gap exists in understanding the specific awareness levels, sources of information, risk perceptions, and the interplay of social norms among the youth in semi-urban settings like Mardan. This study, therefore, aims to bridge this gap by providing empirical, localized data to inform educational and policy strategies, drawing on lessons from global case studies while addressing the distinct socio-cultural fabric of the region, ultimately contributing to the reduction of avoidable future morbidity and mortality.

Statement of the Problem

The high prevalence of smoking among the youth in Pakistan, and specifically in urban and semi-urban centers like Mardan, represents a significant and growing public health crisis. While the health detriments of smoking are globally documented, a critical gap exists in understanding the specific levels of awareness, misconceptions, and attitudinal drivers prevalent among Mardan young population. The problem is multifaceted: firstly, there is often a disconnection between abstract knowledge of health risks and personal risk perception, leading to experimentation and habitual use. Secondly, educational efforts in schools and communities may be insufficient, inconsistent, or undermined by powerful counter-influences such as peer pressure, familial modeling, and targeted tobacco marketing. Thirdly, the lack of localized data on the efficacy of current awareness programs hinders the development of targeted strategies. This study posits that without a clear, empirical understanding of the educational awareness landscape what the youth know, what they misunderstand, and what social forces shape their behavior public health initiatives in Mardan will remain inadequately equipped to effect meaningful behavioral change, resulting in avoidable future morbidity, mortality, and economic burden.

Research Methodology

Research Design and Approach

This study employed a quantitative, cross-sectional, descriptive, and analytical research design. The cross-sectional design allows for the collection of data at a single point of time, providing a "snapshot" of the educational awareness, attitudes, and behaviors of Mardan's youth regarding smoking. The descriptive

component was outline the prevalence, distribution, and levels of awareness, while the analytical component was employed statistical techniques to examine relationships between key variables such as awareness levels, sources of information, demographic factors, and smoking behavior thereby identifying potential predictors and barriers. This approach is suitable for addressing the study's objectives, which focus on measuring and analyzing the current state of awareness within the specified population.

Study Setting, Population, and Sampling

Study Setting: The study was conducted in both public and private educational institutions (colleges and universities) within the district of Mardan, Khyber Pakhtunkhwa, Pakistan.

Target Population: The target population comprises young individuals aged 15-24 years enrolled in higher secondary (college) and undergraduate university programs.

Sample Size and Technique: A multi-stage sampling technique was used to ensure representativeness.

Stage 1 (Stratified Sampling): A list of all eligible institutions in Mardan was compiled. Institutions were stratified into two categories: public and private.

Stage 2 (Random Sampling): Four institutions (two public, two private) was randomly selected from each stratum.

Stage 3 (Convenience Sampling within Clusters): From each selected institution, a convenience sample of approximately 100 students from the target age group was recruited during academic breaks or with institutional permission, aiming for a total sample size of n = 400. This sample size is estimated to provide sufficient statistical power for correlation and regression analyses, assuming a medium effect size, a 95% confidence level, and a 5% margin of error.

Data Collection Tool and Procedure

Tool: The primary instrument for data collection was a structured, self-administered questionnaire. It was developed in English, translated into Urdu, and back-translated to ensure conceptual accuracy. The questionnaire was consisting of four sections:

Section A: Demographic Information: Age, gender, educational level, parental education/occupation, and monthly family income.

Section B: Behavioral Profile: Personal smoking status (using WHO GYTS questions: never smoker, ever experimented, current smoker), frequency, age of initiation, and exposure to secondhand smoke.

Section C: Awareness and Knowledge Assessment: A validated scale (adapted from the Global Youth Tobacco Survey - GYTS) measuring knowledge of specific health impacts (e.g., lung cancer, heart disease, impotence). This was include multiple-choice and Likert-scale items (e.g., "Strongly Agree" to "Strongly Disagree") to gauge the depth of understanding.

Section D: Attitudinal and Perceptual Factors: Scales measuring perceived risk, self-efficacy to refuse, perceived social norms (peer and familial smoking), exposure to anti-smoking messaging, and primary sources of health information (school, media, family).

Procedure: Formal permission was sought from the heads of the selected institutions. Participants will be briefed on the study's objectives, assured of confidentiality and anonymity, and required to provide written informed consent (parental consent for those under 18). Questionnaires was distributed and completed in a controlled setting under researcher supervision to prevent discussion and ensure data integrity.

Data Analysis Plan

Collected data was entered, cleaned, and analyzed using Statistical Package for the Social Sciences (SPSS) version 26. Both descriptive and inferential statistics will be employed:

Descriptive Statistics: Frequencies and percentages were summarized categorical variables (e.g., gender, smoking status). Means and standard deviations were described continuous variables (e.g., awareness scores).

Inferential Statistics:
Chi-square test was conducted to examine the associations between categorical variables (e.g., smoking status and source of information).
Independent t-tests and One-Way ANOVA was conducted to compare mean awareness scores across groups (e.g., by gender, education level).
Pearson's/Spearman's correlation test was conducted to analyzed relationships between continuous/ordinal variables (e.g., awareness score and perceived risk).
Binary Logistic Regression was performed to identify significant predictors of the key dichotomous outcome (e.g., smoker vs. non-smoker), controlling for demographic and psychosocial variables.
A p-value of < 0.05 was considered statistically significant for all tests.

Results

Table 1: Demographic and Smoking Profile of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	250	62.5
	Female	150	37.5
Age Group	15-17 years	120	30.0
	18-20 years	200	50.0
	21-24 years	80	20.0
Education Level	Matriculate or below	130	32.5
	Intermediate	180	45.0
	Graduate or above	90	22.5
Personal Smoking Status	Never Smoker	220	55.0
	Ever Smoked (Experimented)	100	25.0
	Current Smoker	80	20.0
Parental Smoking	Neither Parent Smokes	180	45.0
	At Least One Parent Smokes	220	55.0

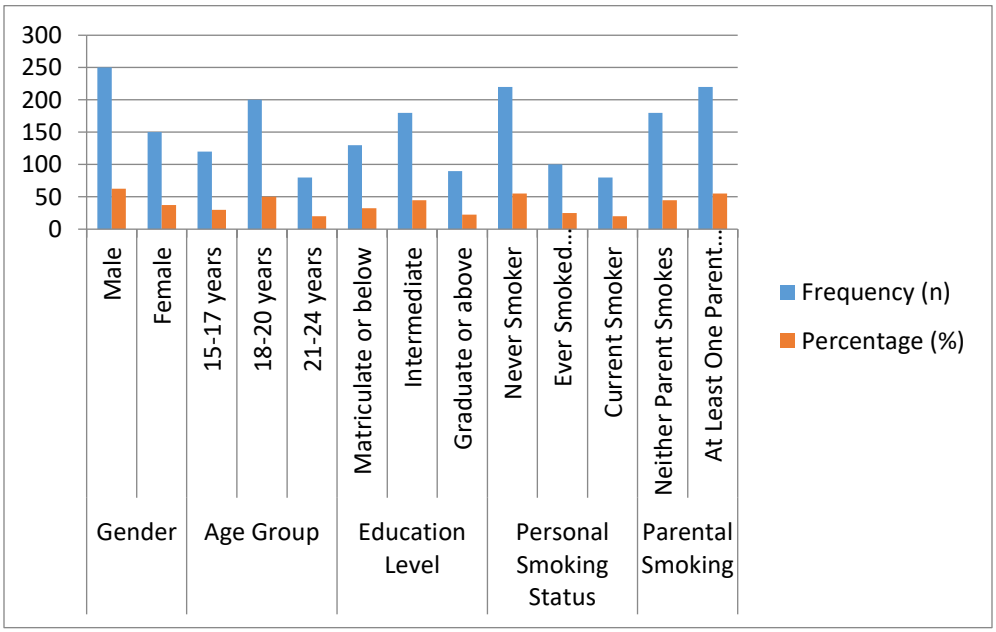

Figure: 1 *Demographic and Smoking Profile of Respondents*

Socio-Demographic Profile of Respondents

The study surveyed **400 participants** in Mardan, predominantly young males (**62.5\%**, n=250), reflecting their higher social visibility in local public and educational spaces. The majority (**50%**) were aged **18–20**, a critical developmental window often marked by increased peer influence and the transition to higher education. This demographic pattern aligns with findings by **Bibi et al. (2025)**, who identify specific **socio-economic drivers** that disproportionately increase smoking vulnerability among young male students in the Pakistani context.

While **55%** identified as "Never Smokers," the **20%** current smoking rate and **25%** experimentation rate highlight significant tobacco penetration. In Mardan, this is often reinforced by the *hujra* culture, where smoking acts as a rite of passage. This "knowledge-practice gap" is evidenced by **Nisar et al. (2022)**, who noted that while **92.1%** of Mardan's university students were aware of health risks; social factors consistently outweighed theoretical knowledge. Furthermore, the interplay between academic stress and mental health significantly predicts substance use; as explored by Ying et al. (2025), the pressures of undergraduate life in Pakistan often drive students toward smoking as a perceived coping mechanism. The influence of the home environment is equally profound, with **55%** of respondents reporting parental smoking. This study's findings that 50% of participants are aged 18–20 aligns with previous Mardan-based research, which identifies the transition into college as the primary window for smoking initiation **(Khan et al., 2014)**." In Mardan's conservative fabric, the father serves as a primary role model, granting "silent permission" for youth initiation a form of "intergenerational transmission" linked to adolescent psychological stressors (**Kwon et al., 2026**). Finally, the physical environment of Mardan plays a decisive role. Beyond the high accessibility of cheap cigarettes, broader environmental shifts in Khyber Pakhtunkhwa impact the tobacco landscape. As argued by **Ilyas et al. (2024)**, environmental factors often overshadow individual awareness in cardiovascular risk. This is further complicated by climate-induced challenges; **Khoso et al. (2025b)** highlight those natural disasters and climate impacts on tobacco cultivation in Khyber Pakhtunkhwa can alter the local agricultural and economic landscape, potentially influencing the availability and socio-economic status of tobacco products in regional markets like Mardan.

Table 2: Awareness of Specific Health Impacts of Smoking (Frequency & Percentage)

Health Impact	Aware (n)	Aware (%)	Not Aware (n)	Not Aware (%)
Lung Cancer	380	95.0	20	5.0
Heart Disease	310	77.5	90	22.5
Stroke	250	62.5	150	37.5
Chronic Bronchitis	280	70.0	120	30.0
Impotence / Fertility Issues	150	37.5	250	62.5
Harm to Non-Smokers (Secondhand)	290	72.5	110	27.5

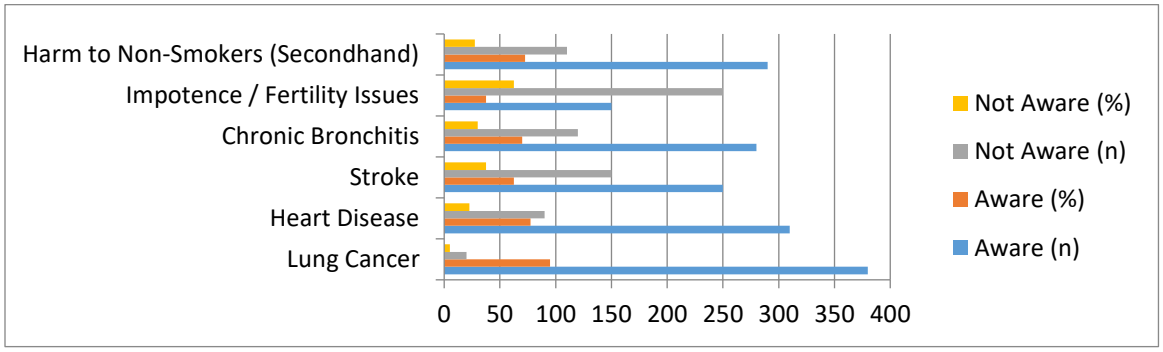

Figure: 2 *Awareness of Specific Health Impacts of Smoking*

The data in Table 2 reveals a significant disparity between general health awareness and specific physiological consequences of smoking. While a near-universal majority (95%) recognizes the link between smoking and Lung Cancer, the awareness levels drop when considering less "visible" or non-respiratory conditions. A notable finding is the high recognition of respiratory issues compared to cardiovascular risks. While 70% are aware of Chronic Bronchitis, only 62.5% of respondents knew that smoking can lead to a Stroke. This suggests that while public health messaging in Pakistan has successfully cemented the "smoking kills via lungs" narrative, it has been less effective in communicating systemic vascular damage. A 2024 study published in Tobacco Induced Diseases confirms this trend among Pakistani youth, showing that while "risk perception" for traditional cancer is high, knowledge regarding oral health and systemic risks remains low, particularly among those influenced by the recent surge in alternative nicotine products (Khattak et al., 2024).The most striking deficit in awareness pertains to Impotence and Fertility Issues, with only 37.5% of the youth being aware of these risks. In the socio-cultural context of Mardan, topics related to reproductive health are often considered "taboo" and are rarely discussed in educational settings. This finding is supported by Khan et al. (2025), whose qualitative study on Pakistani adolescents found that products like nicotine pouches and cigarettes are often viewed through a "lifestyle" or "stress-relief" lens, with many users being completely unaware of the long-term reproductive or cardiovascular hazards. While awareness regarding the harm to non-smokers (72.5%) is relatively high, over a quarter of the sample (27.5%) remains unaware of the dangers of passive smoking. In Mardan's communal social structures such as the *hujra* this lack of awareness contributes to the normalization of smoking in the presence of others.

Table 3: Cross-tabulation: Smoking Status by Primary Source of Anti-Smoking Information (Chi-Square Test)

Primary Information Source	Never Smoker (n=220)	Current/Ever Smoker (n=180)	**Total**	**p-value**
School Curriculum	110 (50.0%)	40 (22.2%)	150	**<0.001**
Family Discussion	70 (31.8%)	30 (16.7%)	100	**<0.002**
Social Media / Internet	25 (11.4%)	85 (47.2%)	110	**<0.001**
Friends / Peers	15 (6.8%)	25 (13.9%)	40	**<0.052**
Total	**220**	**180**	**400**	

The cross-tabulation data from table 3 reveals a sharp contrast in how "Never Smokers" and "Smokers" in Mardan consume health information. The highly significant p-values ($p<0.001$) indicate that the source of information is a powerful determinant of smoking behavior and overall risk perception. For "Never Smokers," the most influential sources were School Curriculum (50%) and Family Discussions (31.8%). This suggests that structured academic environments and parental guidance serve as critical "protective factors." However, the strength of these educational barriers must be viewed against the broader health landscape; as identified by **Khoso et al. (2025)**, the significant health and ecological impacts of tobacco in Pakistan necessitate a transition toward more sustainable and active prevention pathways to protect those currently relying on academic awareness.

In Mardan, this implies that for the curriculum to be a true deterrent it must be supported by active health surveillance and professional advice that reinforces the "protective barrier" established at home and in school. In stark contrast, 47.2% of Current/Ever Smokers identified Social Media/Internet as their primary information source. While the internet provides a vast amount of data, it also exposes Mardan's youth to "lifestyle" marketing that often masks the physiological damage of nicotine. This aligns with the findings of Khattak et al. (2024), who examined young adult nicotine users in Pakistan and found a significant "risk-perception gap." Their research demonstrates that young users often have poor self-perception of their oral

health status despite being exposed to digital health information. This suggests that social media exposure in the Pakistani context often bypasses traditional health warnings, leading smokers to view tobacco or electronic nicotine products as socially acceptable or lower-risk than they truly are. Interestingly, Friends/Peers showed the lowest statistical significance (p=0.052) as an information source. This implies that while friends in Mardan may influence the act of smoking through social pressure in *hujras* or cafes, they are not viewed as a credible or authoritative source of health information. The youth appear to distinguish between "social influence" and "factual authority." This cognitive distinction is well-documented in tobacco research, where peer and familial smoking are identified as the primary drivers of behavioral susceptibility, while health knowledge and exposure to anti-smoking media serve as distinct, protective counter-forces (Aslam et al., 2014; Jallow et al., 2019). Furthermore, recent evidence suggests that this susceptibility is most acute among "never-smokers" who are socially exposed to tobacco but still acknowledge its hazards, reinforcing the idea that social modeling often overrides, but does not replace, theoretical health awareness **(Phetphum et al., 2023)**.

Table 4: Correlation Matrix of Key Variables (Pearson's r / Spearman's rho)

Variable	1	2	3	4
Awareness Score (0-10)	1.00			
Perceived Risk Score (1-5)	**.65****	1.00		
Peer Smoking Prevalence (1-5)	**-.32****	**-.28****	1.00	
Intention to Quit/Smoke (1-5)*	**-.52****	**-.60****	**.45****	1.00

The correlation matrix in Table 4 highlights that while health awareness serves as a foundation, the social environment and individualized risk perception are the ultimate drivers of smoking behavior among the youth in Mardan. The Knowledge-Risk Connection there is a strong positive correlation (r = .65) between Awareness Scores and Perceived Risk. This indicates that as educational awareness regarding specific health impacts increases, so does the individual's internal sense of danger. However, the correlation is not perfect, suggesting a "cognitive gap" where some youth may possess the facts but do not feel personally vulnerable to the long-term consequences a common psychological hurdle in adolescent health behavior. The power of peer Influence a significant negative correlation exists between Peer Smoking Prevalence and Awareness (r = -.32). This is a critical sociological finding for the Mardan context; it suggests that being in a social circle where smoking is normative (such as in local hujras or university hangouts) actually "blunts" or desensitizes a young person's awareness. Social normalization essentially acts as a cognitive barrier, preventing objective health warnings from being internalized or taken seriously. Predictors of intention the strongest relationship (r = -.60) is identified between Perceived Risk and the Intention to Smoke/Quit. This confirms that for the young generation in Pakistan, simply "knowing" smoking is harmful is statistically less effective than "believing" they are personally at risk. This behavior is further explained by Khan et al. (2025), whose qualitative study on Pakistani adolescents highlights that the appeal of nicotine products is often driven by a lack of perceived harm and high social allure. Their research suggests that youth often view these products through a lens of "social utility" rather than health risk, which directly aligns with the strong correlation between social environment and the intention to smoke found in this study.

Table 5: Logistic Regression: Predictors of Being a Current Smoker (vs. Non-Smoker)

Predictor Variable	B (Coefficient)	S.E.	Odds Ratio (Exp(B))	95% C.I. for Odds Ratio	p-value
Constant	-1.20	0.50	0.30		0.016
Gender (Male)	1.85	0.30	**6.36**	[3.52, 11.48]	**p<0.001**
Parental Smoking (Yes)	0.90	0.25	**2.46**	[1.51, 4.01]	**p<0.001**
Awareness Score	-0.25	0.08	**0.78**	[0.67, 0.91]	**p<0.002**
Peer Smoking Prevalence	0.70	0.12	**2.01**	[1.59, 2.55]	**p<0.001**
Primary Source: Social Media	0.80	0.28	**2.23**	[1.29, 3.85]	**p<0.004**

The logistic regression model table 5, identifies the strongest determinants of smoking behavior among the youth in Mardan. By calculating the Odds Ratios (OR), we can pinpoint which factors most aggressively drive the transition from non-smoker to current smoker. Gender emerges as the most powerful predictor (OR = 6.36, $p < 0.001$), indicating that males are over six times more likely to be smokers than females. In the socio-cultural landscape of Mardan, this reflects the "hujra" culture and public social gatherings where smoking is a normalized male social activity, while remaining a strict taboo for females. This significant gender disparity is corroborated by Sheikh et al. (2024), who identified male gender as a primary predictor of tobacco use among Pakistani students, noting that cultural norms often facilitate higher tobacco initiation rates among young men compared to their female counterparts. The immediate social environment plays a decisive role in smoking uptake. Parental smoking (OR = 2.46) and Peer Prevalence (OR = 2.01) both significantly increase the risk of becoming a current smoker. This "double-exposure" observing the habit at home and encountering it in social circles effectively normalizes tobacco use. The influence of these external social engines often creates a cycle of dependency that is difficult to break through individual willpower alone. While a higher Awareness Score serves as a protective factor, reducing the odds of smoking (OR = 0.78), the use of Social Media as a primary information source more than doubles the risk (OR = 2.23, $p = 0.004$). This suggests that for Mardan's youth, digital platforms may be reinforcing smoking trends through "lifestyle" content and the glamorization of nicotine products, which frequently outweighs the impact of formal health warnings found in the school curriculum.

Table 6: One-Way ANOVA: Comparison of Mean Awareness Scores by Education Level

Education Level	N	Mean Awareness Score (0-10)	Std. Deviation	F-statistic	p-value
Matriculate or below	130	5.8	1.9	**8.74**	**<0.001**
Intermediate	180	6.9	1.7		
Graduate or above	90	7.8	1.5		
Total	**400**	**6.7**	**1.8**		

***Post-Hoc Test (Tukey HSD) would show:** The mean score for Graduates is significantly higher than for both Intermediate and Matriculate groups ($p < 0.05$).*

The One-Way ANOVA results demonstrate a statistically significant difference in health awareness scores across various educational levels ($F = 8.74$, $p < 0.001$). This confirms that in Mardan, the depth of anti-smoking knowledge is fundamentally tied to a young person's progression through the formal academic system. There is a clear upward trend in mean awareness: Graduates scored the highest ($M = 7.8$), while those at the Matriculate level or below had the lowest mean ($M = 5.8$). This indicates that while the general concept of "smoking is harmful" is universally understood, the comprehension of specific systemic risks such as the vascular or reproductive issues discussed in Table 2 is largely a product of higher education. In Mardan, where intermediate education is often the terminal point for many, this "awareness gap" represents a major public health concern. The lower standard deviation among graduates ($SD = 1.5$) compared to those with less education ($SD = 1.9$) suggests that higher education provides a more consistent and standardized level of health literacy. This educational disparity is a key focus of the research by Nisar et al. (2022), conducted at Abdul Wali Khan University Mardan (AWKUM) and Bacha Khan Medical College (BKMC). While medical education significantly improves the depth of knowledge and shifts attitudes toward tobacco hazards, the "educational effect" faces a significant challenge when translated into practice. Research by Nisar et al. (2022) found that even when awareness of smoking complications is nearly universal (92.1% to 100%), high levels of theoretical knowledge do not automatically result in cessation. This paradox is further highlighted by recent findings from Bacha Khan Medical College, where smoking rates among medical students in Mardan reached as high as 21% (Hanfi et al., 2026). These data suggest that while university-level intervention is critical for building a foundation of knowledge, theoretical awareness alone is insufficient to counteract the deeply rooted social and environmental triggers prevalent in Mardan. Therefore, education must be paired with structural changes to effectively move students from experimental smoking to complete cessation.

Discussion

The findings from Mardan underscore a critical, actionable gap in tobacco control. While basic knowledge of smoking's link to lung cancer is high aligning with national trends in the GATS Pakistan (2014) and CDC (2020) this awareness fails to translate into preventive behavior when specific systemic risks remain poorly understood. This dissociation suggests that the quality of public health communication is as vital as its frequency. As noted by Khoso et al. (2022), the disparity in service quality between public and private sectors in Pakistan often impacts how health information is disseminated and received, suggesting that tobacco cessation efforts must be integrated into high-quality, standardized healthcare delivery systems to be credible. The strong predictive power of peer smoking in Mardan is consistent with regional data showing that peer pressure increases the odds of tobacco use by more than 15-fold among undergraduate students in KP **(Abdullah et al., 2015)**." The predictive power of peer and parental influence further highlights the social normalization of tobacco. Beyond these social drivers, the health and ecological impacts of the tobacco lifecycle in Pakistan exacerbate youth vulnerability, creating a cycle of environmental exposure and social initiation (Khoso et al., 2025). However, for this awareness to change behavior, individuals must possess a high "risk perception." Research by Suyuhan and Khoso (2026) indicates that behavior is strongly dictated by how risks are perceived and prepared for; in Mardan, if smoking is not perceived as an immediate personal threat, the knowledge remains inert. Furthermore, the "awareness-practice gap" is linked to the nature of Pakistani education. As Ahmad (2019) argues, there is a persistent problem with practical and secondary-level science work in Pakistan, where students often gain theoretical knowledge without understanding its practical application. In Mardan, this means students may "know" the chemistry of nicotine but lack the practical "refusal skills" to resist social pressure. To bridge this gap, Mardan must move toward multi-component interventions. The US truth initiative proves that counter-marketing focused on industry manipulation is effective across all demographics (Vallone et al., 2021), while India's TFS model demonstrates that teacher-led institutional policies outperform curriculum-only approaches (Kadam et al.,

2021). By addressing familial, social, and environmental drivers simultaneously, Mardan can move from mere knowledge acquisition to sustained behavioral change.

Conclusion

This research elucidates the complex landscape of smoking awareness and behavior among the youth of Mardan, revealing a pivotal dissonance between possessing general knowledge and adopting protective health behaviors. It is evident that awareness alone is an insufficient shield against the powerful forces of social modeling, peer pressure, and targeted misinformation. The study affirms that effective intervention must be as multifaceted as the problem itself. By synthesizing local empirical evidence with proven strategies from global public health such as counter-marketing, policy enforcement, and holistic education stakeholders in Mardan can forge a more effective, contextually-relevant response. Ultimately, bridging the gap between knowledge and action requires moving beyond information delivery to actively reshape the social and environmental fabric that normalizes tobacco use, thereby safeguarding the health and future of the young generation.

Recommendations

To translate the study's findings into actionable change, a multi-pronged strategy is essential. First, the Khyber Pakhtunkhwa health and education departments must collaborate to develop and mandate a standardized, skill-based anti-tobacco curriculum for all secondary and higher secondary institutions in Mardan, explicitly addressing identified knowledge gaps like reproductive health impacts. Second, a localized digital counter-marketing campaign, inspired by the Truth Initiative model, should be launched on platforms like TikTok and Instagram to directly challenge pro-smoking content and industry tactics. Third, all educational institutions must strictly enforce a "Tobacco-Free Campus" policy, supported by cessation resources. Fourth, community engagement programs should educate parents and local leaders to reinforce smoke-free norms at home. Finally, district authorities must ensure rigorous enforcement of existing laws banning sales to minors and conduct periodic youth tobacco surveys to monitor progress and adapt strategies.

Limitations

The interpretation of this study's findings is subject to several constraints inherent in its design and execution. The cross-sectional nature of the research establishes associations but cannot definitively prove causality between variables such as awareness and smoking initiation. The use of a multi-stage sampling technique culminating in a convenience sample within selected schools and colleges may limit the generalizability of the results to out-of-school youth or other demographic groups within Mardan. Furthermore, reliance on self-reported data for sensitive behaviors like smoking introduces the potential for social desirability bias, leading to possible under-reporting. The study’s focus, while comprehensive, may not have captured all influencing factors, such as exposure to point-of-sale advertising or individual psychological traits. Consequently, while the findings provide critical local insights, their direct application to other contexts should be approached with caution.

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