

# Knowledge, Attitude, and Perception of Passive Smoking Among Medical and Dental Students of Karachi: A Survey-Based Study

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## ABSTRACT

**BACKGROUND:** Passive smoking, the involuntary inhalation of tobacco smoke, poses significant health risks; however, its prevalence and impact on medical and dental students in Karachi, Pakistan, remain understudied. Therefore, this research aims to understand the knowledge, attitudes, and practices (KAP) regarding passive smoking among medical and dental students and will help shed light on their awareness, perceptions, and behaviours regarding this public health concern.

**METHODS:** A cross-sectional study was conducted over 3 months, involving 378 medical and dental students (303 medical and 75 dental students) from various universities in Karachi. Participants completed a questionnaire to gather information on demographics, awareness of passive smoking, perceptions of its health effects, and actions taken in response to exposure.

**RESULTS:** The majority of participants demonstrated awareness of passive smoking 320 (84.7%) and believed that it was essentially linked to active smoking 320 (84.7%). Cigarette smoke was identified as the primary contributor to passive smoking 345 (91.3%). A significant proportion of participants believed that children and pregnant women exposed to passive smoking had elevated health risks. In areas where smoking is not permissible, less than half of the participants 173 (45.8%) reminded smokers about the smoking regulations, and a few even referred smokers for counselling 141 (37.3%). Males are usually indifferent to smokers around them, whereas females are found uncomfortable with smoking in their surroundings.

**CONCLUSION:** In conclusion, our study highlights the persistent prevalence of passive smoking among medical and dental students in Pakistan. Enforcing strict tobacco control policies, integrating passive smoking education into medical curricula, and improving communication strategies for smoking cessation interventions are crucial steps towards creating smoke-free environments and healthier lifestyles nationwide. Despite awareness among medical and dental students about the dangers of cigarette smoking, their reluctance to urge regular smokers to quit underscores the need for improved communication between smokers and non-smokers to foster a cleaner and hazard-free environment.

**KEYWORDS:** passive smoking, medical students, dental students, awareness, public health

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## Background and Introduction

Tobacco inhalation, either active or passive smoking, is the most preventable cause of mortality worldwide. In this regard, the World Health Organization (WHO) introduced a program named MPOWER which consists of 6 measures that help in curbing tobacco consumption and exposure.<sup>1</sup> Pakistan has implemented a few of the provisions of MPOWER; the reasons underlying the limited implementation are poor law enforcement by the authorities and lack of appropriate funding and workforce to facilitate and monitor implementation. Pakistan is making progress towards tobacco control, but the level of compliance with the WHO recommended best practices as

outlined in the MPOWER package is quite sub-optimal.<sup>2</sup> Smoking and Passive smoking are interrelated. Passive smoking is widely acknowledged as a grave health hazard, capable of precipitating severe and potentially life-threatening medical conditions, given the absence of a safe threshold for exposure.<sup>3</sup> Passive smoking, commonly referred to as second-hand smoke (SHS), arises from inhalation of exhaled smoke emitted by individuals.<sup>4,5</sup> According to the 2014 Global Adult Tobacco Survey, the prevalence and exposure to SHS in Pakistan were 69.1% and 48.3% in workplaces and homes, respectively.<sup>6</sup> According to a recent report, globally, 37% of people are still exposed to SHS.<sup>7</sup> Scientific evidence indicates that living with a



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smoker can increase a non-smoker's likelihood of developing lung cancer by 20%–30%.<sup>8,9</sup> Furthermore, empirical evidence suggests that SHS may augment the risk of breast, nasal sinus, and nasopharyngeal cancers in adults.<sup>10</sup> Additionally, the risk of heart disease, stroke, and male infertility stemming from SHS is expected to be substantially lower, with supporting studies reporting a decrease of approximately 75%.<sup>11</sup>

Various studies have investigated the risks of SHS in different population subgroups, such as college and university students and health care professionals.<sup>12</sup> Smoking prevalence has been observed in both genders within medical universities, with a higher prevalence in males. Notably, some students smoked due to misguided beliefs and societal norms, with approximately 46.9% believing that smoking enhances their concentration in studies and about 40% perceiving smokers as more attractive than non-smokers.<sup>13</sup> Consequently, they expose their peers to environmental tobacco smoke, turning them into secondhand smokers who are affected by the hazards of passive smoking. Interestingly, medical students are generally aware of the harmful effects of smoking, with a higher proportion of smokers recognising the addictive and harmful nature of cigarette smoking than non-smokers.<sup>14-16</sup>

Despite their awareness of the dire consequences associated with both active and passive smoking, only a fraction of students expressed intentions to quit smoking in the immediate future.<sup>17</sup> Given their future role as health care practitioners, medical students ought to set a precedent by renouncing this habit, thereby fostering a healthier milieu.<sup>18</sup> Furthermore, it is imperative to integrate training and counselling sessions into the medical school curriculum aimed at educating students about the perils of smoking and equipping them with effective strategies for smoking cessation. Several studies have identified an amplified awareness of the hazards posed by passive smoking among medical students, with the majority lending their support to legislative measures aimed at discouraging public tobacco smoking.<sup>19-21</sup> Further research into the Knowledge, Attitude, and Practice (KAP) concerning passive smoking among medical and dental students can provide insights into whether enhanced knowledge and attitude correlate with more favourable practices and potential predictors.

This study on medical and dental students is aimed to assess KAP regarding passive smoking among medical and dental students in Karachi, despite their awareness of smoking hazards. The findings of this study could pave the way for future research to evaluate the KAP of medical and dental students across Pakistan and to develop educational programs to enhance awareness and foster a positive attitude toward passive smoking.

## Methods

### *Participants and Sampling*

The study was conducted in Karachi, Pakistan, from June to August 2023. This study involved a non-randomised cross-sectional survey targeting medical and dental students from

both public and private universities. Ethical clearance was obtained from the Institutional Review Board of Jinnah Sindh Medical University. Sample size determination was conducted using the Open Epi sample size calculator, resulting in a sample size of 378 participants with a 5% margin of error and 95% confidence interval. The participants comprised both male ( $n = 138$ ) and female ( $n = 240$ ) students aged between 18 and 25 years enrolled in MBBS and BDS degrees ranging from 1st to 5th years. The inclusion criteria encompassed both smokers and non-smokers. Participants were recruited from public sector universities, such as Jinnah Sindh Medical University (JSMU) and Dow University of Health Sciences (DUHS), as well as private sector universities, such as Ziauddin University and Liaquat National Medical College. Informed consent was mandatory for participation, and individuals who declined or withheld consent were excluded from the study.

### *Survey and Measures*

Questionnaires were distributed using various online channels, including WhatsApp groups from other universities, and some participants received questionnaires via email while maintaining participant anonymity. The questionnaire, designed to assess knowledge and awareness of passive smoking, underwent content validity checks through a comprehensive literature review and expert consultation. It was developed based on a literature search of articles from around the world concerning secondhand smoke (SHS),<sup>22</sup> its association with heart and lung diseases,<sup>23</sup> its effects on children,<sup>24</sup> and the attitudes and knowledge of adults regarding passive smoking.<sup>25</sup> The questions were tailored to the study's context, ensuring content validity through an expert review.

### *Statistical Analysis*

Statistical analyses were performed using SPSS version 25.0. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to summarise participant characteristics and responses. Chi-square tests were used to assess differences in knowledge, attitudes, and practices regarding passive smoking among students, with significance set at  $P < .05$ . Furthermore, logistic regression analysis was performed to identify factors associated with knowledge and awareness of passive smoking among participants. Covariates such as age, gender, educational level, and smoking status were included in the regression models to control for potential confounding variables and elucidate their impact on the outcomes of interest.

## Results

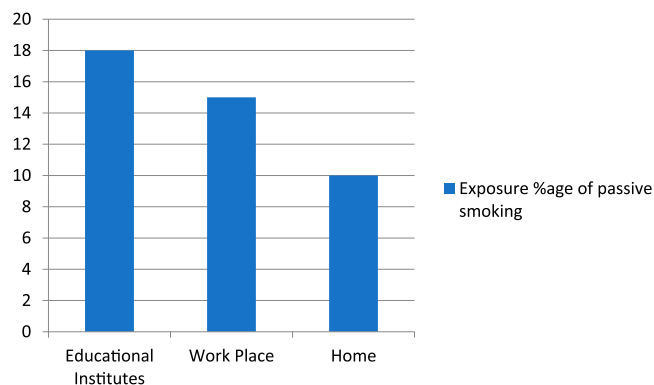
### *Participant Demographics*

A total of 378 male ( $n = 138$ ) and female ( $n = 240$ ) participants aged between 18 and 25 years who were in their MBBS and

**Table 1.** Demographic Characteristics of Study Participants.

DEMOGRAPHICS	N (%)
<b>Gender</b>	
Male	138 (36.5)
Female	240 (63.5)
Total	378 (100)
<b>Age</b>	
Mean	21
Median	20-22
Standard deviation	2
<b>Institute</b>	
JSMU	266 (70.4)
DUHS	62 (16.4)
Others	50 (13.2)
<b>Sector</b>	
Public sector	341 (90.2)
Private sector	37 (9.70)
<b>Program</b>	
MBBS	303 (80.2)
BDS	75 (19.8)
<b>Year</b>	
1 <sup>st</sup>	38 (10.1)
2 <sup>nd</sup>	40 (10.6)
3 <sup>rd</sup>	73 (19.3)
4 <sup>th</sup>	208 (55.0)
5 <sup>th</sup>	19 (5.03)
<b>Residence</b>	
Home	318 (84.1)
Hostel	60 (15.9)
<b>Smocking status</b>	
Yes	30 (7.94)
No	348 (92.1)
<b>Lives with habitual smoker in hostel</b>	
Yes	33 (8.73)
No	126 (33.3)
Doesn't stay in the hostel	219 (57.9)
<b>Do family members/Friends smoke</b>	
Yes	132 (57.9)
No	246 (65.1)

BDS degrees (first to fifth years) were included in the study. Table 1 provides an overview of the demographic characteristics. The median age group was 20-22 years 211 (55.8%). The majority of participants, 266 (70.6%), were affiliated with Jinnah Sindh Medical University, and 303(80.2%) were pursuing the MBBS program. Furthermore, 208 (55.0%) participants were in their fourth professional year. A significant



**Figure 1.** Percentage of exposure to passive smoking.

proportion 318(84.1%) of participants resided in their homes and were non-smokers 348 (92.1%). Most participants did not share accommodations with smoking friends in hostel 126(79.2%), and the majority did not have friends or family members who smoked 246 (65.1%).

*Knowledge and Attitude Towards Passive Smoking*

Most participants demonstrated an awareness of passive smoking 345 (91.3%). Moreover, a substantial proportion 320 (84.7%) of our sample recognised a direct link between active and passive smoking. Specifically, most participants acknowledged cigarette smoke 345 (91.3%) as a contributor to passive smoking, and Shisha/water pipes 305(80.7%) were perceived as harmful agents for non-smokers in their proximity. Approximately 163 (43.1%) participants reported 0 days of exposure to passive smoking, while approximately 135(35.7%) experienced 1-2 days of exposure on average. Similarly, over half of the participants 202(53.4%) reported no hours of exposure during the day. The highest exposure to passive smoking occurred at the university 71 (18.8%), followed by the workplace 59 (15.6%) and home 38 (10.1%), as shown in Figure 1.

*Perception of Passive Smoking Effects*

The demographic group perceived by medical and dental students as the most adversely affected by smoking comprised children 112 (29.6%) and elderly 102 (27.0%). The majority of participants 204 (54.0%) concurred that children of smokers were more likely to adopt smoking compared to non-smokers. Likewise, a significant proportion 313 (82.8%) believed that children of smokers faced a heightened risk of developing respiratory ailments. Additionally, most participants 312 (82.5%) held the view that children born to pregnant women exposed to passive smoking were at a greater risk of congenital anomalies.

Regarding the association between passive smoking and specific diseases, approximately 220 (58.2%) participants selected all available options, including lung cancer, asthma, coronary heart disease, and nasal sinus cancer. In contrast, 77 (20.4%) participants associated passive smoking primarily with

**Table 2.** Assessment of Knowledge, Attitude, and Practice Towards Passive Smoking.

ASSESSMENTS OF KNOWLEDGE ATTITUDE AND PRACTICE TOWARDS PASSIVE SMOKING		N (%)
<b>Have you heard of the term 'passive smoking'?</b>		
Yes		345 (91.3)
No		33 (8.73)
<b>Do you think active smoking has a direct link to passive smoking?</b>		
Yes		320 (84.7)
No		58 (15.1)
<b>Do you think smoke from cigarettes contributes to passive smoke?</b>		
Yes		345 (91.3)
No		33 (8.73)
<b>Do you think smoke from shisha/water pipes is harmful to the non-smokers around?</b>		
Yes		305 (80.7)
No		73 (19.3)
<b>How many days a week would you say you are exposed to passive smoke?</b>		
0 days		163 (43.1)
1-2 days		135 (35.7)
3-4 days		42 (11.1)
5-7 days		38 (10.1)
<b>How many hours a day would you say you are exposed to passive smoke?</b>		
0 hours		202 (53.4)
1-4 hours		145 (38.4)
4-8 hours		17 (4.50)
10-12 hours		8 (2.12)
More than 12 hours		6 (1.59)
<b>Where do you face the most exposure to passive smoke?</b>		
Home		38 (10.1)
Hostel		33 (8.73)
University		71 (18.8)
Work		59 (15.6)
None		177 (46.8)
<b>According to you, which demographic is most harmed by smoke related diseases?</b>		
Children		112 (29.6)
Adolescents		68 (18.0)
Adults		96 (25.4)
Elderly		102 (27.0)
<b>Do you think children of smokers are more likely to pick up a smoking habit than children of non-smokers?</b>		
Yes		204 (54.0)
No		48 (12.7)
Maybe		126 (33.3)
<b>Which of the following diseases do you think are associated with passive smoke?</b>		
Lung cancer		77 (20.4)
Coronary heart disease		20 (5.29)
Asthma		48 (12.7)
Nasal sinus cancer		13 (3.70)
All of above		220 (58.2)

(Continued)

Table 2. Continued.

ASSESSMENTS OF KNOWLEDGE ATTITUDE AND PRACTICE TOWARDS PASSIVE SMOKING		N (%)
<b>Do you think that children of smokers are more likely to develop respiratory ailments than children of non-smokers?</b>		
Yes		313 (82.8)
No		65 (17.2)
<b>Do you think that babies of pregnant women exposed to passive smoke have a higher chance of developing congenital anomalies as opposed to the contrary?</b>		
Yes		312 (82.5)
No		66 (17.5)
<b>Do you remind smokers of non-smoking regulations?</b>		
Yes		173 (45.8)
No		110 (29.1)
I don't know any smokers		95 (25.1)
<b>Are you comfortable with someone smoking in the same room/car as you?</b>		
Yes		75 (19.8)
No		303 (80.2)
<b>If no, do you ask them to stop?</b>		
Yes		211 (55.8)
No		92 (24.3)
<b>Have you ever had a conversation with a smoker about the health risks of smoking?</b>		
Yes		240 (63.5)
No		138 (36.5)
<b>Have you ever referred counseling to a habitual smoker?</b>		
Yes		141 (37.3)
No		237 (62.7)

lung cancer, 48 (12.7%) with asthma, 20(5.3%) with coronary heart disease, and 13 (3.4%) with nasal sinus cancer.

#### *Practice and Response Towards Passive Smoking*

Less than half of the participants, 173 (45.8%), reported reminding smokers of smoking regulations, while a significant majority 303 (80.2%) expressed discomfort in the presence of a person who smoked. However, almost half 211 (44.2%) of the participants indicated that they did not ask smokers to stop smoking. Most participants 240(63.5%) engaged in conversations with smokers regarding the health risks associated with smoking. Nonetheless, 237 (62.7 %) participants reported that they did not recommend counselling for habitual smokers.

#### *Association and Comparison*

Our analysis identified a statistically significant association between gender and feeling uncomfortable in the presence of a smoker ( $P < .05$ ). Specifically, the majority of females ( $n = 214$ ) expressed discomfort when sharing a room or vehicle with a smoker. Furthermore, our analysis revealed a significant association between gender and reminding smokers about smoking

regulations ( $P < .05$ ). Moreover, a significant majority of the participants ( $n = 211$ ) reported asking smokers to stop smoking ( $P < .05$ ). However, our analysis did not detect any statistically significant correlation between current smoking status and knowledge of the term “passive smoking” ( $P > .05$ ), the connection between active smoking and passive smoking ( $P > .05$ ), or the contribution of shisha and waterpipe smoking to non-smokers ( $P > .05$ ). Table 2 presents the assessment of Knowledge, Attitude, and Practice towards passive smoking among the study participants.

#### **Discussion**

Our study revealed a high level of awareness among participants regarding passive smoking, with the majority recognising cigarette smoke as a significant contributor. Interestingly, perceptions of Shisha/water pipe smoke differed, possibly due to misconceptions about its safety. Children were identified as the demographic most adversely affected by secondhand smoke (SHS), echoing concerns about the long-term health implications for this vulnerable group. Additionally, participants expressed significant concerns about the health risks faced by children born to pregnant women exposed to passive smoking. The association between passive smoking and various diseases

has been acknowledged, although there are discrepancies in perceptions about primary health risks. Despite this awareness, our findings indicate challenges in implementing smoking regulations, with a significant proportion of participants expressing discomfort but refraining from taking action. Furthermore, the reluctance to refer habitual smokers for counselling underscores the need for more comprehensive smoking cessation programs. Overall, our study highlights the importance of addressing misconceptions, implementing effective smoking regulations, and enhancing smoking cessation efforts to mitigate the adverse effects of passive smoking.

### *Concept of Passive Smoking*

In our study, a substantial majority of the participants were aware of passive smoking. This level of awareness is comparable to that in a study conducted in Jordan in 2012, where 92.4% of non-smoking university students were knowledgeable about the adverse effects of passive smoking on the general population.<sup>13</sup> Interestingly, our findings indicated that most participants recognised cigarette smoke as a significant contributor to passive smoking, as opposed to shisha/water pipe smoke. This preference may stem from the perception that waterpipe smoking is safe and less addictive. A study conducted in Lebanon (2008) assessed the dependency scale of waterpipe smokers and categorized them as non-dependent.<sup>26</sup> This supports the prevailing notion that “cigarettes” pose greater health risks than shisha, as they lack proper filters and expose individuals to a higher concentration of contaminants. Alarming reports suggest that as many as 33% of Pakistanis use shisha regularly.<sup>27,28</sup>

### *Passive Smoking and Children*

Our study participants identified children’s demographics as the most adversely affected by SHS, followed by the elderly. A majority of our participants believed that children of smokers were more likely to adopt smoking habits, echoing findings from a study in Karachi, where parental smoking in the household influenced adolescents to take up smoking.<sup>29</sup> Moreover, a significant proportion of our participants believed that children of smokers were at a heightened risk of developing respiratory ailments. Similarly, the majority of our students expressed concerns that children born to pregnant women exposed to passive smoking had a higher likelihood of congenital anomalies. These perceptions align with a meta-analysis conducted in Nottingham (2011), which estimated that pregnant women exposed to SHS were 23% more likely to experience stillbirth and 13% more likely to give birth to a child with congenital malformations.<sup>30</sup>

### *Health Problems Linked With Passive Smoking*

Regarding diseases associated with passive smoking, more than half of our participants selected “all of the above” options,

encompassing lung cancer, asthma, coronary heart disease, and nasal sinus cancer. However, our study differs from a 2014 study in Germany, which pointed out heart disease as the most prevalent disease in comparison with COPD and stroke among nonsmokers with SHS.<sup>31</sup> German research documented IHD as the most prevalent disease because SHS reflects its effect immediately on the cardiovascular system, whereas the occurrence of respiratory and nervous system ailments manifests later in life. Some other studies have suggested correlations between lung cancer and passive smoking at higher exposure levels, typically 40–80 cigarette packs per year.<sup>32</sup> There is a potential misconception among medical students regarding lung cancer as the primary risk factor associated with passive smoking. In reality, however, passive smoking can lead to lung cancer, but typically after extensive exposure to 40–80 packs of cigarettes per year.

### *Awareness in Active Smokers About Smoking Regulations*

Our study revealed that less than half of the participants reported reminding smokers of smoking regulations, indicating a lack of accountability for active smokers. Furthermore, a significant majority of our participants expressed discomfort in the presence of a person who was smoking, reflecting their reluctance to confront smokers, even when it violated smoking guidelines. Research conducted in Pakistan (2001) estimated that 11.7% of commuters who used air-conditioned public transportation reported smoking while travelling, thereby exposing other passengers to SHS.<sup>33</sup> However, nearly half (44.2%) of the participants admitted not asking smokers to stop smoking, possibly because of concerns about potential conflicts. This perception of smokers as individuals with aggressive attitudes may discourage non-smokers from reprimanding them, further hindering essential dialogue. Another study in Karachi (2021) found that 31.2% of smokers were motivated to quit due to social and professional pressures, with 22.7% quitting due to social avoidance by non-smokers.<sup>34</sup> Despite these motivating factors, the low success rate of smoking cessation attempts in Pakistan, estimated at only 2.6%, indicates the need for more comprehensive smoking cessation programs.<sup>35</sup> The tobacco industry’s significant contribution to government revenue may hinder the implementation of anti-smoking policies.<sup>36</sup>

### *Rehabilitation of Smokers for Smoking Cessation*

It is noteworthy that a majority of our participants reported not referring habitual smokers to counselling. This underscores the necessity of establishing rehabilitation clinics that offer affordable pharmacotherapy and counselling services to smokers seeking to quit smoking. Pakistan could also leverage mass media to promote smoking cessation by using imagery that highlights the health risks associated with smoking. This includes showcasing images of individuals with mouth cancer, those reliant on electronic voice boxes, and those requiring ventilators for breathing assistance on cigarette packs, as this has proven effective in motivating high

school students to quit smoking.<sup>37</sup> Other strategies, which may include increasing tobacco prices, reducing the cost of treatment, and establishing telephonic smoking quitlines, have proven successful in many countries such as Brazil, Thailand, Mauritius, and Turkey, and should also be considered for implementation in Pakistan.<sup>38</sup> These measures could potentially reduce passive smoking. This applies not only to passive smoking alone, but also to smoking in general.

### Limitations and Future Implications

While our study sheds light on passive smoking among medical and dental students, it is limited by its cross-sectional design, restricting causal inference. Future research should employ longitudinal designs for a deeper understanding. Additionally, our sample's regional and disciplinary focus limits generalisability, warranting the inclusion of diverse student cohorts. Self-reporting may introduce bias; future studies could validate the findings with objective measures. Despite these limitations, our study underscores the need for a longitudinal investigation across diverse student populations to inform targeted interventions and policy initiatives, ultimately advancing public health efforts to mitigate the adverse effects of passive smoking.

### Conclusion

In conclusion, our study demonstrates that despite the high awareness among medical and dental students about passive smoking and its link to active smoking, frequent exposure to passive smoking persists. The Government of Pakistan should adopt strict policies to curb smoking prevalence. Therefore, enforcement of strict tobacco control policies will automatically be translated on a micro level to universities, hospitals, and workplaces. Consequently, smoking and SHS prevalence in Pakistan have been reduced. Mandatory courses on passive smoking and counselling should be integrated into medical school curricula, as there is a need to create awareness of the adverse effects of passive smoking on public health. Moreover, it is worth noting that medical students are aware of the hazardous effects of smoking, despite their reluctance to ask smokers to quit smoking, because of the belief that such reprimands may lead to conflicts. This underscores the need for effective communication strategies and support systems to facilitate discussions and interventions regarding smoking cessation. By addressing these issues and implementing comprehensive tobacco control measures, we can work towards creating smoke-free environments and promoting healthier lifestyles for all individuals in Pakistan.

### Author Contributions

The study design was proposed and the project was conceptualized by the UN. MTA was responsible for writing the Introduction and conducting the literature search. MTA and FP drafted the initial version of the manuscript. Data were

collected using UA, FP, MTA, and SL. MTA wrote the discussion section. The UN supervised the entire study. MSM and MAS reviewed and edited the manuscript. The final manuscript was approved by all the authors.

### Ethical Statement

#### Ethical Approval

This study was approved by the Institutional Review Board of Jinnah Sindh Medical University Karachi.

#### Informed Consent

Informed Consent was obtained from all participants.

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