AJBMS AFGHANISTAN Journal of Basic Medical Sciences
ISSN: 3005-6632

Afghanistan Journal of Basic Medical Sciences

2025 Jan 2(2): 176-186.

ajbms.knu.edu.af

Awareness of Lung Cancer and Associated Factors among Public Health Students at Kabul University of Medical Sciences, Afghanistan: A Cross-Sectional Study

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ARTICLE INFO

Type: Original Article
Received: 05 May 2025
Accepted: 29 June, 2025

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To cite this article: Qudrati BA, Sakhi R, Haidari Z, Noori N. Awareness of Lung Cancer and Associated Factors among Public Health Students at Kabul University of Medical Sciences, Afghanistan: A Cross-Sectional Study. Afghanistan Journal of Basic Medical Sciences. 2025 Jan 2(2):176-186.
https://doi.org/10.62134/khatamuni.82

ABSTRACT

Background: Lung cancer is the leading cause of cancer-related mortality worldwide, imposing a significant burden on low- and middle-income countries, including Afghanistan. Contributing factors include aging populations, tobacco use, and other high-risk behaviors. We aimed to assess lung cancer awareness and associated factors among public health students at Kabul University of Medical Sciences.

Methods: A descriptive cross-sectional study was conducted among 167 students between Oct and Dec 2024 using a multi-stage stratified sampling method. Data were analyzed using SPSS. Descriptive statistics summarized demographics and awareness levels, and chi-square tests assessed associations between awareness and demographic variables, with a significance threshold of $P<0.05$.

Results: Out of 167 distributed questionnaires, 164 were completed (response rate 98.2%). Most participants (62.2%) were aged 21-24 yr. A majority (80.5%) demonstrated good awareness of lung cancer risk factors, with 98.2% identifying smoking and 76.2% identifying passive smoking as key risks. Awareness of occupational exposures (63.4%) and dietary risks (68.9%) was moderate. No statistically significant associations were observed between awareness and demographic variables such as age ($P=0.439$), year of study ($P=0.415$), or economic status ($P=0.91$).

Conclusion: While students exhibited high awareness of smoking-related risks, gaps remained in recognizing less-discussed risk factors and symptoms. These findings highlight the need for targeted educational interventions to address knowledge gaps and promote preventive health behaviors among students.

Keywords: Lung cancer awareness, Risk factors, Afghanistan, Medical students

Introduction

Cancer represents a significant global health issue, standing as the second leading cause of mortality across the world. Based on estimates, the year 2020 witnessed approximately 9.6 million deaths attributed to cancer, alongside 18.1 million newly reported cases of the disease on a global scale (1-3). Lung cancer ranks as the most frequently diagnosed form of cancer and holds the grim distinction of being the

leading cause of cancer-related mortality worldwide. In 2020, approximately 2.21 million new cases and 1.8 million deaths were reported (1). According to the WHO, nearly one in five cancer-related deaths (18.4%) that year was attributed to lung cancer (1). By 2020, lung cancer maintained its position as the deadliest cancer, causing 1.8 million deaths, while it also became the second most commonly diagnosed cancer globally, surpassed only by breast cancer, with 2.21 million new cases that year (2).

Lung cancer is observed more frequently in low- and middle-income countries, where the rate of cancer-related deaths continues to climb. This increase can be attributed to aging populations and the prevalence of common risk factors such as tobacco use, alcohol consumption, unhealthy dietary habits, and physical inactivity. In 2012, these nations were responsible for 65% of all cancer-related fatalities worldwide, and projections suggest this share could rise to 75% by 2030 (4, 5). Afghanistan, like other low-income nations, faces similar challenges. In 2012, WHO reported that cancer claimed the lives of 15,000 Afghans, including 8,100 men and 7,400 women, with lung cancer listed as one of the primary contributors to cancer-related mortality (3).

Globally, smoking remains the most significant risk factor for lung cancer, responsible for nearly 70% of related deaths. Smokers are approximately 20 times more likely to die from this disease compared to those who do not smoke (6, 7). Lung cancer poses a significant public health challenge due to its high mortality rate and the limited likelihood of survival. This issue is particularly severe in developing nations, where survival rates are less than one-third of those observed in more developed countries, highlighting a stark disparity in outcomes (1). The occurrence of lung cancer is heavily shaped by various factors, such as an aging population, increased life expectancy, and the prevalence of high-risk habits, particularly tobacco use (8, 9). Smoking alone contributes to over 30% of all cancer-related deaths, with lung cancer accounting for 80% of these fatalities (10, 11). Although lung cancer affects both genders, it is more frequently diagnosed in men than in women (12). Persistent symptoms, such as a chronic cough, often serve as critical indicators of the disease and play an essential role in determining its prognosis (13-15).

Lung cancer plays a significant role in Afghanistan's cancer-related mortality, reflecting patterns observed worldwide. According to the latest WHO data published in 2020, lung cancer deaths in Afghanistan reached 1,076, accounting for 0.46% of total deaths. The age-adjusted mortality rate for lung, tracheal, and bronchial cancers is 6.90 per 100,000 of the population, ranking Afghanistan 122nd globally. These statistics are consistent with the general patterns of cancer mortality observed worldwide, where lung cancer remains a leading cause of cancer-related death (16).

Although limited studies have assessed lung cancer awareness and associated factors in various populations, no research to date has specifically examined awareness of lung cancer and its associated factors among public health students at Kabul University of Medical Sciences, Afghanistan. This study fills a significant gap in the existing literature, as public health students represent future healthcare professionals who will play a critical role in health education, disease prevention, and community awareness. This gap is particularly important because the level of awareness in this group can have a substantial impact on early detection and preventive efforts related to lung cancer in Afghanistan. The present study is the first of its kind in Afghanistan, providing baseline data on lung cancer awareness among public

health students, and lays the foundation for future research in this field.

By addressing this gap, the study aimed to explore lung cancer awareness and associated factors among public health students at Kabul University of Medical Sciences. It provides the first empirical evidence in this specific population in Afghanistan, contributing to the development of targeted educational interventions and public health strategies aimed at improving awareness, early detection, and prevention of lung cancer. Filling this gap is significant as it will help strengthen educational programs, enhance the capacity of public health students for community education, and ultimately contribute to reducing the burden of non-communicable diseases like lung cancer in Afghanistan.

Materials and Methods

Study design and setting

This study is a descriptive cross-sectional study based on a questionnaire conducted to assess lung cancer awareness and associated factors among public health students at Kabul University of Medical Sciences (one of the largest and oldest medical universities in Afghanistan). The study was carried out between Oct and Dec 2024.

Sample Size and Sampling Method

In 2024, the Public Health Faculty included a total of 272 undergraduate students (from first to fourth year). To determine the sample size, a 95% confidence level and a 5% margin of error were considered. Using Cochran's formula and Epi Info software version 7.2.6, the initial sample size was calculated to be 159 students. To account for a potential 5% non-response rate, the final sample size was increased to 167 students.

In this study, a two-step stratified random sampling method was applied to ensure proper representation across academic years. First, the students were grouped into strata according to their academic year (class). Then, within each stratum, participants were selected using simple random sampling, with the sample size proportional to the number of students in each academic year. This stratification ensured that each academic year was proportionately represented in the final sample.

Data Source and Measurement

The standardized questionnaire, adapted from previous research (17, 18), was modified to suit the context of this study. Specifically, certain items were reworded to ensure clarity and relevance to the study population. The questionnaire was divided into three sections: the first section (7 questions) collected demographic data, the second section (5 questions) assessed awareness of lung cancer risk factors, and the third section (9 questions) measured general awareness about lung cancer. Each correct response was awarded 2 points, incorrect answers were given 0 points, and “don’t know” responses were assigned 1 point. The total possible score was 28 points, with participants scoring above 14 classifieds as having good awareness and those scoring below 14 classifieds as having poor awareness. The questionnaire was translated into the local language to ensure clarity and ease of understanding for participants. To ensure reliability and validity, a pilot study was conducted with 20 students who were excluded from the main sample. The questionnaire was designed in closed-ended, multiple-choice questions to facilitate ease of completion in less than ten minutes and to minimize recall bias.

Ethics Approval

This study was approved by the Institutional Review Board (IRB) of the Public Health Faculty at Kabul University of Medical Sciences issued approval 109/2024.

Participation was entirely voluntary, and each participant provided written informed consent before participation. All information was collected and stored anonymously, with no identifying details recorded. The study adhered to the institutional guidelines, national ethical standards, and respected Afghan cultural norms and traditions. Measures were taken to protect participants from any physical or psychological harm, ensuring their rights, safety, and well-being throughout the study.

Statistical Analysis

To conduct the statistical analysis, the collected data were entered into SPSS ver. 27 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including mean, standard deviation, frequency, and percentage, were first employed to summarize the data. To describe categorical variables and the demographics of the participants, frequency distributions and percentages were used. To determine the relationship between awareness levels and demographic variables based on participants' characteristics, cross-tabulation and Chi-square tests were applied to investigate the relationships and associations between categorical variables. A *P*-value of <0.05 was considered statistically significant.

Results

Students' Sociodemographic Characteristics

Out of 167 questionnaires, 164 were fully completed and collected (response rate 98.2%). Demographic characteristics are detailed in (Table 1). The participants' ages were divided into two age groups: 18–20 yr and 21–24 yr. The majority of participants, 102 (62.2%), belonged to the 21–24 age group. The mean age of the participants was 20.9, with a standard deviation of 1.41. Only 5.5% reported a family history of lung cancer, and 19.5% of the participants had a history of smoking. As illustrated in (Figure 1), students reported diverse sources of information about lung cancer. The most commonly cited sources were books or articles 54 (33.01%), followed by the Internet 42 (25.73%).

Table 1: Demographic characteristics of the participants

Demographic characteristics	*Categories*	*Number*	*Percentage*
Age Group	18-20	62	37.8
	21-24	102	62.2
Year of education	1st year	35	21.3
	2nd year	38	23.2
	3rd year	52	31.7
	4th year	39	23.8
Economic Status	Good	18	11
	Average	134	81.7
	Poor	12	7.3
Marital status	Single	151	92.1
	Married	13	7.9
Family History of Lung Cancer	Yes	9	5.5
	Unknown	20	12.2
	No	135	82.3
Smoking History of participants	Yes	32	19.5
	No	132	80.5

Notes: Data are presented as Number (N) and percentage (%). No statistical analysis was applied.

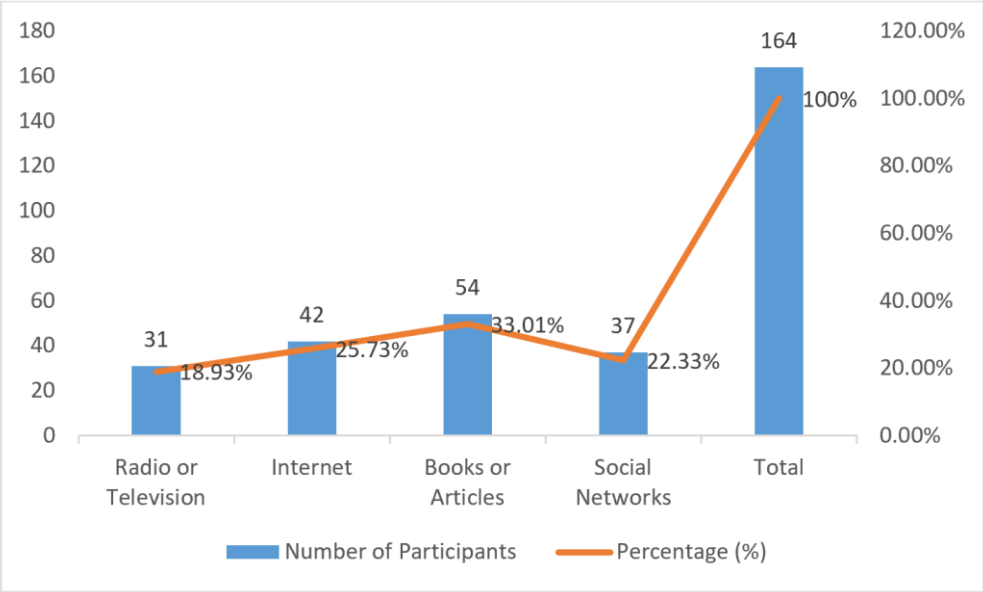

Figure 1: Sources of information about lung cancer. The bar chart illustrates the percentage distribution of individuals obtaining information about lung cancer from four different sources.

Students' Awareness Levels about Lung Cancer

The majority of students 132 (80.49%) had a good level of awareness about lung cancer and its risk factors, while a smaller proportion 32 (19.51%) demonstrated poor awareness (Figure 2). This overall positive awareness level indicates a relatively strong understanding of the topic among the student population.

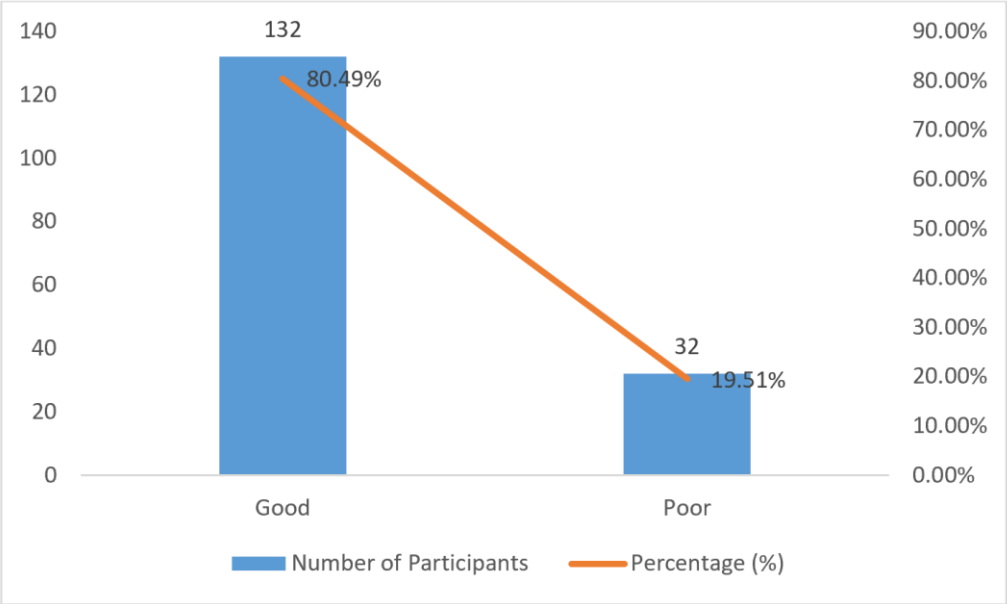

Figure 2: The pie chart illustrates the distribution of students' awareness levels, divided into two categories: good awareness and poor awareness.

Students' Awareness of Risk Factors of Lung Cancer

Participants showed high awareness of major risk factors for lung cancer (Table 2). Nearly all respondents 161 (98.2%) correctly identified smoking as a key risk factor. A substantial proportion also recognized the risks associated with alcohol consumption 129 (78.7%) and passive smoking 125 (76.2%). Awareness was lower for less commonly emphasized risk factors: fried and processed foods 113 (68.9%) and occupational exposure 104 (63.4%). Notably, nearly one-third of students did not associate dietary habits or occupational exposures with lung cancer, indicating potential gaps in public health education.

Table 2: Awareness of Lung Cancer Risk Factors

Variables	*Categories*	*Number*	*Percentage*
Is smoking a risk factor for lung cancer?	Yes	161	98.2%
	No	3	1.8%
Are fried and processed foods a risk factor for lung cancer?	Yes	113	68.9%
	No	51	31.1%
Is alcohol a risk factor for lung cancer?	Yes	129	78.7%
	No	35	21.3%
Is passive smoking an inactive risk factor for lung cancer?	Yes	125	76.2%
	No	39	23.8%
Is an occupational exposure a risk factor for lung cancer?	Yes	104	63.4%
	No	60	36.6%

Notes: Data are presented as Number (N) and percentage (%). No statistical analysis was applied.

Students' Awareness about Lung Cancer

As shown in (Table 3), 125 (76.2%) of participants were aware that lung cancer is among the most common cancers, and 115 (70.1%) correctly identified it as a leading cause of death. Awareness of prevention and lifestyle factors was moderate, 116 (70.7%) believed that exercise can reduce lung cancer risk, and 106 (64.6%) believed that lung cancer is preventable. However, 44 (26.8%) of students reported uncertainty regarding the preventability of lung cancer. Regarding age and risk, 118 (72%) of participants recognized that older adults are at higher risk, whereas awareness of genetic and hereditary components was relatively low. Only 23 (14%) believed lung cancer is genetic, and 24 (14.6%) believed it is inherited, while a significant proportion were unsure. These findings reflect strong understanding of lifestyle-related risk factors but limited knowledge of genetic predisposition.

Among the symptoms of lung cancer, the most recognized symptom among students was shortness of breath, identified by 52 (31.72%). Additionally, weight loss and hemoptysis were each identified by 38 (22.91%) as symptoms of lung cancer (Figure 3).

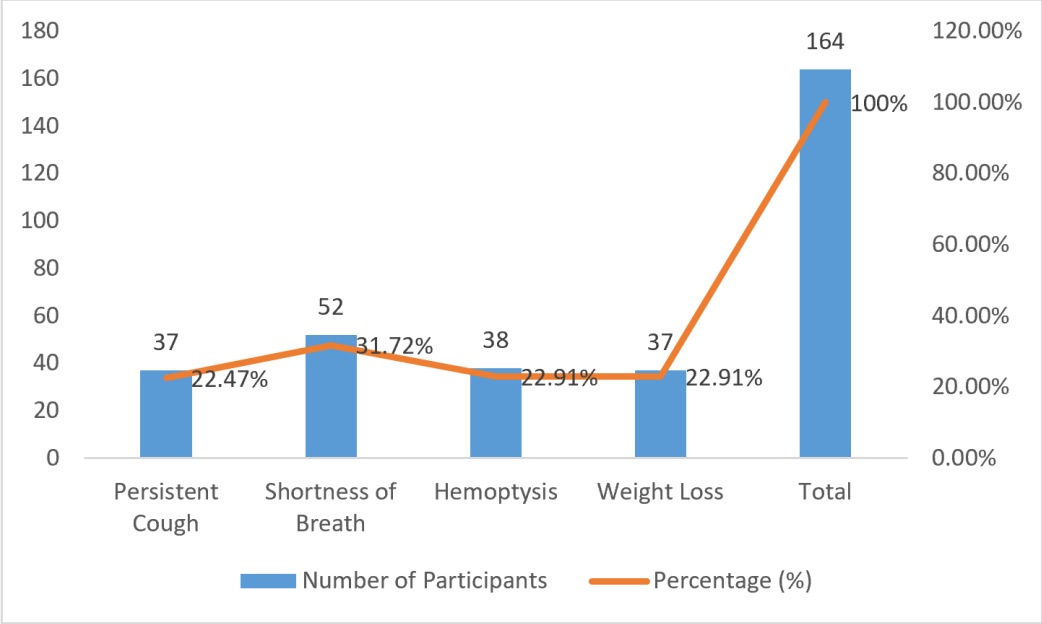

Figure 3: Common Symptoms of Lung Cancer. This figure highlights the primary symptoms associated with lung cancer, including persistent cough, shortness of breath, hemoptysis, and weight loss, emphasizing the varying prevalence of these symptoms among patients.

Table 3: Awareness about lung cancer

Variables	*Categories*	*Number*	*Percentage*
Do you know that lung cancer is one of the most common cancers?	Yes	125	76.2
	No	22	13.4
	Do not Know	17	10.4
Do you know that lung cancer is one of the leading causes of death?	Yes	115	70.1
	No	25	15.2
	Do not Know	24	14.6
Does exercising help reduce the risk of lung cancer?	Yes	116	70.7
	No	13	7.9
	Do not Know	35	21.3
Is lung cancer preventable?	Yes	106	64.6
	No	14	8.5
	Do not Know	44	26.8
Can lung cancer occur at any age?	Yes	105	64
	No	17	10.4
	Do not Know	42	25.6
Are older adults at a higher risk of developing lung cancer?	Yes	118	72
	No	10	6.1
	Do not Know	36	22
Is lung cancer a genetic disease?	Yes	23	14
	No	90	54.9
	Do not Know	51	31.1
Is lung cancer an inherited disease?	Yes	24	14.6
	No	103	62.8
	Do not Know	37	22.6

Notes: Data are presented as Number (N) and percentage (%). No statistical analysis was applied.

Factors associated with level of awareness and demographic

The analysis of factors associated with the level of awareness and demographic variables is presented in (Table 4). The analysis revealed that awareness levels were generally high across all groups; however, there were no significant differences between age groups (χ^2 = 0.598, *P*=0.439) or educational years (χ^2=2.855, *P*=0.415). Participants with different economic statuses exhibited similar levels of awareness, with no meaningful variation observed (χ^2=0.189, *P*=0.910). Likewise, marital status, family history of lung cancer, and smoking history did not show any notable impact on awareness levels (*P*>0.05). Overall, demographic factors played a limited role in influencing awareness about lung cancer, highlighting consistency in awareness levels across diverse groups.

Table 4: Factors associated with level of awareness and Demographic

Variables	*Awareness Level N(%)*		*χ 2*	*P-*
	Good	Poor		**value**
Age Group (yr)				
18-20	48 (77.4c)	14 (22.6)	0.598	0.439
21-24	84 (82.4)	18 (17.6)		
Year of education				
1st year	27 (77.1)	8 (22.9)	2.855	0.415
2nd year	30 (78.9)	8 (21.1)		
3rd year	40 (76.9)	12 (23.1)		
4th year	35 (89.7)	4 (10.3)		
Economic Status				
Good	15 (83.3)	3 (16.7)	0.189	0.91
Average	107 (79.9)	27 (20.1)		
Poor	10 (83.3)	2 (16.7)		
Marital status				
Single	121 (80.1)	30 (19.9)	0.153	0.696
Married	11 (84.6)	2 (15.4)		
Family History of Lung Cancer				
Yes	7 (77.8)	2 (22.2)	0.322	0.851
Unknown	17 (85)	3 (15)		
No	108 (80)	27 (20)		
Smoking History of participants				
Yes	24 (75)	8 (25)	0.762	0.383
No	108 (81.8)	24 (18.2)		

Notes: Data are presented as frequency (N) and percentage (%). The association between demographic characteristics and participants' awareness level was analyzed using the Chi-square test (χ^2). A *P*-value less than 0.05 was considered statistically significant.

Discussion

The findings of this study indicated that the age range of participants was 18-24 yr, which is consistent with other similar studies (17, 19, 20). This similarity might be attributed to the study population, as most of these studies focused on young individuals within the same age range. In our findings, the majority of participants were single (92.1%), which closely aligns with studies conducted in Saudi Arabia (17, 19) and Malaysia (21). This similarity could be due to the young population, particularly students and unmarried individuals, who participated in these studies. Our findings showed that only

5.5% of the participants reported a family history of lung cancer, while 82.3% denied having such a history. This finding is closely aligned with a study conducted in Saudi Arabia (22), where 3.7% of individuals reported a family history of lung cancer. The slight difference could be attributed to variations in family lifestyles and health habits among the populations.

Our study revealed that 19.5% of participants had a history of smoking, while 80.5% did not. This finding closely aligns with studies conducted in Saudi Arabia (18, 19). These differences might be explained by geographical location, economic conditions, and lifestyle differences among the populations. This study showed that the majority of participants had good awareness (80.49%), and only a few of them had poor awareness (19.51%). Meanwhile, in two conducted studies (21, 23), they demonstrated good awareness, whereas in three other studies (24-26), they exhibited poor awareness. This suggests a potential variability in awareness that could be influenced by national education campaigns, cultural perceptions of cancer, and the accessibility of accurate health information.

The present study demonstrated that 98.2% of participants identified smoking as a risk factor for lung cancer. This finding aligns with studies conducted in Malaysia (17) and Saudi Arabia (18). The similarity might be due to public awareness about the negative effects of smoking, particularly in urban areas. This study also showed that fried foods, alcohol, and occupational exposure were identified as risk factors for lung cancer, closely aligned with a study conducted in Malaysia (17). This similarity might be attributed to similarities in lifestyle and dietary habits among these populations. Our findings indicated that most participants had a good level of awareness (80.5%), while only 19.5% had poor awareness. These findings noticeably differ from studies conducted in India (20), Saudi Arabia (19, 22), and Malaysia (21). This difference might be due to variations in public education, access to health information, and awareness programs in these regions.

Our findings revealed that the major symptoms of lung cancer among participants were persistent cough (22.47%), shortness of breath (31.72%), hemoptysis (22.91%), and weight loss (22.91%). When compared with previous studies, these same symptoms have also been commonly reported in the literature. Similar patterns were observed in studies conducted in South Africa (27) and Saudi Arabia (18, 19), although the reported percentages varied. These differences could be attributed to disparities in lung cancer awareness and access to healthcare services among populations.

The findings of this study contribute valuable insights into the level of lung cancer awareness among young adults in Afghanistan, an area where little research exists. The results can help guide awareness campaigns, public health education programs, and university-level interventions aimed at reducing risk factors and promoting early detection. Specifically, by identifying key misconceptions and awareness gaps, health authorities can develop targeted educational content for young adults, which may lead to improved preventive behaviors and timely healthcare-seeking. Given the growing burden of non-communicable diseases in low- and middle-income countries, such localized data are crucial for evidence-based policy-making.

Limitations

This study was conducted at the Public Health Faculty of Kabul University of Medical Sciences in Afghanistan, which limits the generalizability of the findings to the broader student population or general public. Furthermore, due to existing socio-political challenges and cultural barriers

particularly restrictions on female education the study encountered substantial difficulty in accessing female students for questionnaire distribution. This limitation may have influenced the results, as the perspectives and awareness levels of female students could differ significantly from those of male participants.

Conclusion

This study highlights crucial gaps in students' awareness of lung cancer, particularly concerning less recognized risk factors and symptoms. While general knowledge about well-known risks such as smoking was high, the limited understanding of occupational exposures and dietary influences indicates areas where public health education remains insufficient. These gaps may hinder early detection and prevention efforts. The uniformity of awareness across different demographic groups suggests that future awareness campaigns should adopt a universal design, rather than targeting specific subgroups. Moreover, the lack of differentiation in awareness between smokers and non-smokers underscores the need for comprehensive, inclusive educational strategies. These findings underscore the urgent need for structured and accessible awareness programs within educational institutions. Such initiatives should aim not only to improve awareness but also to promote proactive health behaviors. Future research could explore the long-term effectiveness of these programs, their adaptability to different student populations, and their potential role in reducing lung cancer incidence.

Data availability

The data are not publicly available due to ethical restrictions and anonymity but can be obtained upon request from the corresponding author at (bashirqudrati786@gmail.com).

Funding

This research was conducted without any financial support from external sources.

Conflict of interest

The authors declare that there is no conflict of interests.

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