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FACTORS ASSOCIATED WITH CIGARETTE SMOKING AMONG UNDERGRADUATE NURSING STUDENTS AT A PRIVATE COLLEGE, HYDERABAD

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Abstract

Background: Cigarette smoking remains a major global public health concern and is particularly prevalent among young adults, including undergraduate nursing students. Despite their medical knowledge, nursing students are not immune to smoking initiation due to various social, psychological, and environmental influences.

Objective: The study aimed to determine the prevalence of cigarette smoking and identify associated factors among undergraduate nursing students in a private college in Hyderabad, Pakistan.

Methodology: A descriptive cross-sectional study was conducted over three months (January–March 2026) among 169 undergraduate nursing students selected through convenience sampling. Data were collected using a structured, self-administered questionnaire adapted from the National Youth Tobacco Survey (NYTS). Descriptive statistics and Chi-square tests were used, with significance set at $p < 0.05$.

Results: The prevalence of cigarette smoking was 26%. Gender, peer influence, and academic stress showed significant associations with smoking behavior, while age, year of study, living status, and family smoking were not significant.

Conclusion: Smoking among nursing students is mainly influenced by peer pressure and academic stress. Targeted interventions such as peer education and stress management programs are recommended.

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INTRODUCTION

Cigarette smoking remains one of the most significant global public health challenges and a leading cause of preventable death. According to recent global estimates, tobacco use is responsible for more than **8 million deaths annually,** including approximately **1.3 million deaths due to second-hand smoke exposure**. The burden of tobacco use is disproportionately higher in low- and middle-income countries, where nearly **80% of smokers reside** [1].

Young adults, particularly university students, represent a high-risk group for smoking initiation and continuation. Studies conducted between 2021 and 2025 indicate that the prevalence of smoking among university students ranges from **15% to 35% globally**, with higher rates observed in male students and those in stressful academic environments. Among healthcare students, including nursing students, smoking prevalence remains concerning despite their knowledge of the harmful effects of tobacco [2].

Similarly, recent studies emphasize that smoking behavior among university students is strongly associated with social and behavioral determinants. Factors such as peer pressure, family members who smoke, and cultural acceptance significantly increase the likelihood of smoking among students. In addition, stress related to academic workload and clinical training has been identified as a key contributor to smoking behavior among nursing students [3].

A 2023 study conducted among undergraduate nursing students found that tobacco use is influenced by a combination of **socio-demographic characteristics, peer influence, and accessibility of tobacco products**, highlighting the multifactorial nature of smoking behavior [4].

Furthermore, evidence suggests that having family members who smoke increases students' exposure to tobacco and normalizes smoking behavior, thereby increasing the likelihood of adoption[5].

Recent literature (2024–2025) also indicates that emerging forms of nicotine use, such as e-cigarettes, are becoming increasingly common among university students. These trends reflect changing patterns of tobacco consumption and highlight the importance of understanding behavioral and social determinants of smoking among young adults [6].

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Additionally, studies show that environmental and institutional factors, such as lack of strict tobacco control policies within educational institutions, contribute to smoking behavior among students. Even in healthcare settings, where knowledge is expected to be high, smoking persists due to psychological and social influences[7].

In developing countries like Pakistan, smoking among university students, including nursing students, is an increasing concern due to weak policy implementation, easy availability of cigarettes, and socio-cultural acceptance. Identifying the determinants of cigarette smoking among undergraduate nursing students in private colleges is therefore essential for designing effective prevention strategies and strengthening tobacco control interventions. A comprehensive search of peer-reviewed databases and journals yielded key articles emphasizing prevalence rates ranging from 17.6% to 42.6% and multifaceted influences such as peer pressure, academic stress, and campus culture[4, 8, 9]. Prevalence of cigarette smoking among nursing students varies widely by region and setting but remains alarmingly high globally. In a 2020 multicenter cross-sectional study across nursing faculties in Spain and Portugal (N=1,469; 79.8% response rate; 80% female; mean age 21.9 years), the overall tobacco use prevalence was 18.9% (277/1,469), with 16.2% in Portugal and 18.3% in Spain. This figure slightly exceeded the general European young adult rate (18.5% for ages 15–24) and included only 1.1% exclusive e-cigarette use. Notably, 15.8% initiated smoking during university, with rates rising across academic years (3.4% in year 1 to 23.2% in year 4). The study highlighted that students from non-traditional secondary paths had higher rates (27.1% vs. 16.4%), suggesting transitional stressors in higher education amplify uptake [9]. In Spain, a 2024 prospective longitudinal study of Catalan nursing students (baseline N=4,381; 29.7% current smokers; 61.9% daily) followed 276 baseline smokers over ~3 years. Baseline smoking was 29.7%, higher than medical students (17.5% in comparative data). At follow-up, 71.7% continued smoking, but 28.3% quit and 60.8% reduced consumption by ≥5 cigarettes/day (CPD). Poly-tobacco use was prevalent (higher among continuing students), and transitions were unstable—36.2% of non-daily smokers escalated to daily, while only 12.1% of daily reduced intensity. The study included public, private-

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with-public-funding (23.9%), and fully private universities (43.1%), with no significant transition differences by institution type, yet underscored vulnerability in all settings[10]. A 2022 study in a private university in Manila, Philippines (N=477 nursing students; 79.5% response) found 17.6% smoking prevalence alongside vaping risks, with knowledge of diseases moderate but insufficient to deter use[7]. In Nepal (2024), tobacco use among nursing (disaggregated from medical/dental) showed notable rates driven by similar social factors[11]. Similarly, the 2020 European multicenter reported males at 24.4% vs. 19% females ($p < 0.05$), with gender differences in university initiation (males 27.4% vs. females 12.1%)[12]. Academic year and age also matter. Smoking initiation and intensity increase with progression: European data showed year 4 at 23.2% new starts; Pakistani students (mean age ~25) had higher current use in later years. In Jordan (2025), advanced years (5–8) had 88.9% smoking vs. 68.6% early years ($p=0.004$), with GPA inversely correlated (lowest GPA 85.7% smokers). Private college students, often facing higher fees and competition, may experience amplified effects—Philippine private university data linked senior-year stress to elevated risks Other factors include nationality, income, and residence. Jordanian nationals smoked more (74.2%) than others; Pakistani fathers' use (17.7%) predicted offspring behavior. In private settings, higher socioeconomic students (via fees) paradoxically showed mixed patterns—some protected by awareness, others enabled by disposable income for tobacco. These demographics interact with context: private colleges in Pakistan/Philippines mix genders and include international students, potentially heightening peer exposure [13].

Aim of the Study:

The aim of this study was to determine the prevalence and identify the factors associated with cigarette smoking among undergraduate nursing students in a private college, Hyderabad.

Objectives:

- To determine the prevalence of cigarette smoking among undergraduate nursing students.

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- To assess the association of socio-demographic factors (age, gender, year of study, and current living status) with cigarette smoking among undergraduate nursing students.
- To examine the association of peer influence (close friends smoking and being offered cigarettes by friends) with cigarette smoking among undergraduate nursing students.
- To determine the association between smoking to relieve academic stress and cigarette smoking among undergraduate nursing students.
- To explore the association of family member smoking status with cigarette smoking among undergraduate nursing students.

MATERIALS AND METHODS

A descriptive cross-sectional study design was used to identify the factors associated with cigarette smoking among undergraduate nursing students. This design was considered appropriate as it allows the collection of data at a single point in time to determine prevalence and examine associations between variables.

The study was conducted at Al-Biruni College of Nursing, Hyderabad, Sindh, Pakistan. This private nursing college was selected because it provides education to undergraduate nursing students from diverse backgrounds. The data were collected over a period of three months from January 2026 to March 2026. The target population consisted of all undergraduate nursing students (1st to 4th year) enrolled at Al-Biruni College of Nursing, Hyderabad. The total population was approximately 300 students.

The sample size was calculated using the Raosoft sample size calculator with the following parameters, Population size: 300, Margin of error: 5%, Confidence level: 95% The calculated sample size was **169** participants. A non-probability **convenience sampling** technique was used to recruit the participants. The online link of the questionnaire was shared with the students through WhatsApp groups and they were invited to participate voluntarily. Included participant Undergraduate nursing students (1st year to 4th year) enrolled in the selected private nursing college, Students who were

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willing to participate voluntarily, Students who provided informed consent, Both male and female students. Not included participant Students who did not give consent to participate., Students who submitted incomplete questionnaires, Duplicate responses. Data were collected using a structured, self-administered questionnaire adapted from the **National Youth Tobacco Survey (NYTS)**. The questionnaire consisted of the following sections:

1. Socio-demographic characteristics (age, gender, year of study, current living status).
2. Cigarette smoking ("Have you ever tried cigarette smoking, even one or two puffs?").
3. Factors associated with smoking (peer influence, family smoking, academic stress, being offered cigarettes by friends).

The questionnaire included closed-ended questions (Yes/No) and multiple-choice items.

The questionnaire was adapted from a standardized tool (NYTS). Content validity was ensured through expert review by preceptor. The reliability of the tool was assessed using Cronbach's alpha, which was found to be **0.70**, indicating acceptable internal consistency[14]. After obtaining official permission from the college administration, the Google Forms link of the questionnaire was distributed to the students through class WhatsApp groups. Participants were informed about the purpose of the study, voluntary participation, and confidentiality. Informed consent was obtained electronically from all participants via the Google Form prior to their participation in the study. Data were analyzed using SPSS version 27. **Descriptive statistics**: Frequencies and percentages were used to summarize categorical variables. **Inferential statistics**: The Chi-square test of independence was applied to examine the association between cigarette smoking (dependent variable) and independent variables (age, gender, year of study, living status, peer influence, family smoking, and academic stress), A p-value of **< 0.05** was considered statistically significant. Official permission was taken from the Principal of Al-Biruni College of Nursing, Online informed consent was obtained from all participants through the Google Form, Participation was voluntary, and participants had the right to withdraw at any time, Confidentiality and anonymity of the participants were strictly maintained., Data were used only for academic and research purposes.

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RESULTS

Table 4.1: Case Processing Summary of Study Variables (n = 169)

Variable	Valid (n)	Valid (%)	Missing (n)	Missing (%)	Total (n)	Total (%)
Behavior	169	100%	0	0%	169	100%
Personal	169	100%	0	0%	169	100%
Social	169	100%	0	0%	169	100%
Knowledge	169	100%	0	0%	169	100%

The case processing summary indicates that all 169 respondents were included in the analysis with no missing data. All study variables, including behavioral, personal, social, and knowledge scores, showed 100% valid responses and 0% missing values. This reflects complete data collection and ensures that the dataset is reliable and suitable for further statistical analysis without any exclusion of cases.

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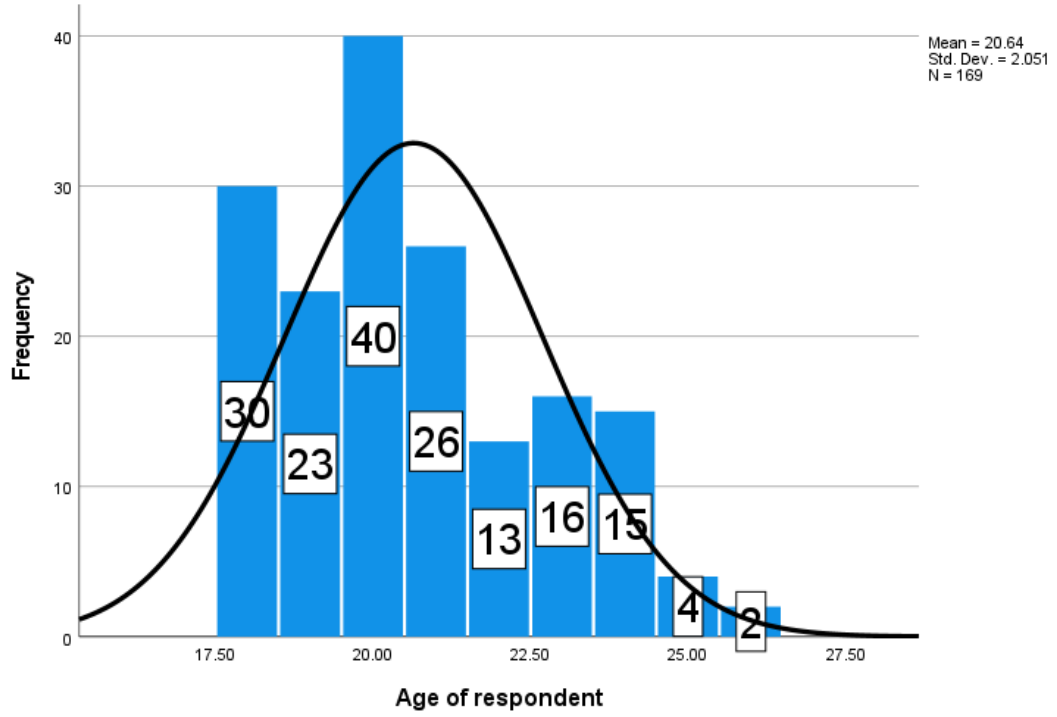
Socio-Demographic Characteristics of Respondents (n = 169)

Graph 1 Age of Respondents



The graph shows that most respondents are concentrated between **18 to 22 years**, indicating a young undergraduate population. The highest frequency is around **20 years**, which appears to be the average age (Mean ≈ 20.64). The distribution is slightly **right-skewed**, with fewer students above 24 years. Very few respondents fall in the older age range (25–27 years).

Overall, the data suggests a typical age pattern for undergraduate nursing students.

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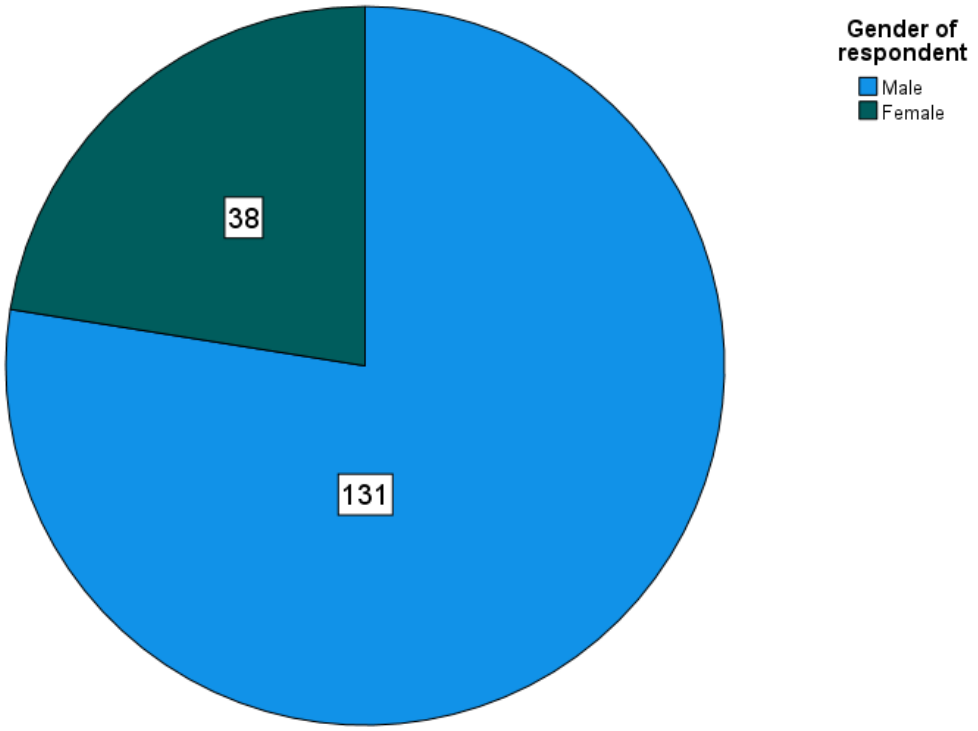
Graph 2 Gender of Respondents



The majority of respondents are **male (131)** compared to **female (38)**. This indicates a strong **male dominance** in the sample population. Females represent a much smaller proportion of the total participants. The imbalance may influence study results, especially in gender-related outcomes. Overall, the sample is not gender-balanced.

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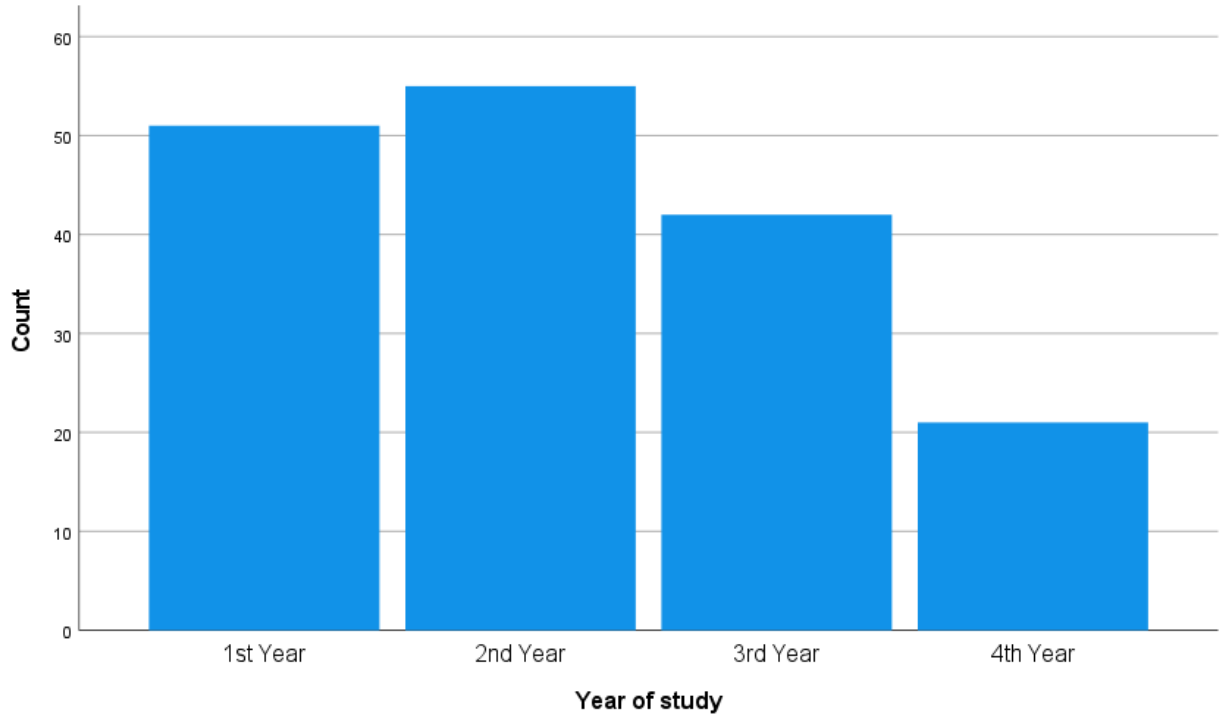
Graph 3 Year of Study



Most participants belong to the **2nd year**, followed closely by the **1st year**. The number of students decreases in higher years, with the **4th year having the least** respondents. This suggests better participation from junior students compared to seniors. Possible reasons could include availability or willingness to participate. Overall, the sample is more representative of early academic years.

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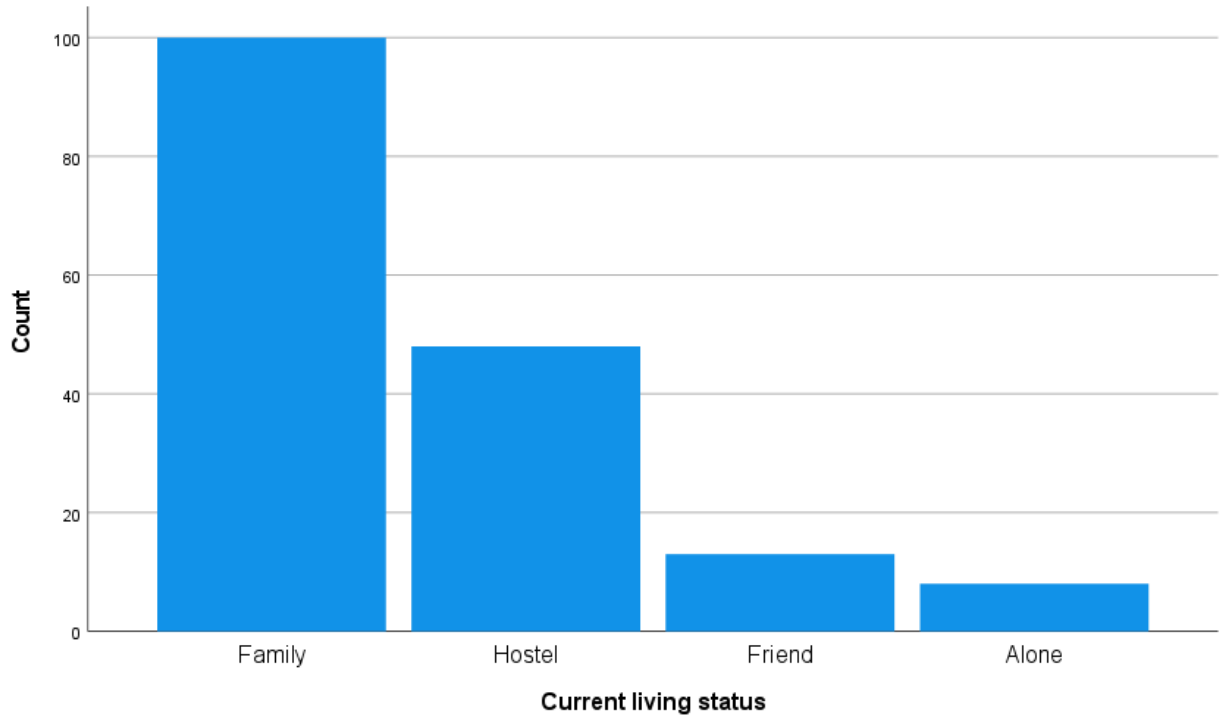
Graph 4 Current Living Status



The majority of students live with their **family**, making it the most common living arrangement. A significant number also live in **hostels**, indicating institutional accommodation. Very few students live with **friends or alone**, showing these are less common choices. Living conditions may influence sleep patterns and academic performance. Overall, family-based living dominates among respondents.

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Table 4.2: Descriptive Statistics of Study Variables (n = 169)

Variable	Median	IQR	Minimum	Maximum
Behavior	14.00	2.00	6	18
Personal	10.00	2.00	6	20
Social	9.00	4.00	4	20
Knowledge	12.00	6.00	3	15

The descriptive statistics of the study variables indicate that the median behavioral score was 14.00 with an interquartile range (IQR) of 2.00, suggesting relatively consistent behavioral responses among participants. The personal score had a median of 10.00 with an IQR of 2.00, indicating low variability in personal factors.

The median social score was 9.00 with an IQR of 4.00, reflecting moderate variability among respondents. In contrast, the knowledge score showed a median of 12.00 with the highest IQR of 6.00, indicating greater dispersion and variability in knowledge levels among the participants.

Overall, the findings suggest that behavioral and personal domains were more consistent, whereas social and especially knowledge domains showed greater variability. Since the data were not normally distributed, median and interquartile range were used as appropriate measures of central tendency and dispersion.

Table 4.3: Association of Age with Cigarette Smoking

Age of Respondent	Smoker n (%)	Non-Smoker n (%)	Total	p-value
18-20 years	16 (21.1%)	60 (78.9%)	76	
21-23 years	21 (33.9%)	41 (66.1%)	62	
24-26 years	5 (21.7%)	18 (78.3%)	23	

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Above 26 years	2 (25.0%)	6 (75.0%)	8	
Total	44 (26.0%)	125 (74.0%)	169	0.364

A chi-square test of independence was conducted to examine the association between age of the respondent and whether they had ever tried cigarette smoking (even one or two puffs). The results indicated no statistically significant association between age and cigarette smoking, $\chi^2(3, N = 169) = 3.181$, $p = .364$.

The proportion of students who had tried cigarette smoking ranged from 21.1% in the 18–20 years age group to 33.9% in the 21–23 years age group. One cell (12.5%) had an expected count less than 5 (minimum expected count = 2.08); however, the overall results remain interpretable.

Table 4.4: Association of Gender with Cigarette Smoking

Gender	**Smoker n** (%)	**Non-Smoker n** (%)	**Total**
Male	40 (30.8%)	90 (69.2%)	130
Female	4 (10.3%)	35 (89.7%)	39
Total	**44 (26.0%)**	**125 (74.0%)**	**169**

A chi-square test of independence was conducted to examine the association between gender (Male vs. Female) and whether the respondents had ever tried cigarette smoking (even one or two puffs). The two respondents who identified as "Others" were merged into the Female category. The results revealed a **statistically significant association** between gender and cigarette smoking: **$\chi^2(1, N = 169) = 5.312$, $p = 0.021$**. Male respondents were significantly more likely to have tried cigarette smoking (30.8%) compared to female respondents (10.3%). This indicates that gender is a significant factor associated with cigarette smoking.

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Table 4.5 Gender and Cigarette Smoking (Chi-Square Test)

Gender	Tried Smoking (Yes)	Tried Smoking (No)	Total	Chi-square (χ^2)	p-value
Male	40	92	132		
Female	4	33	37		
Total	**44**	**125**	**169**	**5.702**	**0.017**

Males have a higher proportion of trying smoking (40) compared to females (4). The p-value (0.017) < 0.05, which means the result is statistically significant.

There is a significant association between gender and cigarette smoking, with males more likely to try smoking than females.

Table 4.2 Association of Year of Study with Cigarette Smoking Status

Year of Study	Smoker n (%)	Non-Smoker n (%)	Total	p-value
1st Year	12 (21.8%)	43 (78.2%)	55	
2nd Year	14 (28.0%)	36 (72.0%)	50	
3rd Year	8 (27.6%)	21 (72.4%)	29	
4th Year	10 (28.6%)	25 (71.4%)	35	
Total	44 (26.0%)	125 (74.0%)	169	0.859

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A chi-square test of independence was conducted to examine the association between year of study and cigarette smoking status (whether the respondent had ever tried cigarette smoking even one or two puffs). The results indicated no statistically significant association between year of study and cigarette smoking, $\chi^2(3, N = 169) = 0.761$, $p = .859$. The proportion of students who had tried cigarette smoking was similar across all years of study, ranging from 21.8% in 1st year to 28.6% in 4th year. All expected cell counts were above 5 (minimum expected count = 7.55), satisfying the assumptions of the chi-square test.

Table 4.6: Association of Current Living Status with Cigarette Smoking Status

Current Living Status	**Smoker n (%)**	**Non-Smoker n (%)**	**Total**
Family	27 (27.0%)	73 (73.0%)	100
Hostel	12 (26.1%)	34 (73.9%)	46
Friend	3 (25.0%)	9 (75.0%)	12
Alone/Others	2 (18.2%)	9 (81.8%)	11
Total	**44 (26.0%)**	**125 (74.0%)**	**169**

A chi-square test of independence was conducted to examine the association between current living status and whether the respondents had ever tried cigarette smoking (even one or two puffs). The analysis revealed **no statistically significant association** between current living status and cigarette smoking: $\chi^2(3, N = 169) = 0.407$, $p = 0.939$. The proportion of students who had tried cigarette smoking was relatively similar across different living arrangements, ranging from 18.2% among those living alone/others to 27.0% among those living with family.

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Table 4.7 Association of Close Friends' Smoking Status with Cigarette Smoking

Close Friends Smoke	Smoker n (%)	Non-Smoker n (%)	Total
Yes	25 (47.2%)	28 (52.8%)	53
No	19 (16.5%)	97 (83.5%)	116
Total	**44 (26.0%)**	**125 (74.0%)**	**169**

A chi-square test of independence was conducted to examine the association between whether the respondent's close friends smoke and whether the respondent had ever tried cigarette smoking (even one or two puffs. The results showed **a highly statistically significant association: $\chi^2(1, N = 169) = 16.347, p < 0.001$.** Respondents whose close friends smoke were substantially more likely to have tried cigarette smoking (47.2%) compared to those whose close friends do not smoke (16.5%). This indicates a strong relationship between peer smoking behavior and personal smoking initiation.

Table 4.8 Association of Family Member Smoking Status with Cigarette Smoking

Does any family member smoke?	Smoker n (%)	Non-Smoker n (%)	Total
Yes	13 (32.5%)	27 (67.5%)	40
No	31 (24.0%)	98 (76.0%)	129
Total	**44 (26.0%)**	**125 (74.0%)**	**169**

A chi-square test of independence was conducted to examine the association between family member smoking status and whether the respondents had ever tried cigarette smoking (even one or two puffs). The results indicated **no statistically significant association** between family member smoking and cigarette smoking: **$\chi^2(1, N = 169) = 0.740, p = 0.390$**. Although a higher percentage of respondents

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with smoking family members had tried cigarette smoking (32.5%) compared to those without smoking family members (24.0%), this difference was not statistically significant.

Table 4.9 Association of Being Offered Cigarettes by Friends with Cigarette Smoking

Have you ever been offered cigarettes by friends?	Smoker n (%)	Non-Smoker n (%)	Total
Yes	29 (54.7%)	24 (45.3%)	53
No	15 (12.9%)	101 (87.1%)	116
Total	**44 (26.0%)**	**125 (74.0%)**	**169**

A chi-square test of independence was conducted to examine the association between having ever been offered cigarettes by friends and whether the respondents had ever tried cigarette smoking (even one or two puffs). The results revealed a **highly statistically significant association: $\chi^2(1, N = 169) = 30.851$, $p < 0.001$**. Respondents who had been offered cigarettes by their friends were significantly more likely to have tried cigarette smoking (54.7%) compared to those who had never been offered cigarettes (12.9%). This indicates a strong relationship between being offered cigarettes by peers and personal smoking initiation.

Table 4.10 Association of Smoking to Relieve Academic Stress with Cigarette Smoking

Do you smoke to relieve academic stress?	Smoker n (%)	Non-Smoker n (%)	Total
Yes	10 (58.8%)	7 (41.2%)	17
No	34 (22.4%)	118 (77.6%)	152
Total	**44 (26.0%)**	**125 (74.0%)**	**169**

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A chi-square test of independence was conducted to examine the association between smoking to relieve academic stress and whether the respondents had ever tried cigarette smoking (even one or two puffs). The results showed a **statistically significant association: $\chi^2(1, N = 169) = 8.744$, $p = 0.003$.** Respondents who reported smoking to relieve academic stress were significantly more likely to have tried cigarette smoking (58.8%) compared to those who did not (22.4%). This suggests that using cigarettes as a coping mechanism for academic stress is associated with higher rates of smoking initiation.

DISCUSSION

The present study examined the factors associated with cigarette smoking among undergraduate students. The findings revealed that **26% of respondents had tried cigarette smoking**, which indicates a moderate prevalence among students. This finding is consistent with previous studies that reported smoking among university students ranging between 20% and 35% [15]**.** However, the prevalence observed in this study is slightly lower than studies conducted in Western populations, where higher rates have been reported[16]. In this study, **age was not significantly associated with cigarette smoking** ($p = .364$). This finding is similar to studies, who also reported no significant relationship between age and smoking behavior among young adults[17]. However, it contrasts with other studies where older students showed higher smoking rates due to increased independence and exposure [18]. Gender, on the other hand, showed **a statistically significant association with smoking** ($p = .036$), with males more likely to smoke than females [19]. This finding is consistent with multiple studies[20], which reported higher smoking prevalence among males due to cultural norms, social acceptability, and risk-taking behaviors. In contrast, female smoking remains lower in many developing countries due to social stigma[21] The **year of study was not significantly associated with smoking** ($p = .859$), which aligns with findings from more two studies [22, 23]. However, some studies suggest that senior students may have higher smoking rates due to stress and academic pressure which was not observed in this study.[24] Similarly, **current living status showed no significant association** with smoking behavior ($p = .925$). This result found that living arrangements did not

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significantly influence smoking behavior, however, other studies have reported that students living away from family are more likely to smoke due to reduced supervision[25]. One of the most significant findings of this study is the strong influence of peers. The study found that **students whose close friends smoke were significantly more likely to try smoking** ($p < .001$). This result strongly supports previous research highlighting peer influence as a key predictor of smoking behavior [26]. Peer pressure and social acceptance are well-documented factors contributing to smoking initiation among adolescents and young adults [27]. Similarly, **being offered cigarettes by friends was highly associated with smoking** ($p < .001$)[28]. This finding emphasize that direct exposure and offers significantly increase the likelihood of smoking initiation[29]. In contrast, **family member smoking was not significantly associated** with smoking behavior ($p = .401$). This finding differs from several studies that identified parental smoking as a strong predictor [30]. However, some recent studies suggest that peer influence may outweigh family influence in young adult which supports the findings of this study.[31]. The study also found a **significant association between smoking to relieve academic stress and smoking** ($p = .008$). Students who reported using smoking as a coping mechanism were more likely to engage in smoking behavior. This finding identified stress as a major contributing factor to smoking initiation[32]. Academic stress, particularly among nursing students, has been widely reported as a trigger for unhealthy coping behaviors, including smoking. This highlights the importance of stress management interventions in reducing smoking behavior[33]. The study had a complete dataset (100% response rate) with no missing values, enhancing reliability. A relatively adequate sample size ($n = 169$) improves the generalizability within the study setting. Use of chi-square tests allowed appropriate analysis of associations between categorical variables. The study examined multiple influencing factors (demographic, social, psychological), providing a comprehensive understanding. This study has several limitations that should be considered while interpreting the findings. First, the use of a cross-sectional study design limits the ability to establish causal relationships between cigarette smoking and associated factors; only associations can be identified. Second, the study was conducted in a single private nursing college, which may limit the generalizability of the results to

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other institutions or regions. Third, a non-probability convenience sampling technique was used, which may introduce selection bias and affect the representativeness of the sample. Additionally, the data were collected using a self-administered questionnaire, which may be subject to reporting bias, as participants might underreport or over report their smoking behavior due to social desirability. The study also had a gender imbalance, with a higher proportion of male participants, which may influence the findings related to gender differences. Health education programs should be implemented to raise awareness about the risks of smoking. Peer-led interventions should be designed to reduce peer pressure and promote healthy behaviors. Universities should provide stress management and counseling services for students. Anti-smoking campaigns should particularly target male students, who are at higher risk. Future research should use longitudinal designs to establish causal relationships. Larger and more diverse samples should be included to improve generalizability.

Conclusion

The study concludes that cigarette smoking among students is influenced more by social and psychological factors than demographic characteristics. While age, year of study, and living status were not significantly associated, gender, peer influence, and stress-related factors played a significant role. Peer-related factors, including having friends who smoke and being offered cigarettes, emerged as the strongest predictors of smoking behavior. Additionally, academic stress contributes to smoking as a coping mechanism. These findings highlight the need for targeted interventions focusing on peer influence and stress management

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