Libyan Med J. 2025;17(3):302-306
https://doi.org/10.69667/lmj.2517301
Libyan Medical Journal
https://lmj.ly/index.php/ojs/index *eISSN: 2079-1224*

Original article

Cigarette Smoking Among Libyan Adolescents: Prevalence, Initiation Factors, And Prevention Implications

Halima Buni[1]*, Khaled Elmaghbub[2]
[1]*Department of Family and Community Medicine-Faculty of Medicine, University of Tripoli, Tripoli, Libya*
[2]*Paediatric Intensive Care Unit, Tripoli Children Hospital, Tripoli, Libya*
Corresponding email. *h.buni@uot.edu.ly*

Keywords:
Cigarette Smoking, Adolescents, Prevalence, Gender Disparity, Peer Influence.

A B S T R A C T
Tobacco smoking among adolescents remains a critical public health challenge, with profound implications for long-term health outcomes and societal well-being. This study aimed to assess the prevalence of cigarette smoking among school students in Tripoli-Libya and explore the key initiation factors to inform locally tailored prevention strategies. A school-based cross-sectional study was conducted across six randomly selected governmental middle and high schools in one of the largest Municipalities in Tripoli, targeting 379 students aged 10–18 years. A pretested, anonymous, self-administered questionnaire was administered to assess current and lifetime cigarette smoking, sociodemographic characteristics, and self-reported reasons for initiation. Data were analyzed using the SPSS version 22. The total prevalence of current cigarette smoking was 10%, while the prevalence of cigarette smoking ever use was 26.6%. Ever use of cigarette smoking was significantly higher among male students (32%) compared to females (3%). Students in grades ten and twelve had the highest prevalence, followed by those in grade nine. Male gender was a statistically significant factor associated with cigarette smoking ($p<0.05$). The most common self-reported reasons for cigarette smoking included imitating smokers, curiosity, and expressing masculinity ($p<0.05$). This study contributes to the growing body of evidence on adolescent cigarette smoking patterns, with higher rates among males and older students, suggesting smoking may symbolize a transition to adulthood.

Introduction

Tobacco smoking among adolescents remains a critical public health challenge, with profound implications for long-term health outcomes and societal well-being [1]. Adolescence is a critical period for smoking initiation, often leading to lifelong nicotine addiction and increased risks of chronic diseases, including cardiovascular and respiratory diseases, and cancers [2]. Understanding the prevalence of smoking among school students and its associated factors is essential for designing effective prevention strategies [3].

Globally, smoking prevalence among adolescents varies significantly due to cultural, economic, and regulatory differences. In Tunisia, the overall prevalence of cigarette smoking was 16.0% of school students, with male sex, academic failure, poor family management, antisocial behavior, and addictive behavior being key predictors [4]. Similarly, in China, the smoking prevalence among adolescents was 12.5%, with higher rates among those having older family members who smoke and a low level of education [5]. In Saudi Arabia, 19.5% of high school students smoke, particularly males and those with smoking parents or peers [6]. The school environment significantly influences adolescent smoking behavior. Research from Chile demonstrates that weak school bonding and poor academic performance correlate with higher smoking rates [7]. In the United States, exposure to tobacco marketing and flavored tobacco products drives use among middle and high school students [8]. Socioeconomic disparities further exacerbate smoking prevalence. These findings highlight the need for preventive interventions targeting both individual behaviors and environmental influences.

In Libya, published studies about adolescent smoking are strikingly scarce [9]. This gap in evidence is alarming, given that adolescence is a pivotal period for nicotine addiction and future health risks [10]. While existing studies have established key predictors of adolescent smoking behavior [4–6], these associations remain unexplored in the Libyan context due to insufficient evidence. Therefore, this study aimed to assess the prevalence of cigarette smoking among middle and high school students in one of Tripoli's largest municipalities and explore the key initiation factors to inform locally tailored prevention strategies.

Received: *01-05-2025* - ***Accepted***: *03-07-2025* - ***Published***: *12-07-2025*

Libyan Med J. 2025;17(3):302-306
https://doi.org/10.69667/lmj.2517301
Libyan Medical Journal
https://lmj.ly/index.php/ojs/index eISSN: 2079-1224

Methods

This school-based cross-sectional study was conducted during the 2023-2024 academic year across six randomly selected governmental middle and high schools in one of the largest Municipalities in Tripoli-Libya. The study employed a two-stage cluster sampling design to ensure representative sampling of the adolescent school population. In the first stage, schools were randomly selected from the municipal registry, while in the second stage, classes were randomly selected within each school. This approach accounted for potential intra-class correlations while maintaining feasibility within resource constraints.

The study population comprised students aged 12-18 years enrolled in grades 7-12 (middle and high school levels), representing both sexes. All participants provided written consent alongside parental consent, with exclusion criteria applied to students who were unable to provide consent or those absent during data collection periods. The sample size of 379 was calculated by using Cochran's formula based on regional smoking prevalence estimates of 19.5%, with a 95% confidence level, 5% margin of error, design effect of 1.5 for cluster sampling, and 10% buffer for potential non-response.

Data collection utilized a pretested, anonymous, self-administered questionnaire. The questionnaire captured multiple dimensions including: cigarette smoking status (categorized as never, ever [≥1 lifetime use], or current [past 30-day use]), sociodemographic characteristics (age and sex), school-related factors (grade level), psychosocial determinants (peer influence, imitation and masculinity expression), and environmental exposures (household smoking and curiosity-driven use).

Data were analyzed using SPSS version 22. Descriptive statistics were presented as means ± standard deviation for continuous variables and frequencies with percentages for categorical variables. Prevalence rates for current and ever cigarette smoking were calculated overall and stratified by sex and grade. Chi-square tests assessed associations between cigarette smoking and categorical variables, with Fisher's exact test used where cell counts were small (e.g., Grade 10). While, independent t-tests compared age differences between user groups. All tests used two-tailed significance at $p<0.05$.

This study received formal approval from the Municipality's Mayor and the principals of all participating schools before data collection commenced. To protect participants' privacy, all data were collected anonymously, and strict confidentiality measures were upheld throughout the study. The Municipal Education Office will receive a summary report of the study findings to guide local health promotion strategies.

Results

Socio-demographic characteristics:

Of the 379 targeted students, 169 (44.6%) completed the questionnaire. Participants had a mean age of 14.5 (±1.43) years, with males comprising the majority (80.5%) and females representing 19.5%. Nearly half of the participants (50.3%) were in Grade 9 (Table 1).

Table 1. Socio-demographic Characteristics of Respondents

Characteristics	Frequency	Percentage
Age (years)		
10 -12	9	5.3%
13 - 15	131	77.5%
16 - 18	29	17.2%
Sex		
Male	136	80.5%
Female	33	19.5%
Grade		
Seven	33	19.5%
Eight	28	16.6%
Nine	85	50.3%
Ten	2	1.2%
Eleven	11	6.5%
Twelve	10	5.9%

Prevalence of Cigarette smoking

The overall prevalence of current cigarette smoking was 10.1%**,** while 26.6% reported ever using cigarette. Males had significantly higher rates of ever-use (32.3% vs. 3.0% in females). Grades 10 and 12 showed the highest ever-use prevalence, followed by Grade 9 (Table 2).

Table 2: Prevalence of Cigarette smoking Among Students

Received: 01-05-2025 - **Accepted**: 03-07-2025 - **Published**: 12-07-2025

Libyan Med J. 2025;17(3):302-306
https://doi.org/10.69667/lmj.2517301
Libyan Medical Journal
https://lmj.ly/index.php/ojs/index eISSN: 2079-1224

Characteristic	Current Use (%)	Ever Use (%)	Non-Use (%)
Total	10.1%	26.6%	63.3%
Sex			
Male (n=136)	16 (11.8%)	44 (32.3%)	76 (55.9%)
Female (n=33)	1 (3.03%)	1 (3.03%)	31 (93.94%)
Grade			
Middle school			
Seven (n=33)	5 (15.2%)	11 (33.3%)	17 (51.5%)
Eight (n=28)	6 (21.4%)	7 (25%)	15 (53.6%)
Nine (n=85)	5 (5.9%)	27 (31.8%)	53 (62.3%)
High school			
Ten (n=2)	0	1 (50%)	1 (50%)
Eleven (n=11)	1 (9.1%)	2 (18.2%)	8 (72.7%)
Twelve (n=10)	4 (40%)	4 (40%)	2 (20%)

Factors associated with ever use of cigarette smoking:
Male gender was significantly associated with cigarette smoking (p=0.002). The most frequently reported reasons for cigarette smoking included curiosity/experimentation (41.4%, *p<0.005*); imitating smokers (23.1%, *p<0.005*); and peer influence (10.7%, *p<0.005*) (Table 3).

Table 3: Self-Reported Factors Associated with Ever Cigarette Smoking

Characteristics	Ever user, n (%)	P value
Sex		0.002
Male (n=136)	60 (44.11%)	
Female (n=33)	2 (6.06%)	
Grade		0.364
Middle school (n=146)	61 (41.8%)	
Secondary school (n=23)	12 (52.2%)	
Reported reasons for cigarette smoking		
Lack of knowledge about tobacco's harmful effect	10 (5.9%)	0.212
Imitating smoker people	39 (23.1%)	< 0.005
Curiosity of experience	70 (41.4%)	< 0.005
Expressing masculinity	10 (5.9%)	
Peer influence	18 (10.7%)	< 0.005
Family cigarette smoking	9 (5.3%)	0.275
Relief of boredom	13 (7.7%)	0.175

Discussion
The current study revealed a 10.1% prevalence of current cigarette smoking and 26.6% of ever-use among Libyan adolescents, with rates significantly higher than the global adolescent average of 15.3% but consistent with regional trends in low-resource settings [8,11-14]. This disparity may reflect cultural norms or weak tobacco control policies. The pronounced gender gap—with males reporting 32.3% ever-use compared to just 3.0% among females—aligns with studies from similar cultural contexts where cigarette smoking is strongly tied to masculine identity [15, 16]. Qualitative research in these settings describes how boys often perceive smoking as a marker of adulthood or toughness, while female use remains low and stigmatized [17, 18].
The age trend was particularly striking, with Grades 10 and 12 students showing the highest ever-use rates (50% and 40% respectively). This pattern mirrors neurodevelopmental research demonstrating that mid-adolescence (ages 15–17) represents a perfect storm for risk-taking, the prefrontal cortex remains immature while sensitivity to peer influence peaks [19]. Neuroimaging studies confirm that adolescents process social rewards more intensely than adults, which may explain why social factors outweighed health knowledge in our findings [20]. However, these findings should be interpreted with caution due to the very small sample sizes in these grades (n = 2 for Grade 10; n = 10 for Grade 12). Rates based on such limited data are highly sensitive to individual responses and may not reflect true population-level patterns.
Participants' reported reasons for cigarette smoking revealed three key social drivers, aligning with those identified in an Indonesian study [21]. First, curiosity/experimentation (41.4%) aligns with established

Received: 01-05-2025 - **Accepted**: 03-07-2025 - **Published**: 12-07-2025

Libyan Med J. 2025;17(3):302-306
https://doi.org/10.69667/lmj.2517301
Libyan Medical Journal
https://lmj.ly/index.php/ojs/index *eISSN: 2079-1224*

evidence that novelty-seeking peaks during adolescence due to developmental changes in the pubertal hormones [22]. Second, imitating smokers (23.1%) finds support in fMRI studies showing that observing peers' smoking behaviors activates the adolescent brain's reward pathways more strongly than in adults [23]. Third, the role of peer influence (10.7%) is corroborated by a meta-analysis of 75 studies concluding that having smoking peers doubles the risk of smoking initiation [24]. These findings collectively emphasize how social learning mechanisms drive adolescent cigarette smoking more powerfully than the rational decision-making.

The connection between expressing masculinity (5.9%) and cigarette smoking echoes qualitative work across multiple cultures. In Jordan, boys framed smoking as a normative social transition into manhood [25], while male adolescents in India described it as a symbol of social dominance [26]. Conversely, the minimal role of knowledge gaps about harms (5.9%) challenges common assumptions about prevention. Clinical trials have consistently shown that knowledge-based interventions yield smaller effect sizes on reducing the initiation rates than social competence programs, including social-resistance and skills-based interventions [27, 28].

While our study provides valuable insights into the prevalence and patterns of cigarette smoking among Libyan school students, it has some limitations. The low response rate (44.6%) may limit the generalizability of the findings, and the cross-sectional design precludes causal inferences. Additionally, self-reported cigarette smoking data may be subject to both social desirability bias [29] and stigma [30]. Future research should employ longitudinal designs to better understand the temporal relationships between cigarette smoking and its determinants. Qualitative studies could also explore the social and cultural factors driving cigarette smoking among adolescents, providing deeper insights for preventive interventions.

Conclusion

This study contributes to the growing body of evidence on adolescent cigarette smoking patterns, with higher rates among males and older students, suggesting smoking may symbolize a transition to adulthood. The findings highlight the need for gender-sensitive, peer-focused interventions targeting early adolescence (Grades 7–9) before experimentation escalates.

Acknowledgments

The authors gratefully acknowledge His Excellency the Mayor of the targeted Municipality in Tripoli for facilitating this research, as well as the principals and staff of participating schools for their invaluable cooperation in data collection. Their support was essential in understanding adolescent health challenges in our community.

Conflicts of Interest

The authors declare no conflicts of interest.

References

1. World Health Organization. (2022). Tobacco [Internet]. Geneva: WHO. Available from: https://www.who.int/news-room/fact-sheets/detail/tobacco
2. U.S. Department of Health and Human Services. (2020). Smoking cessation: A report of the Surgeon General [Internet]. Washington, DC: HHS. Available from: https://www.hhs.gov/sites/default/files/2020-cessation-sgr-full-report.pdf
3. Arrazola RA, Singh T, Corey CG, Husten CG, Neff LJ, Apelberg BJ, Bunnell RE, Choiniere CJ, King BA, Cox S, McAfee T, Caraballo RS; Centers for Disease Control and Prevention (CDC). Tobacco use among middle and high school students - United States, 2011-2014. MMWR Morb Mortal Wkly Rep. 2015 Apr 17;64(14):381-5. PMID: 25879896; PMCID: PMC5779546.
4. El Mhamdi S, Wolfcarius-Khiari G, Mhalla S, Ben Salem K, Soltani SM. Prevalence and predictors of smoking among adolescent schoolchildren in Monastir, Tunisia. East Mediterr Health J. 2011 Jun;17(6):523-8. PMID: 21796971.
5. Wang, Minghuan et al. Trends in smoking prevalence and implication for chronic diseases in China: serial national cross-sectional surveys from 2003 to 2013. The Lancet Respiratory Medicine, Volume 7, Issue 1, 35 – 45.
6. Al Ghobain MO, Al Moamary MS, Al Shehri SN, Al-Hajjaj MS. Prevalence and characteristics of cigarette smoking among 16 to 18 years old boys and girls in Saudi Arabia. Ann Thorac Med. 2011 Jul;6(3):137-40. doi: 10.4103/1817-1737.82447. PMID: 21760845; PMCID: PMC3131756.
7. Gaete, J., Ortúzar, C., Zitko, P. et al. Influence of school-related factors on smoking among Chilean adolescents: a cross-sectional multilevel study. BMC Pediatr 16, 79 (2016). https://doi.org/10.1186/s12887-016-0612-z
8. Birdsey J, Cornelius M, Jamal A, Park-Lee E, Cooper MR, Wang J, Sawdey MD, Cullen KA, Neff L. Tobacco Product Use Among U.S. Middle and High School Students - National Youth Tobacco Survey, 2023. MMWR Morb Mortal Wkly Rep. 2023 Nov 3;72(44):1173-1182. doi: 10.15585/mmwr.mm7244a1. PMID: 37917558; PMCID: PMC10629751.

Received*: 01-05-2025 -* ***Accepted****: 03-07-2025 -* ***Published****: 12-07-2025*

9. World Health Organization. (2023). WHO global report on trends in prevalence of cigarette smoking 2000–2030 (4th ed.). https://iris.who.int/bitstream/handle/10665/375711/9789240088283-eng.pdf?sequence=1
10. U.S. Department of Health and Human Services. (2014). The health consequences of smoking—50 years of progress: A report of the Surgeon General [Internet]. Atlanta, GA: CDC. Available from: https://www.ncbi.nlm.nih.gov/books/NBK179276/
11. World Health Organization. Global Youth Tobacco Survey 2020: Results by country and region. Geneva: WHO; 2021. Available from: https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/global-youth-tobacco-survey
12. Simons-Morton BG, Farhat T. Recent findings on peer group influences on adolescent smoking. J Prim Prev. 2010 Aug;31(4):191-208. doi: 10.1007/s10935-010-0220-x. PMID: 20614184; PMCID: PMC3313483.
13. World Health Organization. WHO Report on the Global Tobacco Epidemic 2023. Geneva: WHO; 2023. Available from: https://www.who.int/publications/i/item/9789240077164
14. Warren CW, Jones NR, Eriksen MP, Asma S; Global Tobacco Surveillance System (GTSS) collaborative group. Patterns of global tobacco use in young people and implications for future chronic disease burden in adults. Lancet. 2006 Mar 4;367(9512):749-53. doi: 10.1016/S0140-6736(06)68192-0. PMID: 16517275.
15. Morrow M, Barraclough S. Gender equity and tobacco control: bringing masculinity into focus. Glob Health Promot. 2010 Mar;17(1 Suppl):21-8. doi: 10.1177/1757975909358349. PMID: 20595351.
16. Kasim K, Al-Zalabani A, Abd El-Moneim ES, Abd El-Moneim S. Beliefs and attitudes of male and female adolescents and the risk of smoking behavior. J Postgrad Med. 2016 Apr-Jun;62(2):80-5. doi: 10.4103/0022-3859.180546. PMID: 27089105; PMCID: PMC4944355.
17. Mutaz M, de Vries N, Cheung KL, de Vries H. Towards a better understanding of factors affecting smoking uptake among Saudi male adolescents: A qualitative study. Tob Prev Cessat. 2020 May 15;6:29. doi: 10.18332/tpc/120000. PMID: 32760864; PMCID: PMC7398134. https://doi.org/10.1111/add.12933
18. World Health Organization. Gender, women, and the tobacco epidemic. Geneva: 2010. Available from: https://www.who.int/publications/i/item/9789240004849
19. Elizabeth P. Shulman, Ashley R. Smith, Karol Silva, Grace Icenogle, Natasha Duell, Jason Chein, Laurence Steinberg. The dual systems model: Review, reappraisal, and reaffirmation, Developmental Cognitive Neuroscience, Volume 17,2016, Pages 103-117. https://doi.org/10.1016/j.dcn.2015.12.010.
20. Steinberg L. A Social Neuroscience Perspective on Adolescent Risk-Taking. Dev Rev. 2008 Mar;28(1):78-106. doi: 10.1016/j.dr.2007.08.002. PMID: 18509515; PMCID: PMC2396566.
21. Fithria F, Adlim M, Jannah SR, Tahlil T. Indonesian adolescents' perspectives on smoking habits: a qualitative study. BMC Public Health. 2021 Jan 7;21(1):82. doi: 10.1186/s12889-020-10090-z. PMID: 33413232; PMCID: PMC7791848.
22. Braams BR, van Duijvenvoorde AC, Peper JS, Crone EA. Longitudinal changes in adolescent risk-taking: a comprehensive study of neural responses to rewards, pubertal development, and risk-taking behavior. J Neurosci. 2015 May 6;35(18):7226-38. doi: 10.1523/JNEUROSCI.4764-14.2015. PMID: 25948271; PMCID: PMC6605271.
23. Spear LP. Adolescent neurodevelopment. J Adolesc Health. 2013 Feb;52(2 Suppl 2):S7-13. doi: 10.1016/j.jadohealth.2012.05.006. PMID: 23332574; PMCID: PMC3982854.
24. Liu J, Zhao S, Chen X, Falk E, Albarracín D. The influence of peer behavior as a function of social and cultural closeness: A meta-analysis of normative influence on adolescent smoking initiation and continuation. Psychol Bull. 2017 Oct;143(10):1082-1115. doi: 10.1037/bul0000113. Epub 2017 Aug 3. PMID: 28771020; PMCID: PMC5789806.
25. McKelvey K, Attonito J, Madhivanan P, Yi Q, Mzayek F, Maziak W. Determinants of cigarette smoking initiation in Jordanian schoolchildren: longitudinal analysis. Nicotine Tob Res. 2015 May;17(5):552-8. doi: 10.1093/ntr/ntu165. Epub 2014 Aug 20. PMID: 25143297; PMCID: PMC4432393.
26. Bhojani, U.M., Elias, M.A. & N, D. Adolescents' perceptions about smokers in Karnataka, India. BMC Public Health 11, 563 (2011). https://doi.org/10.1186/1471-2458-11-563
27. Georgie J M, Sean H, Deborah M C, Matthew H, Rona C. Peer-led interventions to prevent tobacco, alcohol and/or drug use among young people aged 11-21 years: a systematic review and meta-analysis. Addiction. 2016 Mar;111(3):391-407. doi: 10.1111/add.13224. PMID: 26518976; PMCID: PMC4833174.
28. Thomas RE, McLellan J, Perera R. Effectiveness of school-based smoking prevention curricula: systematic review and meta-analysis. BMJ Open. 2015 Mar 10;5(3):e006976. doi: 10.1136/bmjopen-2014-006976. PMID: 25757946; PMCID: PMC4360839.
29. Stein LA, Colby SM, O'Leary TA, Monti PM, Rohsenow DJ, Spirito A, Riggs S, Barnett NP. Response distortion in adolescents who smoke: a pilot study. J Drug Educ. 2002;32(4):271-86. doi: 10.2190/GL7E-B8MV-P9NH-KCVV. PMID: 12556133; PMCID: PMC2867081.
30. Littlecott, H.J., Moore, G.F., Evans, R.E. et al. Perceptions of friendship, peers and influence on adolescent smoking according to tobacco control context: a systematic review and meta-ethnography of qualitative research. BMC Public Health 23, 424 (2023). https://doi.org/10.1186/s12889-022-14727-z

Received*: 01-05-2025 -* ***Accepted****: 03-07-2025 -* ***Published****: 12-07-2025*