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Tobacco and Shisha Use among Sudanese Migrants in Beirut, Lebanon, and Oman: A Cross-Sectional Study

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Abstract

Background: Tobacco consumption remains a major public-health concern in the Eastern Mediterranean region, particularly among migrant populations who experience socioeconomic stress, limited access to healthcare, and barriers to preventive services. Evidence describing smoking patterns in displaced communities remains limited.

Objective: To estimate the prevalence and behavioural characteristics of cigarette and shisha smoking among Sudanese adults residing in Beirut and Amman, and to examine whether tobacco-use patterns differed according to migration region.

Methods: A cross-sectional study was conducted between January and March 2026 among 50 adult participants recruited through non-probability convenience sampling in community locations where Sudanese migrants commonly reside. Data was collected using a structured self-administered survey adapted from validated tobacco-use instruments, including indicators aligned with the ASSIST framework. Descriptive statistics and chi-square tests were performed using SPSS v26, with significance set at $p<0.05$.

Results: Current cigarette smoking prevalence was 46.0%, with 36.0% daily smokers. Tobacco use in the past three months was reported by 36.0% of participants. Among smokers, 65.2% initiated smoking between ages 15–18, 52.2% smoked >10 cigarettes/day, and 52.2% reported strong cravings. Ever shisha use was 12.0%, and dual use was 6.0%. Nearly half (48.0%) reported attempting to quit within the past year, while 28.0% reported failed attempts. No statistically significant associations were observed between smoking status and age group ($p=0.122$), gender ($p=0.908$), marital status ($p=0.197$), or duration of residence ($p=0.457$). Dependence scores were not associated with age ($p=0.633$).

No statistically significant differences were identified between migrants residing in Lebanon and Oman regarding cigarette smoking prevalence ($p=0.496$), age distribution ($p=0.616$), previous shisha use ($p=0.547$), or smoking cessation attempts ($p=0.461$).

Conclusion: The findings indicate a substantial burden of cigarette smoking and nicotine dependence within this migrant population, with no significant differences observed between migrants residing in Lebanon and Oman. These findings highlight the need for culturally responsive cessation interventions and improved access to support services.

Keywords: cigarette smoking; migrants; nicotine dependence; shisha; cessation attempts; prevalence.

Introduction

Tobacco consumption is increasingly recognized as a major and preventable cause of morbidity and mortality globally (Al-Delaimy & Al-Ani, 2021). According to the World Health Organization, tobacco consumption is responsible for more than 8 million deaths annually, with a substantial proportion of these deaths occurring in low- and middle-income countries (Organization, 2024). Despite the efforts to reduce its prevalence, smoking is still a common practice in many developing countries, including

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the Eastern Mediterranean Region (EMR), where cigarette and waterpipe smoking are culturally embedded (Kargar & Ansari-Moghaddam, 2023; Nakkash et al., 2022). Shisha smoking has recently increased in prevalence due to the misconceptions among the population that it is less harmful than cigarette smoking (Akel et al., 2022; Hamadeh et al., 2020).

Displacement and migration are key social determinants of health that influence health behaviours, including tobacco use. Therefore, forced displacement exposes individuals to significant life stressors, including loss of housing, lack of economic security, social marginalization, disruption of families, and exposure to violence within their communities. Such stressors lead to a rise in the risk of engaging in maladaptive coping behaviours, for instance, smoking shisha and cigarettes as a means of stress relief (Bahdila, 2022; Vollebregt et al., 2025).

Recently, Beirut has become a destination for an increasing number of Sudanese nationals who have been displaced due to conflict and economic breakdown in their home country. These migrants face multiple challenges, including uncertain legal status, lack of access to health services, unemployment, and substandard living conditions. Such circumstances have also been associated with adverse mental health outcomes and leads to substance abuse (Haddad et al., 2024). However, it is important to note that despite the growing presence of the Sudanese community in Beirut, there remains a prevalent and notable lack of information regarding their tobacco consumption patterns. Existing studies in Lebanon have investigated the usage of tobacco among the general public or different refugee groups, leaving the Sudanese refugee groups somewhat underrepresented in the epidemiological literature. Only a few studies have explored this demographic, for instance, the systematic review by Elgoni and Mohammed (2022) found that the prevalence of tobacco use among Sudanese adults ranged widely as 10 to 47.5% of adults were cigarette smokers, tobacco users, and shisha users (Elgoni & Mohammed, 2022). Moreover, Othman et al. (2019) and Alshaikh (2020) provided results on adolescent-oriented research that specified peer influence, social norms, and demographic determinants as relevant predictors of shisha and tobacco use among students in Khartoum (Alshaikh, 2020; Othman et al., 2019). Although these works shed light on domestic tobacco trends, they fail to reflect on how migration, acculturation, and settlement in Lebanon can alter smoking behaviours, levels of dependence, or cessation patterns. Besides these studies not being recent, another gap in the literature concerns the insufficient investigation of dual cigarette and shisha use, sociodemographic predictors, and determinants of cigarette use in displaced adults.

Moreover, awareness and knowledge of tobacco usage among migrant communities are of utmost importance due to several reasons. One of the major reasons is that migrants face limited access to preventive services as well as rehabilitation programs because of legal, financial, or linguistic barriers (Bahdila, 2022; Farran et al., 2024). Additionally, tobacco use combined with occupational and environmental exposures increases the health risks of not only the individual abusing it but also of those around them (Kargar & Ansari-Moghaddam, 2023). This highlights the importance of granular, subgroup-specific data, which is essential to effective targeted tobacco-control interventions (Nakkash et al., 2022; Vollebregt et al., 2025). Without empirical data on prevalence, consumption patterns, and dependence in migrant communities, public-health programs are likely to miss vulnerable subpopulations.

In light of these research gaps, the current study aimed to bridge this gap by exploring tobacco-use behaviours among Sudanese adults residing in Beirut. Therefore, the objectives of the current study were to estimate the prevalence of current cigarette smoking and shisha smoking, to determine behavioural features such as age of initiation and daily use, to measure nicotine dependence indicators, and to investigate cessation attempts and intention.

Methods

Study Design and Setting

The current study was conducted using a cross-sectional design between January and March 2026 among Sudanese adults residing in Beirut, Lebanon.

Determination of Sampling Strategy and Sample Size

Due to the absence of a comprehensive sampling frame for Sudanese migrants in Beirut and the logistical challenges in accessing this population, a non-probability convenience sampling strategy was employed. Participants were recruited from community locations where Sudanese migrants commonly reside or gather. A total of 50 participants were included in the final analysis.

Inclusion and Exclusion Criteria

Individuals were eligible to participate if they were Sudanese nationals aged 18 years or older and residing in

Beirut during the study period. Participants were required to have sufficient proficiency in Arabic or English to complete the questionnaire. Individuals who declined to provide informed consent or submitted incomplete questionnaires were excluded from the study.

Data Collection

Data were collected using a structured self-administered questionnaire available in both Arabic and English. The questionnaire was adapted from previously validated tobacco-use survey instruments and included items assessing sociodemographic characteristics, cigarette smoking behaviour, shisha use, tobacco consumption patterns, indicators of nicotine dependence, and cessation-related behaviours. The instrument incorporated measures aligned with the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) framework to assess tobacco use and dependence indicators. Participants were approached in community areas where Sudanese migrants commonly reside, and informed consent was obtained prior to questionnaire completion. Participation was voluntary and all responses were recorded anonymously.

Statistical Analysis

All collected data were entered into Microsoft Excel and subsequently analysed using the Statistical Package for the Social Sciences (SPSS) version 26 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarise participant characteristics and tobacco-related behaviours. Categorical variables were presented as frequencies and percentages. Associations between smoking status and sociodemographic variables were examined using chi-square tests. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

Ethical approval for this study was obtained from the Embassy of the Republic of Sudan in Beirut, Lebanon (IRB Reference No: SEB/T/2; 25 December 2025). Informed consent was obtained from all participants prior to data collection, and confidentiality of personal information was maintained. The study was conducted in accordance with the ethical guidelines of the research committee, the STROBE reporting guidelines, and the Declaration of Helsinki (1964).

Results

Sociodemographic Characteristics and Association with Current Smoking

Table 1. Sociodemographic Characteristics Stratified by Current Smoking Status (N = 50)

Variable	Category	Total n (%)	Current Smoker n (%)	Not Current Smoker n (%)	χ^2	p-value
Age group	18–24	7 (14.0)	2 (28.6)	5 (71.4)	8.70	0.122
	25–34	17 (34.0)	10 (58.8)	7 (41.2)		
	35–44	13 (26.0)	8 (61.5)	5 (38.5)		
	45–54	11 (22.0)	2 (18.2)	9 (81.8)		
	55–64	1 (2.0)	1 (100.0)	0 (0.0)		
	≥65	1 (2.0)	0 (0.0)	1 (100.0)		
Gender	Male	48 (96.0)	22 (45.8)	26 (54.2)	0.013	0.908
	Female	2 (4.0)	1 (50.0)	1 (50.0)		
Marital status	Single	22 (44.0)	13 (59.1)	9 (40.9)	4.68	0.197
	Married	25 (50.0)	8 (32.0)	17 (68.0)		
	Divorced	2 (4.0)	1 (50.0)	1 (50.0)		
	Widowed	1 (2.0)	1 (100.0)	0 (0.0)		
Length of stay	<1 year	1 (2.0)	1 (100.0)	0 (0.0)	1.57	0.457
	1–3 years	6 (12.0)	2 (33.3)	4 (66.7)		
	>3 years	43 (86.0)	20 (46.5)	23 (53.5)		

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Table 1 shows the sample was mainly composed of young to middle-aged males, 86% of whom have lived in Lebanon over a period of three years. The percentage of current smokers was the greatest among the participants who were aged between 25 and 44 years. Nevertheless, there were no statistically significant relationships between the current smoking status and the age group (p=0.122), gender (p=0.908), marital status (p=0.197), or duration of residence (p=0.457). These results indicate that cigarette smoking was relatively evenly distributed among the sociodemographic groups among this group of migrants.

Cigarette Smoking Prevalence and Behavioural Characteristics

Table 2. Cigarette Smoking Prevalence and Characteristics (N = 50; smokers n = 23)

Variable	Category	n (%)	95% CI
Smoking status	Daily smoker	18 (36.0)	22.9–50.8
	Occasional smoker	5 (10.0)	3.3–21.8
	Former smoker	4 (8.0)	2.2–19.2
	Never smoker	23 (46.0)	31.8–60.7
Current smokers	Yes	23 (46.0)	31.8–60.7
	No	27 (54.0)	39.3–68.2
ASSIST past 3 months use	Yes	18 (36.0)	22.9–50.8
Age of initiation*	15–18 years	15 (65.2)	42.7–83.6
>10 cigarettes/day*	—	12 (52.2)	30.6–73.2
Strong craving*	Yes	12 (52.2)	30.6–73.2
Failed quit attempt (12 mo)*	Yes	14 (60.9)	38.5–80.3

**Among current smokers (n=23)*

Table 2 indicates that almost half of the participants (46%) were current cigarette smokers and 36% were smoking every day. Among the existing smokers 65.2% started smoking between 15-18 years and 52.2% smoked over 10 cigarettes a day. Dependence indicators were also significant, as more than half of them had strong cravings and 60.9% had an unsuccessful quit attempt within the past year. These results show that the study population has significant tobacco exposure and behavioural dependence.

Shisha Use and Dual Tobacco Consumption

Table 3. Shisha Use and Dual Tobacco Consumption (N = 50)

Variable	Category	n (%)
Ever shisha use	Yes	6 (12.0)
	No	44 (88.0)
Frequency	Daily	1 (2.0)
	Weekly	4 (8.0)
	Rarely	19 (38.0)
	Never	26 (52.0)
Dual use (cigarette + shisha)	Yes	3 (6.0)
	No	47 (94.0)

Table 3 presents 12% of respondents used shisha, but those who used it weekly or rarely were more widespread than those who used it on a daily basis, while 6% of the sample reported dual tobacco use. Even though these findings are lower than those of cigarette prevalence, they point to the existence of concurrent patterns of tobacco exposure among a group of participants.

Quit Attempts and Motivation to Quit

Table 4. Quit Attempts and Motivation Among Current and Former Smokers (N = 50)

Variable	Category	n (%)
Attempted to quit (past 12 months)	Yes	24 (48.0)
	No	9 (18.0)
	Not applicable	17 (34.0)
Desire to quit	Yes	24 (48.0)
	No	4 (8.0)
	Not sure	4 (8.0)
	Not applicable	18 (36.0)
Tried and failed to quit	Yes	14 (28.0)
	No	20 (40.0)
	Not applicable	16 (32.0)

As Table 4 demonstrates, almost half of the respondents stated that they have tried to quit smoking in the last year, and the same percentage stated that they want to quit. Nevertheless, 28% stated that they were unable to quit, which indicates difficult cessation patterns. The findings highlight motivation to quit and chronic obstacles to effective tobacco cessation among this migrant population.

Association Between Tobacco Dependence Score and Age Group

A chi-square test was conducted to examine the association between tobacco dependence score and age group among participants with complete data (n=32).

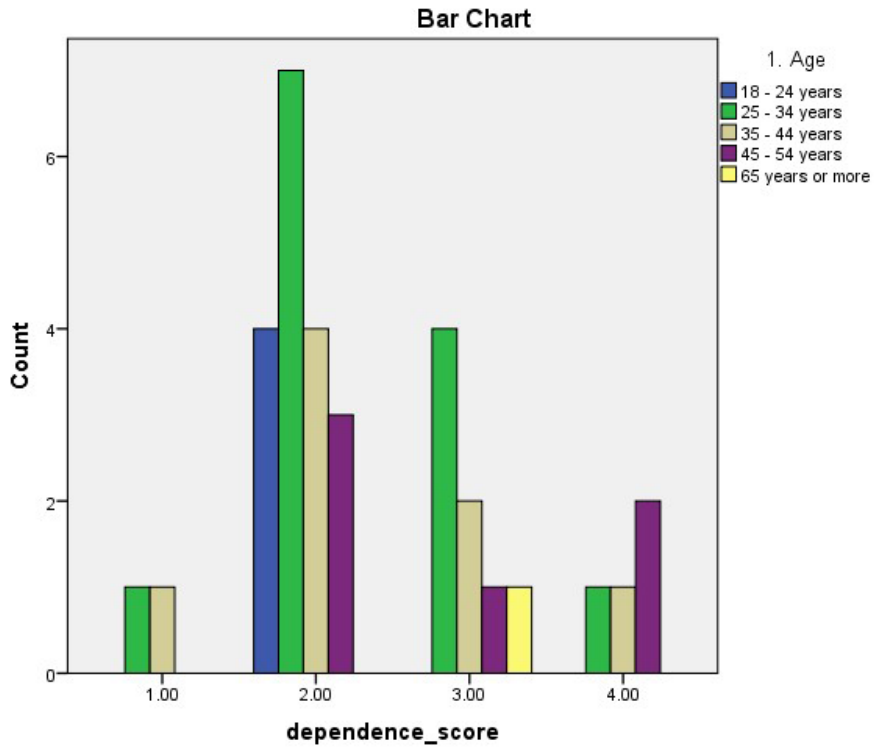

Figure 1. Distribution of Tobacco Dependence Scores by Age Group (n = 32)

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Figure 1 indicates that moderate dependence (score = 2) was the most prevalent category of all age groups, especially the ones who are 25-34 years and those who are 35-44 years of age. The age groups of 25-34 and 45-54 were found to have higher dependence scores (34) but the frequency was small. The chi-square test showed no statistically significant association between age group and dependence score ($\chi^2 = 9.80$, df = 12, p = 0.633). These finding highlight that the levels of tobacco dependence among the group were non-age related with no notable age-based trend.

Table 5. Independent Samples t-test to identify differences in tobacco use among migrants in Oman and Lebanon

Dimension	Comparison Groups	Sample Size	Mean	Standard Deviation	Degrees of Freedom	Calculated t-value	p-value	Conclusion
Cigarette smoking prevalence rate	Oman	50	1.72	0.36	113	-0.68	0.496	No statistically significant differences
	Lebanon	50	1.75	0.34				
Age group	Oman	50	1.69	0.28	113	0.502	0.616	No statistically significant differences
	Lebanon	50	1.67	0.33				
Previous use of shisha	Oman	50	1.67	0.33	113	-0.602	0.547	No statistically significant differences
	Lebanon	50	1.70	0.30				
Attempt to quit smoking	Oman	50	1.70	0.32	113	0.739	0.461	No statistically significant differences
	Lebanon	50	1.67	0.33				
Total score	Oman	50	1.69	0.268	113	-0.085	0.932	No statistically significant differences
	Lebanon	50	1.70	0.265				

It is observed from table (5), which present the independent samples t-test to determine whether there are differences in tobacco use attributable to the migration region (Lebanon/ Oman), that the calculated t-values across the dimensions were as follows: for the dimension of cigarette smoking prevalence rate, the calculated t-value was (-0.68) and the p-value was (0.496), indicating no statistically significant differences; for the age group, the calculated t-value was (-0.502) and the p-value was (0.616), indicating no statistically significant differences; for the previous use of shisha, the calculated t-value was (-0.602) and the p-value was (0.547), indicating no statistically significant differences; and for attempts to quit smoking, the calculated t-value was (-0.739) and the p-value was (0.461), indicating no statistically significant differences. This indicates that there are no statistically significant differences in tobacco use among migrants in Lebanon and Oman.

Discussion

The use of tobacco is a major concern in the public health of Lebanon and the Middle East in general, especially in adult men and the lower socioeconomic groups (Elgoni & Mohammed, 2022). The current study findings provide empirical evidence with a specific focus on cigarette and shisha use among Sudanese migrants living in Beirut,

which is a subgroup that is mostly underrepresented in national surveillance systems. The results outline a trend that is characterized by high cigarette rates, high nicotine addiction, early onset and recurrent but unsuccessful cessation.

Current cigarette smoking was 46% prevalent among the sample, which is higher than the combined regional estimates among the Middle Eastern populations. A systematic review and meta-analysis study by Kargar and Ansari-Moghaddam (2024) determined that the pooled prevalence of ESR is 17.41% in the Middle East countries, with significantly higher levels of smoking in males compared to females (Kargar & Ansari-Moghaddam, 2023). Although that estimate represents the average data of people in several countries, the significantly high prevalence rate in the current study is due to the possibility of migration stressors, cultural impact and work exposures. These findings are further explained by Lebanese national data. According to Haddad et al. (2024), the prevalence of smoking peaked at around 55% at the time of the economic crisis and COVID-19 pandemic (Haddad et al., 2024). The study noted high level of nicotine dependence and it was observed that the participants found it difficult to quit smoking, this dependence was related to older age and lower education (Haddad et al., 2024). The overlap of these results with the current study implies that socioeconomic instability and chronic stress can increase smoking habits and hinder cessation, which affects both host and migrant communities. The percentage of daily smokers and the age distribution of the smoking population with the concentration between the 25–44-year-old age bracket also confirms that smoking is not experimental but an established and behaviourally rooted habit.

Compared to cigarette smoking, the use of shisha in the current study was relatively low with 12% reporting that they ever used it and 6% reporting dual cigarette and shisha use. The regional statistics show that there has been an increase in shisha smoking in the recent years (Kargar & Ansari-Moghaddam, 2023). Kargar and Ansari-Moghaddam (meta-analysis) found that the pooled prevalence of shisha is 6.92 and that this has been on an increasing trend over the last decade (Kargar & Ansari-Moghaddam, 2023). Nonetheless, there is a significant difference in prevalence across countries and subgroups of the population. In Sudan there are indications that there are non-homogeneous trends in tobacco consumption. Elgoni (2023) conducted a systematic review, claiming a prevalence of adult tobacco use between 10% and 47.5% with cigarette smoking, toombak dipping, and shisha all practiced, but the distribution varied according to the demographic group (Elgoni & Mohammed, 2022). These results correlate with the current study in which cigarette smoking is more normal as compared to recreational shisha among Sudanese migrants.

Further evidence is found in the study by Othman et al. (2019), who described the current prevalence of ever-shisha (13.4) among secondary school students in Khartoum, where the use was strongly correlated with peer influence, having friends who smoke cigarettes, and academic achievement (Othman et al., 2019). Despite the fact that the current study was carried out among adults and not adolescents, the relatively low shisha use could be attributed to the existence of certain socio-cultural beliefs according to which smoking cigarettes is the more dominant and fashionable method of tobacco use in males of Sudanese descent.

Moreover, nicotine dependence markers were eminent in the current study as over 50% of smokers smoked over ten cigarettes in a day and were strongly addicted. Early onset is a proven indicator of chronic nicotine dependence and poor quit failure, as the current study reported many people starting smoking from 15-18 years. Haddad et al. (2024) also reported the high degree of dependence and the lack of ability to decrease cigarette consumption during the time of the economic and social unsteadiness (Haddad et al., 2024). The fact that the moderate to high dependence was not found to be significantly related to age group in the current study implies that moderate to high dependence is not concentrated in a particular age group but spread out throughout the adulthood.

Additionally, almost half of the respondents in the current study stated that they had attempted to quit in the past 12 months, and a similar proportion reported that they wanted to quit. Nonetheless, over a quarter of them reported unsuccessful quitting. Such co-occurrence of quit intention and cessation failure reflects broader regional findings regarding structural barriers, such as the limited accessibility of cessation services and financial constraints that can hinder sustained abstinence. The meta-analysis conducted by Kargar and Ansari-Moghaddam (20233) further highlighted the substantial health burden of cigarette smoking in the Middle East, reporting that approximately 30–35% of esophageal and lung cancers were attributable to smoking (Kargar & Ansari-Moghaddam, 2023). These statistics underscore the need to strengthen tobacco control measures.

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The current study did not find any statistically significant associations between smoking status and age group, marital status, gender, or duration of residence. Furthermore, the independent samples t-test results revealed no statistically significant differences between Sudanese migrants residing in Lebanon and Oman regarding cigarette smoking prevalence, age distribution, previous shisha use, or smoking cessation attempts. These findings suggest that tobacco-use behaviours among Sudanese migrants are relatively consistent across different host-country contexts and may be more strongly influenced by shared migration-related stressors and socio-cultural factors than by geographical location.

Although the statistical power was limited due to the small sample size and the predominance of male participants, the absence of clear sociodemographic gradients suggests that cigarette smoking may be a widely shared behavioural pattern among this group of migrants. This observation is consistent with findings from Sudan summarized by Elgoni et al. (2022), which indicate that adult males frequently use tobacco across different marital and residential contexts where social acceptance is relatively high (Elgoni & Mohammed, 2022).

Overall, the current study demonstrated a concentrated burden of cigarette smoking and nicotine dependence among Sudanese migrants in Beirut, alongside comparatively lower but still present shisha use. The findings are consistent with regional evidence from Lebanon and Sudan and highlight subgroup dynamics characterized by early initiation, dependence, and repeated cessation failure. These results support the need for culturally responsive and accessible tobacco cessation programs that address behavioural dependence as well as the socioeconomic stressors associated with migration.

Strengths and Limitations

This study provides preliminary evidence regarding tobacco use patterns among Sudanese migrants in Beirut, a population that remains largely underrepresented in epidemiological research. However, the study has several limitations, including the small sample size, the use of convenience sampling, and reliance on self-reported data, which may introduce reporting bias. Therefore, the findings should be interpreted with caution and confirmed in larger population-based studies.

Conclusion

The findings of the current study indicate a substantial prevalence of cigarette smoking and notable levels of nicotine dependence among Sudanese migrants residing in Beirut. Early initiation of smoking and frequent unsuccessful cessation attempts suggest persistent tobacco use behaviours within this population. These findings highlight the need for culturally appropriate tobacco-control strategies and improved access to smoking cessation support services targeting migrant communities.

Declarations

Consent for Publication

Not applicable. The manuscript does not contain any identifiable personal data.

Availability of Data and Materials

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

All authors contributed to the conception and design of the study. Data collection and analysis were performed collaboratively. All authors contributed to drafting and revising the manuscript and approved the final version for publication.

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