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Abstract

This report presents nationally representative evidence on waterpipe smoking in Lebanon focusing on consumption patterns, spending behavior, and smoking settings. We document high prevalence of waterpipe use, particularly among women, younger individuals, and the more educated. The vast majority of smokers consume at home, with a significant share also smoking in cafés and restaurants. Although total monthly spending is higher for home smoking due to frequency, café smoking carries a substantial per-bowl premium, indicating significant profit margins for hospitality establishments. We argue for a dual policy approach combining higher excise taxation on waterpipe tobacco with targeted taxation or licensing of establishments that profit from waterpipe services, alongside interventions aimed at reshaping social norms surrounding waterpipe smoking.

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1. Introduction

Waterpipe tobacco smoking (WTS) has increased globally, with the Eastern Mediterranean region showing especially high rates. Lebanon has one of the highest WTS prevalences, affecting both genders and showing a rising trend among adolescents and young adults. In our most recent study (Chalak et al., 2025), we document a 39 percent waterpipe smoking prevalence rate among adult population in Lebanon. The trends show distinctive traits by gender, age, educational attainment, and income, with women, young people, and more educated people being more likely to be waterpipe smokers.

Counter to some popular beliefs, waterpipe smoking is not a safer alternative to cigarette smoking (El-Zaatari et al., 2015). Its smoke contains nicotine, carbon monoxide, tar, heavy metals, and other toxic compounds, including carcinogenic substances (Shihadeh et al., 2015). In the context of Lebanon, and the East Mediterranean region, the normalization and social acceptance of waterpipe use makes it a major public-health concern.

In this study, we zoom in on waterpipe smoking behavior, focusing on its distinctive consumption patterns and spending dynamics. Waterpipe smoking in Lebanon merits special attention, distinct from other forms of tobacco use, for several reasons. First, it enjoys a high degree of social acceptance and is often perceived as a socially desirable and culturally embedded activity. This normalization weakens the stigma typically associated with tobacco consumption and may reduce the effectiveness of standard anti-smoking measures. Second, prevalence exhibits marked heterogeneity across demographic groups, suggesting the possibility of difference in price responsiveness across subpopulations. Third, waterpipe smoking has evolved into a significant service-based economic activity, generating substantial revenues for restaurants, cafes, hotels, and other touristic establishments. In this context, tobacco consumption is not only an individual health behavior but also a profit-generating commercial activity embedded in the hospitality sector. All these features have important implications for tobacco control policies. They suggest that effective regulation may require strategies that account for social norms, and incentives faced by service providers.

2. Trends in Waterpipe Consumption

Our analysis relies on findings from a nationally representative study. The data collection took place between February and April 2024. We surveyed 2,500 adults residing in Lebanon. The survey collected a wide range of data including demographic information, income and overall spending, and detailed information on consumption of and spending on various tobacco products. A detailed description of the survey and the sample is provided in Chalak et al. (2025) and in the online data repository.[2] In our earlier study, we highlight that 39 percent of the survey participants reported smoking waterpipe, and that waterpipe smoking was more common among women, and younger and more educated people. This section presents detailed analysis of waterpipe consumption patterns. First, presenting a descriptive analysis of waterpipe smoking, and waterpipe smokers characteristics in comparison to non-smokers, and smokers of other tobacco products. Second, exploring waterpipe consumption patterns and spending.

a. Descriptive analysis and stylized facts

Table 1 presents estimation results of a binary logit model estimating the association of waterpipe smoking with individual characteristics. Estimates using the full sample (smokers and non-smokers), and the sub-sample of smokers are reported.

Table 1. Predictors of waterpipe smoking

Variable	Full sample		Smoker	
	Coefficient	Adjusted Probability	Coefficient	Adjusted Probability
Gender				
Male	-	20.3%	-	27%
Female	1.96***	32.6%	3.84***	56%
Age	0.97***		0.956***	
Marital Status				
Not Married	-	23.3%	-	32.1%
Married	1.27*	27.5%	1.70***	42.3%
Completed Education				
No formal Education	-	11.5%	-	21.1%
Primary Education	2.75***	25.5%	2.64**	37.8%
Secondary Education	3.30***	28.9%	3.18***	41.6%
Tertiary Education	3.05***	27.4%	3.42***	43.1%
Type of Residential Area				
Urban	-	26.0%	-	38.5%

[2] The repository can be accessed on https://github.com/aliabb87/Tobacco-Use-Survey-Lebanon-2024

Suburban	1.03	26.5%	0.97	37.9%
Rural	1.17	28.8%	1.72***	49.4%
Employment Status				
Employed	-	28.8%	-	40.6%
Unemployed	0.78	24.2%	0.80	36.3%
Inactive	0.78*	24.2%	0.95	39.6%
Not in labor force (retirees or students)	0.53**	18.2%	0.59*	30.8%
Income Group				
Less than $500	-	26.6%	-	39.9%
$500 - $1,000	*0.98*	26.2%	0.95	38.9%
$1,000 - $2,000	*0.92*	25.1%	0.76	34.7%
More than $2,000	*0.27*	9.3%	0.29	18.9%
Model fit				
Log-pseudolikelihood	-1,307.19		-926.15	
Wald χ^2 (p-value)	174.39 (0.00)		311.84 (0.00)	

Note: * p<.1; ** p<.05; *** p<.01

In both samples, the results show strong association of waterpipe smoking with gender, age, level of completed education, and urbanicity. Adjusted for other demographic factors, women in the full sample were 50 percent more likely than men to be waterpipe smokers. Among smokers, women were twice as likely to be waterpipe smokers than men. Odds of waterpipe usage decreased steadily with age, with a 0.6 percentage point decrease in adjusted probability of waterpipe usage per year of age on average. Prevalence of waterpipe smoking increases progressively with completed education, the average adjusted probability of waterpipe usage among the smokers who completed at least secondary education is higher than 41% compared to 21% among smokers with no formal education. Rural smokers were significantly more likely to be waterpipe smokers compared to urban and suburban smokers, conditional on education, gender, and other covariates.

The association of waterpipe usage with employment and earnings has limited statistical significance. The pattern of association with employment status seems to suggest a lower likelihood of waterpipe usage among individuals out of the labor force, however the statistical significance is weak. The estimates point to a constant likelihood of waterpipe usage across income groups.

Waterpipe smoking differs from other forms of tobacco use because it requires a more complex and time-intensive preparation process before consumption. This is likely to impact the frequency of consumption, and other smoking behavior among waterpipe smokers. Table 2 presents a description of frequencies and other statistics on waterpipe consumption. Given the demographic

trends highlighted above we report the averages for the full sample and stratified by gender and educational attainment.

The reported averages show very distinct patterns. While prevalence is higher among women, it is men who have a higher frequency of smoking and a higher level of spending. The highest prevalence of waterpipe smoking is among educated women, 37 percent of women with secondary education or higher smoke waterpipe, among women with primary education or less the rate of waterpipe smokers is 21 percent. In comparison, among men the rates of waterpipe prevalence are 19 percent and 21 percent, for primary education or less and secondary education or higher, respectively.

Waterpipe smokers report smoking waterpipe on 1.28 days per week on average, while the maximum reported number in the sample was 4 days. This confirms that waterpipe smoking is often social and intermittent rather than daily habitual use. There is no significant difference between men and women in the number of days of smoking. However, men consume a larger quantity, with smoking men reporting an average of 3.5 bowls or higher per week, while women report, on average, between 2.57 and 2.82. After accounting for gender, there is no significant difference in frequency of smoking by education level.

Table 2. Smoking frequency among waterpipe smokers

	Full sample	Men		Women	
		Primary education or less	Secondary education or higher	Primary education or less	Secondary education or higher
Prevalence	0.26	0.19	0.21	0.25	0.37
Age of Initiation	23.6	23.6	21.6	24.5	24.0
Number of bowls per week	2.99	3.74	3.51	2.82	2.57
Days smoked per week	1.28	1.21	1.32	1.27	1.30
Average monthly spending	20.46	24.1	24.2	19.7	17.2

The gender difference in frequency of smoking translates into a significant difference in monthly spending on waterpipe smoking. The average waterpipe smoker in the sample spends $20.46 per month, with men spending $24 on average, while women with low educational attainment spend $19.7, and women with higher educational attainment spend $17.2.

The survey allows us to look into some changes in behavior associated with the financial crisis. Compared to before the crisis, 56.6 percent of waterpipe smokers reported smoking at the same

frequency as pre-2019, 29.8 percent reported smoking less, and 12.1 percent reported smoking more. There was minimal brand switching, with 18 percent of survey participants reporting changing brands. Reduction in consumption is associated with levels of education, with 39.68 percent of lower education men and 32.87 percent of lower education women reporting smoking less. Among the higher education group in comparison, 22.95 percent and 26.38 percent of men and women reported smoking less, respectively.

b. Home smokers and cafe smokers

A central feature of waterpipe smoking – distinct from other tobacco products – is the importance of place and setting of consumption. Waterpipe smoking often occurs either at home or in commercial service establishments such as cafes and restaurants. Analyzing the difference in consumption and spending behavior between these two settings is the focus of this section. Sample means for key variables measuring the distinctions between the two settings are reported in Table 3.

Waterpipe consumption commonly takes place across multiple settings. Most waterpipe smokers report smoking at home, but this does not necessarily imply solitary consumption. In the Lebanese context, home-based waterpipe smoking often remains a social activity, occurring within household or during visits with friends and relatives. In our sample, 94 percent of waterpipe smokers report consuming waterpipe at home. Among them, a small share (4 percent) report ordering waterpipe through delivery services, while the rest using home prepared waterpipe. Café/restaurant smoking is also relatively common, with 30 percent of waterpipe smokers reporting frequently consumption in such establishments. These settings often overlap: only 10 percent of café/restaurant smokers report not smoking at home, suggesting that many users combine home-based and out-of-home waterpipe consumption.

Table 3. Spending on waterpipe consumption by smoking setting

	Full sample	Men	Women
Smoking at home	0.94	0.95	0.93
Smoking in café/restaurant	0.30	0.32	0.28
Monthly spending at home smoking	20.46	24.2	18.1
Monthly spending in café/restaurant	18.47	22.83	15.40
Spending per bowl in café/restaurant	5.41	5.13	5.59

Overall spending is higher at home. With men spending around $24 per month, and women around $18 per month, on average at home. Whereas spending is $22.83 and $15.40 at café/restaurant for men and women, respectively. This is mainly driven by the frequency of smoking, as most waterpipe smokers in our sample are home smokers. When accounting for spending per bowl, the average reported cost is $5.41 per bowl, with a maximum reported number of $15.5. In contrast, the survey respondents report an average price of 50g mu'assel at $1.2.

3. Discussion

Findings from this study fit within a growing literature that highlights the persistence and uniqueness of waterpipe tobacco smoking as a public health concern in Lebanon and the broader Eastern Mediterranean region. Consistently with previous national representative research, waterpipe smoking exhibits distinctive socio-demographic associations that distinguish it from cigarette smoking, particularly its stronger concentration among lower-educated men, and other forms of tobacco use (Nakkash et al., 2022).

Regional evidence documents that waterpipe smoking prevalence in Lebanon has historically been among the highest in the region. In the most recent multi-country survey covering Lebanon, Jordan, and Palestine, reported adult waterpipe prevalence in Lebanon was 39.5 percent, substantially higher than in Jordan (11 percent) and Palestine (12.9 percent) (Nakkash et al., 2022). Additionally, unlike cigarette smoking, waterpipe smoking was more prevalent among women than men in Lebanon. Our findings reconfirm these observations and demonstrate the persistence of a high prevalence even after the crisis.

The strong association between gender and waterpipe we document reinforces qualitative and quantitative work showing that social norms around waterpipe smoking differ significantly from those of cigarette smoking in the region. In many countries, waterpipe use is seen as more socially acceptable for women, partly because it is framed as a social or leisure activity rather than a solitary or addictive habit (Farran et al., 2024).

Our results also show decreasing likelihood of waterpipe smoking with age. This age gradient is well documented in literature focusing on the Eastern Mediterranean region, which consistently finds higher waterpipe prevalence among young adults and adolescents compared with older age groups

(Farran et al., 2024). Jawad (2018) attribute this trend to cultural diffusion, café culture, and the appeal of flavored mu'assel tobacco[3] products among youth. Based on these behavioral observations, we can anticipate, or project, alarming patterns in adoption of modern tobacco products among the youth.

The positive association between waterpipe smoking and educational attainment reflect the social consumption patterns of waterpipe smoking – often occurring in cafes or social venues frequently by educated, urban youth – and the perception of waterpipe as a culturally normative or even modern lifestyle choice.

The low frequency, intermittent use of waterpipe have been noted in systematic reviews as waterpipe sessions are embedded in social gatherings and perceived as less harmful, with users typically underestimating dependence and health risks relative to cigarettes (Kargar et al., 2023). The gender difference in consumption intensity and spending is especially informative. Although prevalence is higher among women, men in our sample smoke more bowls and spend more monthly, suggesting higher overall consumption among male waterpipe users. Regional survey work, including among university students, indicates a generally smaller gender gap in waterpipe smoking than in cigarette smoking, but still a tendency for male smokers to engage in heavier use (Hamadeh et al., 2020).

The findings on behavioral response to the crisis highlight a mixed resilience of waterpipe use. A majority reported no change in frequency, although a significant minority reduced consumption. We see limited brand switching in the case of waterpipe, unlike what we document for cigarettes, where large relative price variation across brands – especially the local brand, Cedars,becoming comparatively much cheaper – created stronger incentives to switch (Chalak et al., 2025). This shows that economic constraints can suppress use among price-sensitive groups, but may have limited impact on established social smokers.

The results highlight an important structural feature of waterpipe consumption in Lebanon: while café smoking is visible and socially salient, home smoking remains the dominant mode of use. Waterpipe consumption is a hybrid practice that combines private, low-cost consumption with periodical social smoking in public venues. Although total monthly spending is higher at home, this

[3] Mu'assel tobacco is particularly appealing, especially for novice tobacco users, because it is flavored, sweetened, aromatic, and generally perceived as smoother and less harsh than cigarettes or unflavored tobacco.

is largely driven by the greater frequency of home-based sessions. Once spending is standardized by bowl, café smoking is substantially more expensive than home smoking. This confirms that cafés extract a significant service premium. Waterpipe smoking in cafes, therefore, functions partly as a bundled leisure service rather than simply tobacco consumption. The price paid in this setting reflects not only the cost of tobacco, but also the preparation of waterpipe, table service, café ambiance, and the opportunity to consume waterpipe as part of a broader social outing.

4. Conclusion and Policy Recommendations

This study confirms that waterpipe smoking in Lebanon is not only widespread, but structurally distinct from other forms of tobacco use. It combines two dimensions: (i) high prevalence home-based consumption driven by relatively inexpensive tobacco, and (ii) premium-priced café and restaurant service provision that generates significant revenues for hospitality establishments. At the same time, waterpipe smoking remains socially normalized, particularly among women, youth, and educated populations, reinforcing its persistence despite economic hardship.

The low-cost home smoking coupled with high-margin café provision creates substantial public health risks and strengthens the case for requiring establishments that profit from tobacco sales to internalize part of the associated social costs. The evidence indicates that restaurants and cafés charge substantial per-bowl premia relative to the retail cost of tobacco, suggesting a significant profit extraction from this activity. This provides clear room for targeted regulatory and fiscal intervention. We therefore make the following recommendations.

Policy Recommendations

1. Tax or license café and restaurant waterpipe services
    a. Introduce a supplemental tax or higher licensing fees for establishments that offer waterpipe services.
    b. Consider auction-based licensing mechanisms to efficiently capture part of the economic rents earned through premium pricing.
    c. Gradually reduce the number of available waterpipe service licenses over time to limit market expansion and reduce availability, while implementing safeguards (e.g.,

license caps per owner and transparent allocation rules) to present excessive market concentration and monopolization.

   d. Strengthen enforcement of smoke-free indoor regulations in hospitality venues.

2. Increase excise taxation on waterpipe tobacco
   a. Raise tobacco taxes to reduce affordability of home-prepared waterpipe smoking, which represents the dominant mode of consumption.
   b. Align waterpipe taxation more closely with cigarette taxation to avoid potential product switching.
3. Address social norms and risk misperceptions
   a. Implement targeted awareness campaigns to counter the perception of waterpipe as a harmless leisure activity.
   b. Focus interventions on youth, women, and rural populations, where prevalence is relatively higher.
   c. Regulate flavoring, marketing, and promotional practices that reinforce the social and recreational framing of waterpipe smoking.

An effective waterpipe control strategy must operate along both economic and social margins. Capturing fiscal revenues from high-profit service provision, reducing product affordability, and reshaping social norms are complementary policy tools.

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