



Women and Waterpipe Smoking: The Impact of a Month of Fasting (Ramadan)

Sukaina Alzyoud, RN, MSN, PhD^{1*}; Fatima Alzyoud, RN, MSN, PhD²

¹ Department of Community and Mental Health, Faculty of Nursing, Hashemite University, Zarqa, Jordan.

* Corresponding Author. Email: sukaina-alzyoud@hu.edu.jo

² Loewenberg College of Nursing, University of Memphis, Memphis, TN.

ARTICLE INFO

Article History:

Received: October 3, 2025

Accepted: May 19, 2026

ABSTRACT

Background: Waterpipe use is a significant factor in female tobacco consumption, particularly in the Middle East, where it is often perceived as a symbol of social emancipation. While cigarette smoking remains socially discouraged for women, waterpipe smoking has gained cultural acceptance. **Purpose:** This study examined changes in waterpipe smoking patterns among Jordanian women before, during, and after the holy month of Ramadan. **Methods:** A descriptive, repeated-measure design was used to assess waterpipe smoking among 109 Jordanian women recruited from maternal outpatient clinics. Data was collected at three time points: two weeks before, during, and two weeks after Ramadan using the Women's Smoking Questionnaire. **Results:** The average age of the participants was 25 years, and they were non-pregnant women. While overall smoking status remained stable across the three periods ($\chi^2 \approx 0.27$, $p=0.60$), there were minor fluctuations in the reported prevalence at each point: before Ramadan (86.2%), during Ramadan (80.3%), and after Ramadan (82.5%). There was no significant association between waterpipe smoking status and perceived health harms ($p = 0.367$). However, smoking status was significantly associated with social judgment and the perceived "attractiveness" of women waterpipe smoking ($\chi^2 \approx 4.89$, $p=0.027$). **Conclusion:** This study is among the first to document the stability and periodic increases in women's waterpipe smoking habits surrounding Ramadan. The findings suggest that waterpipe smoking is a deeply entrenched social ritual rather than purely nicotine-seeking behavior. **Implications for Nursing:** Nurses should implement culturally sensitive screening that specifically includes waterpipe smoking. Interventions should address misconceptions regarding waterpipe safety and be strategically timed to target post-holiday increase in usage.

Keywords: Waterpipe, Smoking, Women, Fasting, Ramadan.

What does this paper add?

1. This is among the first longitudinal studies to document that, while smoking status remained stable, smoking intensity (measured by the frequency of changing waterpipe heads) showed a notable increase among women following the conclusion of Ramadan.
2. The study demonstrates that while frequency of use fluctuates, overall smoking status remains stable

throughout the holy month, suggesting that waterpipe use is a deeply entrenched habit.

3. The paper identifies that perceived "attractiveness" and social acceptability are stronger drivers of smoking behavior than perceived health harms, which did not significantly impact smoking status.

Introduction

The most recent estimation of tobacco users by the

World Health Organization (WHO) is that approximately 1.25 billion adults use tobacco worldwide. Notably, only six countries globally show this rise in tobacco consumption, with three in the Eastern Mediterranean Region (Egypt, Jordan, and Oman) (World Health Organization, 2024). According to the latest Ministry of Health (MOH), the National STEPS Survey showed that tobacco smoking is among the highest (51.6% of adult smokers) in the world. The survey showed that cigarette smoking is still the leading product to be consumed mainly among males (over 70%) (MOH, 2020). A significant finding was a clear increase in waterpipe use among females compared to males, at 54% and 46%, respectively (MOH, 2020). A study conducted across four major Jordanian governorates reported that 42.1% of females smoke waterpipes (Alkouri et al., 2023). In Jordan, waterpipe smoking, also known as Arghileh, has become a culturally ingrained and socially acceptable practice, particularly among women (Abdulrashid et al., 2018; Bani Hani et al., 2025; Nemati et al., 2023). Bani Hani et al. (2025) showed that waterpipe smoking has transcended traditional boundaries to become a centerpiece of females' social life, leisure, and even a domestic routine. The evolution of waterpipe smoking in Jordan is not only a health problem to be addressed by health providers and activists; it is deeply embedded in the shifting socio-cultural fabric of the country.

Al-Shatnawi et al. (2021) studied how fasting during Ramadan affects waterpipe smoking withdrawal symptoms in women. They found that waterpipe smoking is affected by gender norms and the special physical and social changes during Ramadan (Al-Shatnawi et al., 2021). Moreover, cultural events, holidays, and stress levels can significantly influence tobacco consumption patterns throughout the year (Abdulrashid et al., 2018; Al-Natour & Gillespie, 2022). Understanding the differences in waterpipe smoking among women requires a multi-dimensional investigation that explores the prevalence and determinants of the habit. As highlighted by Kheirallah et al. (2021), waterpipe smoking poses a significant health risk factor for maternal and overall women's health in general.

In contrast to cigarette smoking, little research has been conducted on the seasonality of waterpipe smoking, particularly among women of reproductive age who are attentive to maternal health considerations.

Few studies to date have reported seasonal trends in smoking as a primary finding, though evidence from broader research on the characteristics of waterpipe smokers suggests that seasonal patterns of waterpipe smoking may exist in specific contexts (Alzaabi et al., 2017). Only a small minority of waterpipe smokers surveyed in the United States reported seasonal waterpipe use; however, studies from the Middle East suggest a significant increase in waterpipe use during holidays (Abdulrashid et al., 2018; Al-Natour & Gillespie, 2022; Maziak et al., 2005; Smith-Simone et al., 2008). When considering the effect of the holy month of fasting, a Lebanese qualitative study has shown that waterpipe smoking is strongly associated with the Muslim holy month of Ramadan in Middle Eastern culture (Afifi et al. 2013). Furthermore, few studies have documented seasonal variations in waterpipe smoking among women during Ramadan, despite it being the most prevalent form of tobacco use among females in Middle Eastern cultures (Asfar et al., 2005; Hamadeh, 2016; Maziak et al., 2015).

Although few studies have examined factors associated with waterpipe smoking, most existing research focuses on the United States. Only a few cross-sectional surveys from Arab countries have explored these factors: one from Saudi Arabia (Abdulrashid et al., 2018) and two from Syria (Asfar et al., 2005; Maziak et al., 2004). These studies have examined seasonal or periodic increases in tobacco use (Abdulrashid et al., 2018; Asfar et al., 2005; Dadipoor et al., 2019; Maziak et al., 2004). In these surveys, most respondents reported increases in waterpipe smoking frequency at certain times, especially in the summer, during periods of stress or happiness, on holidays, and during Ramadan (Abdulrashid et al., 2018; Asfar et al., 2005; Maziak et al., 2004). Maziak et al. (2004) found that a significant percentage of female university students (80%) experienced periodic increases in waterpipe smoking, compared to 68% of male students. Among those who reported increased use, more females than males mentioned smoking during holidays (42% versus 21%) and Ramadan (8% versus 2%) (Maziak et al., 2004).

Additionally, Asfar et al. (2005) indicated that novice waterpipe users, particularly university students, were much more likely to show seasonal patterns in waterpipe consumption than long-term users, such as cafe patrons. These studies collectively suggest that female waterpipe users with shorter smoking histories

may be more prone to increased smoking behaviors during notable seasonal periods like Ramadan (Abdulrashid et al., 2018; Asfar et al., 2005; Dadipoor et al., 2019; Maziak et al., 2004). Therefore, this study aims to analyze seasonal patterns of waterpipe smoking among Jordanian women of reproductive age concerned with maternal health, assessing behaviors at three key points: two weeks prior to Ramadan, during Ramadan, and two weeks after Ramadan. This research represents one of the first longitudinal efforts to track the specific trends in waterpipe smoking frequency among women. Unlike previous cross-sectional studies that relied on retrospective recall of “seasonal” use, this design captures real-time data at three specific intervals—two weeks before, during, and two weeks after Ramadan—allowing precise documentation of the marked increase in smoking frequency following the holy month. Furthermore, the study considers Jordan’s unique socio-cultural landscape, where female waterpipe smoking is more socially acceptable than cigarette smoking.

Materials and Methods

Design

A descriptive quantitative repeated-measures study design was conducted among a sample of Jordanian women of reproductive age who are mindful of maternal health (18 years and older). The study design involved collecting data over three points of time (two weeks prior to Ramadan, during Ramadan, and two weeks following Ramadan).

Sample and Setting

Of the 135 questionnaires completed by women at the first data collection point, the final sample size was 110 adult married non-pregnant women, resulting in an attrition rate of 18.5%. The reduction in sample size was due to participants not answering their phone, a disconnected number, or requesting to withdraw from the study. The study was conducted in the gynecology-obstetrics clinics of Hiba Hospital in Amman, Jordan. On average, 35 patients are seen daily at the clinics. The gynecology and obstetrics clinics at Hiba Hospital were selected as recruitment sites for women of reproductive age who are proactive about their maternal health to participate in the study. In addition, all antenatal clinics affiliated with Hiba Hospital were visited to recruit pregnant women. Hiba Hospital provides comprehensive maternal and reproductive

care, ranging from routine prenatal checkups and high-risk deliveries to advanced infertility treatments, like IVF and minimally invasive gynecological surgeries. An *a priori* sample size calculation was performed assuming a 95% confidence level to detect a moderate effect size, a 5% margin of error, and an estimated national or regional prevalence of waterpipe smoking among women of 9%, resulting in a required sample size of 126 participants. The inclusion criteria were non-pregnant women aged 18 years or older, able to read and write Arabic, without serious illnesses, and not identified as high-risk patients.

Measures

Women Tobacco Smoking Questionnaire (WTSQ): The WTSQ, originally developed by the principal investigator (S. Alzyoud), was adapted for use during Ramadan to assess tobacco smoking patterns among women. The questionnaire consists of four sections: (1) demographics (e.g., age, educational level, marital status), (2) tobacco smoking status, including history of cigarette and waterpipe use, (3) waterpipe smoking behaviors, and (4) Ramadan-specific smoking practices, which assess changes in timing, frequency, and patterns of waterpipe use during and after Ramadan. Items related to smoking behaviors were reworded to reflect the unique context of fasting hours and lifestyle changes during this period.

Response formats varied by construct and included Likert-type scales, dichotomous (yes/no) items, fill-in-the-blank responses, and multiple-choice questions. Content validity of the adapted instrument was established through evaluation by a panel of experts in tobacco research and women’s health, who confirmed the clarity, relevance, and contextual appropriateness of the items for capturing women’s smoking behaviors during Ramadan. Reliability of the WTSQ has been supported in prior studies conducted by the PI (Alzyoud & Massoud, 2021) and other researchers, with reported high internal consistency (Cronbach’s $\alpha = 0.955$) (Abbadi et al., 2020). These findings provide evidence of the instrument’s stability and consistency in measuring tobacco smoking behaviors among women across different samples.

Recruitment, Permission, and Data Collection

Approval was obtained from the Institutional Review Board of the Hashemite University (IRB-HU –

Approval number 16/13/10/1502762) and the ethical committee of Hiba Hospital. All study procedures were conducted in adherence to the HU-IRB and Hiba Hospital's responsible conduct of research on humans' guidelines. Women who visited the GYN/OB clinics during the third week of May 2015 were invited to participate in the study. Participants who met the inclusion criteria and agreed to participate were provided with consent forms detailing the study's purpose, potential risks, and benefits. After obtaining their consent and informing them that their participation is voluntary and that they have the right to withdraw at any time, a written consent form was obtained, and they were then included in the study. They were informed that their participation and information would be kept confidential. Completing the study survey questionnaire took 10-15 minutes. The first point of contact and data collection took place at the clinics before the beginning of the month of Ramadan; the second and third data collection points were conducted by the study team via phone. To reduce potential biases from self-reported data and telephone surveys, the study team employed standardized questioning techniques and verified unique identifiers, ensuring consistency and data integrity throughout all three phases. The participants were called at each data point and answered the survey questions asked by the study team. The study team was able to track and contact the participants by using a unique

identification number at the first point of data collection. Except for the consent signature, the study protocol was repeated at each data collection point. Confidentiality was ensured by using a unique identification number for each participant, which was used when data was collected during the second and third phases.

Data Analysis

The data was analyzed using IBM SPSS (Version 27.0). Univariate, bivariate, and multivariate analyses were performed. After data management, the final sample was 109 responses to be included, as data from one participant was excluded due to many missing answers. A chi-square test was conducted to test the changes in waterpipe smoking status (smoker vs. non-smoker) across three time points: before, during, and after Ramadan. An in paired within-person analysis using McNemar's test was conducted to examine the change in smoking status between before vs. during and during vs. after Ramadan.

Results

A total of 109 women were included in the final analysis (Table 1), with an age range of 18 to 56 years (mean = 26, SD± 9). Almost all participants, 94.5%, reside in an urban setting. More than two-thirds, 69.7%, had a university degree. Thirty-eight percent of the study participants were students.

Table 1. Demographic characteristics of participants (N =109)

Variables	Mean	SD
Age	25.97	±9.02
	N	%
Residence		
Rural	5	4.63
Urban	103	95.4
Level of Education		
High School	18	16.5
Diploma	13	11.9
University	76	69.7
Postgraduate Degree	2	1.83
Work Status		
Government Employee	9	8.26
Non-govt. Employee	16	14.7
Self-employee	18	16.5
Student	42	38.5
Homemaker	11	10.1

Current Tobacco Use Status		
Daily	21	19.27
Less than daily	9	8.26
Not at all	77	70.64
Past tobacco use status		
Daily	18	16.98
Less than daily	17	16.04
Not at all	67	63.21
Waterpipe smoking has adverse health effects*		
No	9	8.3
Yes	99	90.8
Women using waterpipe are socially acceptable*		
Definitely not	19	17.4
Maybe not	21	19.3
Maybe yes	36	33
Definitely yes	32	29.4

¹ Note. N number of participants; SD Standard Deviation; * total does not account for 109 due to missing data.

Smoking Status before Ramadan

Most participants initiated tobacco smoking at the ages of 19-25 years (29.4%), followed by ages 12-18 years. The majority (86.2%) of participants were current waterpipe smokers at the time of the study. When participants were asked about their weekly waterpipe smoking, one-third reported smoking once a week, while 22.9% indicated that they smoked twice a week. Seventeen percent of participants reported that they were unable to stop waterpipe smoking for more than seven days, while 11.9% managed to stop at least once. When asked about their waterpipe smoking sessions over the past 30 days, 29.4% of participants reported smoking it twice or more per week, while 25.7% smoked it once a month. Almost two-thirds of participants indicated that they do not smoke waterpipe alone. Additionally, more than a half (52.3%) reported feeling a strong urge to smoke a waterpipe. Furthermore, 29.4% of participants stated that they would smoke a cigarette rather than a waterpipe when it is not available.

Waterpipe Smoking Status during and after Ramadan

Table 2 presents the results of waterpipe smoking habits during and after Ramadan. Among the 109 participants, there was a slight change in waterpipe smoking reported across three time points: before Ramadan (86.2%), during Ramadan (80.3%), and after

Ramadan

(82.5%). The most common frequency of waterpipe smoking during these periods was once a week. More than a half of the participants reported changing the head of the waterpipe at least once during a single smoking session during and after Ramadan. After Ramadan, the number of active waterpipe smokers fluctuated from 88 participants during Ramadan to 90 participants afterwards; however, the intensity of use surged, as the percentage of participants changing waterpipe heads at least once per session rose from 56.9% during Ramadan to 67.9% after Ramadan.

The chi-square test for changes in waterpipe smoking status (smoker vs. non-smoker) across the three time points showed no significant difference ($\chi^2 \approx 0.27$, $df = 1$, $p = 0.60$), indicating that Ramadan did not materially alter participants' smoking status. In contrast, smoking status during and after Ramadan was strongly associated ($\chi^2 \approx 72.22$, $df = 1$, $p < 0.001$), reflecting the high stability of smoking behavior across these two periods. In paired within-person analysis using McNemar's test, we found no statistically significant change in smoking status between before and during Ramadan ($\chi^2 = 8.00$, $df = 1$, $p \approx 0.21$) or between during and after Ramadan ($\chi^2 = 2.25$, $df = 1$, $p \approx 0.13$). Combined with strong overall stability in prevalence, this indicates that Ramadan did not meaningfully alter participants' waterpipe smoking.

Table 2. Differences in waterpipe use characteristics during and after Ramadan season

	During Ramadan		After Ramadan	
	n	%	n	%
Waterpipe smoked				
No	19	17.43	19	17.43
Yes	88	80.73	90	82.57
Tobacco products other than waterpipe used				
No	84	77.06	14	12.84
Yes	21	19.27	5	4.59
Times smoked waterpipe in last 2 weeks				
Every night	35	32.11	43	39.45
Every other night	27	24.77	22	20.18
Once a week	29	26.61	27	24.77
No. of waterpipe heads during single session				
One head	62	56.88	74	67.89
Two heads	21	19.27	15	13.76
Three heads	7	6.42	3	2.75

Association between Waterpipe Smoking Status and Perceived Health Harms

Our results showed no statistically significant association between smoking status and believing that waterpipe smoking is harmful to health. For smoking during Ramadan, the chi-square test was not significant ($X = 0.08$, $p = 0.367$). This suggests that women who continued to smoke during Ramadan were just as likely as non-smokers to acknowledge that waterpipe smoking is harmful. In other words, continued smoking during Ramadan does not appear to be driven by lower perceived health risk.

Association between Smoking Status and Perceived Social Judgment

In the questionnaire, perceived social judgment was captured using the item “Do you think that waterpipe smoking affects how others perceive the attractiveness of women?”. Because the wording of this question indicates perceived evaluation by others rather than a direct “social acceptability” scale, we recoded it into a clearer binary variable representing perceived negative social judgment. The question was transformed into a binary variable labeled negative social judgment. In this coding scheme, a value of 1 indicates that the respondent believes that smoking negatively influences others’ perceptions of women’s attractiveness, reflecting a perceived social penalty associated with the behavior.

Conversely, a value of 0 signifies that the respondent does not believe that smoking affects perceived attractiveness. Higher values mean more perceived negative social judgment.

In contrast to the perceived health harms, smoking during Ramadan was significantly associated with the recoded negative social judgment proxy (whether smoking affects how others perceive women's attractiveness). The chi-square test for smoking during Ramadan vs. negative social judgment was significant ($X = 4.89$, $p = 0.027$ with an effect size of $\phi \approx 0.215$), indicating that smokers and non-smokers differed in their perceptions of this social judgment dimension. These results demonstrate that perceptions around social judgment/acceptability appear to be related to smoking during Ramadan.

Discussion

The current study is among the first studies to report on the stability of smoking status alongside fluctuations in smoking intensity surrounding the holy month of Ramadan among women who smoke waterpipe. Waterpipe smoking has become a major contributor to tobacco use among women in the region, as female waterpipe smoking is much more socially accepted than female cigarette smoking, which is culturally disapproved (Abdulrashid et al., 2018; Afifi et al., 2013; Al-Natour & Gillespie, 2022; Dadipoor et al., 2019;

Khalil et al., 2013; Salameh et al., 2012). The study demonstrates a marked stability in waterpipe smoking status among women during and after Ramadan. Despite the spiritual and health-conscious framework of the month, the lack of significant change in smoking prevalence suggests that waterpipe use is not merely a nicotine-seeking behavior, but a deeply entrenched social ritual. This assumption could be supported by Nahhas' (2015) report, which documents the increase in a social phenomenon known as "Ramadan Tents" and the extension of café operating hours until dawn (Suhoor). These venues are explicitly designed to cater to the nocturnal rhythm of the month, offering food, entertainment, and most crucially, waterpipe. The "Ramadan Tent" is viewed as a family-oriented or community space, allowing women to smoke waterpipes under the umbrella of religious celebrations and communal gatherings (Nahhas, 2015). A significant finding of our study is the noticeable change in waterpipe smoking patterns among women before, during, and after Ramadan. This is a novel study to document this specific pattern; however, our findings align with previous research that has observed changes in smoking behavior across different seasons, such as winter and summer (Al-Natour & Gillespie, 2022; Arku et al., 2015; Chandra & Chaloupka, 2003; Chandra et al., 2011; Delnevo et al., 2006; Graham et al., 2013; Momperousse et al., 2007; Walsh & Paul, 2002; Wellman & DiFranza, 2003; Zhang et al., 2015). Similarly, Abdulrashid et al. (2018) found an increase in waterpipe smoking among women during various festive occasions, cultural events, and holidays.

A critical finding in our study was that continuing to smoke during Ramadan was not driven by lower perceived health risk. This disconnect between knowledge and behavior is supported by Bani Hani et al. (2025), who found that even healthcare students in the University of Jordan – despite their medical training – showed high waterpipe smoking prevalence (59.6% among males and 39.4% among females). Bani Hani et al. (2025) observed that smokers frequently believe that waterpipe smoking is "less addictive" than cigarettes. This is a harmful misconception, especially considering that a single waterpipe session can increase carbon monoxide inhalation tenfold (Katurji et al., 2010; Primack & Carroll, 2016).

Our findings are particularly alarming for women of reproductive age in Jordan, because smoking impacts

their health and that of their current and future children. Abughosh et al. (2012) found that while health education typically protects against cigarette smoking, household wealth and social status often predict higher odds of waterpipe use among Jordanian women. This means that women who care about their reproductive health might be attracted to waterpipes, because they seem modern and trendy. However, they might overlook known risks, such as changes in menstrual cycles, estrogen deficiency, and pregnancy complications (Bani Hani et al., 2025; Bashirian et al., 2021).

This study is one of the few that focuses exclusively on waterpipe smoking among women and examines its patterns. While health concerns were not significant, our study found that perceived social judgment was significantly associated with smoking status. This aligns with research by Nakkash et al. (2011), which describes waterpipe smoking as being a "symbol of emancipation" for women in the Eastern Mediterranean region. In Jordan, there is a complex duality: while women smoking cigarettes may face harsh social judgment, waterpipe smoking is often viewed as more "socially acceptable" and even attractive (Khalil et al., 2013; Nakkash et al., 2011). Our finding that smokers and non-smokers differ in their perceptions of "attractiveness" and social judgment suggests that the behavior is driven by the desire for social belonging and the perception of waterpipe as a "modern" acceptable form of addiction. This result calls for nurses and other health providers to implement targeted campaigns that address the "misinformation-driven use" (Bani Hani et al., 2025) and the social constructs of "attractiveness" identified in our study. Dissociating the waterpipe from its image as a "trendy," "safe," and "socially acceptable" activity is essential for protecting the reproductive health of Jordanian women.

While this study provides valuable insights, it's important to acknowledge its limitations. The reliance on a sample from a single governorate may limit the generalizability of our findings beyond this specific region and its demographics, although we believe that our sample is representative of the broader female population. Additionally, the self-reported nature of waterpipe smoking habits is a limitation, though research indicates its general validity among smokers, especially with confidentiality. The exclusion of pregnant women also restricts our understanding of the interplay between pregnancy and waterpipe smoking during Ramadan.

Implications for Nursing

The current findings highlight the importance of implementing targeted nursing strategies in health education, screening, and intervention development. Because waterpipe is socially accepted among Middle Eastern women, nurses should incorporate culturally sensitive education that emphasizes waterpipe's addictive and harmful nature, comparable to cigarettes. Educational efforts should directly address misconceptions and offer proactive counseling during high-risk periods, such as holidays, which often lead to a spike in daily use afterward. When counseling patients, nurses should consider social and psychological factors that influence waterpipe use, such as the desire to socialize without judgment. Routine tobacco screening must include waterpipe use and employ nicotine dependence tools to detect signs, such as strong urges or difficulty quitting. Additionally, nurses play a vital role in creating and executing interventions; cessation programs should be strategically timed to target post-holiday increases, with a focus on managing withdrawal and cravings due to dependence. Nurses in clinical settings are also well-positioned to contribute to future research on social and psychological factors affecting waterpipe acceptance and seasonal use patterns. To build upon this research, future studies should investigate perceived health risks and status in relation to seasonal changes in waterpipe smoking. Furthermore, exploring the psychological and social determinants of women's perceptions and acceptance of waterpipe smoking across diverse cultural settings would be highly beneficial.

Conclusions

In conclusion, our study offers valuable insights into the stability of waterpipe smoking status and the periodic shifts in usage intensity among women, particularly in relation to seasonal variations. This research is pioneering in enhancing our understanding of the phenomenon of waterpipe smoking among

Jordanian women who are mindful and attentive to their reproductive health. Unlike previous cross-sectional surveys that relied on retrospective recall, this study uniquely captures real-time behavioral shifts across three distinct time points: before, during, and after the holy month of Ramadan. A significant innovation of this work is the demonstration of a profound "knowledge-behavior gap"; it reveals that among this maternal-health-conscious demographic, smoking status is not driven by perceived health harms but is instead significantly associated with social judgment and the perceived "attractiveness" of the habit. Our findings reveal the cultural nuances surrounding waterpipe smoking among women, where cigarette smoking is often frowned upon, yet waterpipe smoking is more readily accepted. By identifying waterpipe use as a deeply rooted social ritual rather than a purely nicotine-seeking behavior, this study fills a critical gap in understanding how cultural phenomena, such as "Ramadan Tent" sustain and even increase smoking frequency despite the month's spiritual and health-oriented framework.

Acknowledgements

The researchers would like to extend gratitude to Hiba Hospital for their contributions to participant recruitment for the study.

Conflict of Interests

All authors declare no conflict of interests.

Funding or Sources of Financial Support

The Hashemite University [HU] Deanship of Research funded the current study.

Author Contributions

Study Design: **SA**. Data Collection: **SA**. Data Analysis: **SA, FA**. Study Supervision: **SA**. Manuscript Writing: **SA, FA**. Critical Revision for Important Intellectual Content: **SA, FA**.

REFERENCES

Abbadi, A., Alnahr, J., Zoghoul, S., Bsoul, A., Alarood, S., Al-Mistarehi, A., & Alzyoud, S. (2020). Waterpipe nicotine dependence and depressive symptoms among adolescent waterpipe and dual users. *Journal of Environmental and Public Health*, Article 2364571.

<https://doi.org/10.1155/2020/2364571>
Abdulrashid, O. A., Balbaid, O., Ibrahim, A., & Shah, H. B.U. (2018). Factors contributing to the upsurge of water-pipe tobacco smoking among Saudi females in selected Jeddah cafés and restaurants: A mixed-method study. *Journal of Family & Community Medicine*, 25(1), 13-19. https://doi.org/10.4103/jfcm.JFCM_137_17

- Abughosh, S., Wu, I.H., Peters, R.J., Crutchley, P., & Ross, A. (2012). Predictors of waterpipe use and dependence among Jordanian females. *Women & Health*, 52(2), 160–180.
- Afifi, R., Khalil, J., Fouad, F., Hammal, F., Jarallah, Y., Abu Farhat, H., Ayad, M., & Nakkash, R. (2013). Social norms and attitudes linked to waterpipe use in the Eastern Mediterranean region. *Social Science & Medicine*, 98, 125–134. <https://doi.org/10.1016/j.socscimed.2013.09.007>
- Alkouri, O., Khader, Y., & Al-Bashaireh, A.M. (2023). Prevalence of cigarettes and waterpipe smoking among Jordanians, refugees, and migrants in Jordan and its associated factors: a secondary data analysis. *International Journal of Environmental Research and Public Health*, 20(1), 82. <https://doi.org/10.3390/ijerph20010082>
- Al-Natour, A., & Gillespie, G. (2022). Female university students' experiences of hookah smoking: Cool habit and non-predictable imminent consequences and risks. *Jordan Journal of Nursing Research*, 1(2), 89–98. <https://doi.org/10.14525/JJNR.v1i2.09>
- Al-Shatnawi, S. F., Alzoubi, K. H., & Khabour, O. F. (2021). Withdrawal symptoms among cigarette and waterpipe smokers: A study in natural setting. *Clinical Practice and Epidemiology in Mental Health*, 17, 114–120. <https://doi.org/10.2174/1745017902117010114>
- Alzaabi, A., Mahboub, B., Salhi, H., Kajingu, W., Rashid, N., & El-Hasnaoui, A. (2017). Waterpipe use in the Middle East and North Africa: Data from the Breathe study. *Nicotine & Tobacco Research*, 19(11), 1375–1380. <https://doi.org/10.1093/ntr/ntw256>
- Alzyoud, S., & Massoud, F. (2021). Waterpipe and cigarette tobacco smoking and depressive symptoms among public school students in central Jordan. *Journal of Health Research*, 35(3), 240–248. <https://doi.org/10.1108/JHR-09-2019-0209>
- Arku, R. E., Adamkiewicz, G., Vallarino, J., Spengler, J. D., & Levy, D.E. (2015). Seasonal variability in environmental tobacco smoke exposure in public housing developments. *Indoor Air*, 25(1), 13–20. <https://doi.org/10.1111/ina.12117>
- Asfar, T., Ward, K. D., Eissenberg, T., & Maziak, W. (2005). Comparison of patterns of use, beliefs, and attitudes related to waterpipe between beginning and established smokers. *BMC Public Health*, 5, Article 19. <https://doi.org/10.1186/1471-2458-5-19>
- Bani Hani, A., Mansour, S., Al Smady, M. M., Bani Hani, F., Obeidat, S.M., Zahran, E.A., Awamleh, N., Rayyan, R., Bani-Khaled, F.T., Odeh, M., Alshdaifat, L.T., Addasi, R., & Al-Taher, R. (2025). Waterpipe tobacco smoking in healthcare students in the University of Jordan. *Frontiers in Public Health*, 13, Article 1576868. <https://doi.org/10.3389/fpubh.2025.1576868>
- Bashirian, S., Barati, M., Karami, M., Hamzeh, B., Afshari, M., & Ezati, E. (2021). Determinants of waterpipe smoking among women: A systematic review. *International Journal of Preventive Medicine*, 12, Article 25. https://doi.org/10.4103/ijpvm.IJPVM_116_20
- Chandra, S., & Chaloupka, F.J. (2003). Seasonality in cigarette sales: Patterns and implications for tobacco control. *Tobacco Control*, 12(1), 105–107. <https://doi.org/10.1136/tc.12.1.105>
- Chandra, S., Gitchell, J. G., & Shiffman, S. (2011). Seasonality in sales of nicotine replacement therapies: Patterns and implications for tobacco control. *Nicotine & Tobacco Research*, 13(5), 395–398. <https://doi.org/10.1093/ntr/ntq258>
- Dadipoor, S., Kok, G., Aghamolaei, T., Heyrani, A., Ghaffari, M., & Ghanbarnezhad, A. (2019). Factors associated with hookah smoking among women: A systematic review. *Tobacco Prevention & Cessation*, 5, Article 26. <https://doi.org/10.18332/tpc/110586>
- Delnevo, C. D., Lewis, M. J., Foulds, J., & Momprouse, D. (2006). Patterns of waterpipe tobacco use and consumer knowledge about its health risks. *Journal of the American Board of Family Medicine*, 19(4), 427–428.
- Graham, A.L., Cha, S., Cobb, N.K., Fang, Y., Niaura, R. S., & Mushro, A. (2013). Impact of seasonality on recruitment, retention, adherence, and outcomes in a web-based smoking cessation intervention: Randomized controlled trial. *Journal of Medical Internet Research*, 15(11), e249. <https://doi.org/10.2196/jmir.2798>
- Hamadeh, R.R. (2016). Water pipe tobacco smoking among females: A Middle Eastern or a global epidemic? *Journal of Women's Health Care*, 5, e119.
- Katurji, M., Daher, N., Sheheitli, H., Saleh, R., & Shihadeh, A. (2010). Direct measurement of toxicants inhaled by water pipe users in the natural environment using a real-time *in situ* sampling technique. *Inhalation Toxicology*, 22(13), 1101–1109.
- Khalil, J., Afifi, R., Fouad, F.M., Hammal, F., Jarallah, Y., Mohamed, M., Nakkash, R., Al Sahab, B., & Maziak,

- W. (2013). Women and waterpipe tobacco smoking in the Eastern Mediterranean region: Allure or offensiveness. *Women & Health*, 53(1), 100-116. <https://doi.org/10.1080/03630242.2012.753366>
- Kheirallah, K. A., Shugaa Addin, N., & Alolimat, M. M. (2021). Trends of maternal waterpipe, cigarettes, and dual tobacco smoking in Jordan: A decade of lost opportunities. *PLOS ONE*, 16(7), e0253655. <https://doi.org/10.1371/journal.pone.0253655>
- Maziak, W., Eissenberg, T., & Ward, K. D. (2005). Patterns of waterpipe use and dependence: Implications for intervention development. *Pharmacology Biochemistry and Behavior*, 80(2), 173-179. <https://doi.org/10.1016/j.pbb.2004.10.026>
- Maziak, W., Fouad, F.M., Asfar, T., Hammal, F., Bachir, E.M., Rastam, S., & Ward, K. (2004). Prevalence and characteristics of narghile smoking among university students in Syria. *International Journal of Tuberculosis and Lung Disease*, 8(7), 882-889.
- Maziak, W., Taleb, Z. B., Bahelah, R., Islam, F., Jaber, R., Auf, R., Salloum, R. G., & Ward, K. D. (2015). The global epidemiology of waterpipe smoking. *Tobacco Control*, 24(Suppl. 1), i3-i12. <https://doi.org/10.1136/tobaccocontrol-2014-051903>
- Ministry of Health. (2020). *Jordan national stepwise survey (STEPS) for noncommunicable diseases risk factors 2019: Technical report*. [https://www.moh.gov.jo/ebv4.0/root_storage/en/eb_list_page/stepwise_survey_\(steps\)_2020_technical_report-english.pdf](https://www.moh.gov.jo/ebv4.0/root_storage/en/eb_list_page/stepwise_survey_(steps)_2020_technical_report-english.pdf)
- Momperousse, D., Delnevo, C. D., & Lewis, M. J. (2007). Exploring the seasonality of cigarette-smoking behaviour. *Tobacco Control*, 16(1), 69-70. <https://doi.org/10.1136/tc.2006.018135>
- Nahhas, R. (2015). The Ramadan tent: Cultural and social transformations of the holy month in Jordan. *Middle Eastern Studies*, 51(3), 445-460.
- Nakkash, R.T., Khalil, J., & Afifi, R.A. (2011). The rise in narghile (shisha, hookah) waterpipe tobacco smoking: A qualitative study of perceptions of smokers and non-smokers. *BMC Public Health*, 11, Article 315. <https://doi.org/10.1186/1471-2458-11-315>
- Nemati, S., Mohebbi, E., Toorang, F., Hadji, M., Hosseini, B., Saeedi, E., Abdi, S., Nahvijou, A., Kamangar, F., Roshandel, G., Ghanbari Motlagh, A., Pourshams, A., Poustchi, H., Haghdooost, A. A., Najafi, F., Sheikh, M., Malekzadeh, R., & Zendehdel, K. (2023). Population attributable proportion and number of cancer cases attributed to potentially modifiable risk factors in Iran in 2020. *International Journal of Cancer*, 153(8), 1758-1765. <https://doi.org/10.1002/ijc.34658>
- Primack, B. A., & Carroll, M. V. (2016). Systematic review and meta-analysis of inhaled toxicants from waterpipe and cigarette smoking. *Public Health Reports*, 131(1).
- Salameh, P., Khayat, G., & Waked, M. (2012). Lower prevalence of cigarette and waterpipe smoking, but a higher risk of waterpipe dependence in Lebanese adult women than in men. *Women & Health*, 52(2), 135-150. <https://doi.org/10.1080/03630242.2012.653139>
- Smith-Simone, S., Maziak, W., Ward, K. D., & Eissenberg, T. (2008). Waterpipe tobacco smoking: Knowledge, attitudes, beliefs, and behavior in two U.S. samples. *Nicotine & Tobacco Research*, 10(2), 393-398. <https://doi.org/10.1080/14622200701858223>
- Walsh, R. A., & Paul, C. L. (2002). New year quit smoking resolutions. *Australian and New Zealand Journal of Public Health*, 26(2), 181. <https://doi.org/10.1111/j.1467-842X.2002.tb00007.x>
- Wellman, R. J., & DiFranza, J. R. (2003). Seasonality in onset of youth smoking parallels seasonality in cigarette sales. *Tobacco Control*, 12(3), 339. <https://doi.org/10.1136/tc.12.3.339>
- World Health Organization. (2024). *WHO global report on trends in prevalence of tobacco use 2000-2030*. World Health Organization.
- Zhang, Z., Zheng, X., Zeng, D.D., & Leischow, S.J. (2015). Information seeking regarding tobacco and lung cancer: Effects of seasonality. *PLOS ONE*, 10(2), e0117938. <https://doi.org/10.1371/journal.pone.0117938>