

RESEARCH ARTICLE

Policy-Relevant Context of Waterpipe Tobacco Smoking among University Students in Six Countries Across the Eastern Mediterranean Region: A Qualitative Study

Ramzi G Salloum¹, Niveen Abu-Rmeileh², Randah Hamadeh³, Justin Thomas⁴, Aya Mostafa⁵, Afzalhussein Yusufali⁶, Khalid A Kheirallah⁷, Mark M Macaуда⁸, Ryan P Theis¹, Lama El Kadi⁹, Evan J Johnson¹, Muhammad W Darawad¹⁰, Rima Nakkash^{9*}

Abstract

Background: Waterpipe tobacco smoking rates in the Eastern Mediterranean region are some of the highest worldwide, especially among young people. This study aimed to improve our knowledge of the policy-relevant context of waterpipe smoking among six countries in the Eastern Mediterranean region. **Methods:** In-depth interviews were conducted in Bahrain, Egypt, Jordan, Lebanon, Palestine, and the United Arab Emirates. Participants were young adult university students (18-29 years) from both genders who had ever smoked the waterpipe, recruited from universities participating in this study. Directed content analysis was used to analyze the transcripts. **Results:** A total of 53 in-depth interviews were conducted in Arabic in 2016. Findings were organized around 5 themes: waterpipe product characteristics; patterns of waterpipe smoking; the waterpipe café setting; perceived health consequences; and health warning labels. Waterpipe smoking was commonly perceived as a safe alternative to cigarettes. Waterpipe tobacco was reported to be widely accessible and affordable to young participants. There is a lack of knowledge among waterpipe smokers about the associated health effects. Warning labels are effective at communicating health risks associated with waterpipe smoking. **Conclusions:** Regulatory frameworks for waterpipe tobacco smoking should be developed and enforced, including waterpipe-specific health warning labels that elucidate the harmful effects of waterpipe smoking.

Keywords: Waterpipe- hookah- shisha- policy- qualitative- Eastern Mediterranean

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Introduction

Waterpipe tobacco smoking, also known as hookah, shisha, and narghile, is a traditional tobacco use method in the Eastern Mediterranean region that has experienced a resurgence in recent decades (Maziak et al., 2013; Maziak et al., 2015). Waterpipe smoking rates in this region are some of the highest worldwide, especially among young people, exceeding cigarette smoking rates in select jurisdictions (Maziak et al., 2015). According to the Global Youth Tobacco Survey (GYTS), past 30-day waterpipe smoking prevalence is highest in Lebanon (36.9%) and the

West Bank (32.7%) (Jawad et al., 2015). Its popularity has also extended beyond the Eastern Mediterranean region. For example, past 30-day waterpipe smoking prevalence in American youth has increased from 4.1% to 9.4% between 2011 and 2014 (Singh et al., 2016), and GYTS estimates from the Eastern European region are highest in Latvia (22.7%) and the Czech Republic (22.1%) (Jawad et al., 2015). A growing body of evidence associates waterpipe smoking with nicotine dependence and smoking-related diseases including cancer, cardiovascular disease, lung disease, and adverse pregnancy outcomes (Aboaziza and Eissenberg, 2015; El-Zaatari et al., 2015). Waterpipe

¹Department of Health Outcomes and Policy, College of Medicine, University of Florida, Gainesville, FL, ⁸Department of Health Promotion, Education and Behavior, Arnold School of Public Health, University of South Carolina, Columbia, SC, USA, ²Institute of Community and Public Health, Birzeit University, Birzeit, Palestine, ³College of Medicine and Medical Sciences, Arabian Gulf University, Manama, Bahrain, ⁴Department of Natural Science and Public Health, College of Sustainability Sciences and Humanity, Zayed University, Abu Dhabi, ⁶Dubai Medical College, Dubai, United Arab Emirates, ⁵Department of Community, Environmental and Occupational Medicine, Faculty of Medicine, Ain Shams University, Cairo, Egypt, ⁷Department of Public Health and Community Medicine, School of Medicine, Jordan University of Science and Technology, Irbid, ¹⁰Department of Clinical Nursing, School of Nursing, University of Jordan, Amman, Jordan, ⁹Department of Health Promotion and Community Health, Faculty of Health Sciences, American University of Beirut, Beirut, Lebanon. *For Correspondence: rn06@aub.edu.lb

smoking also can potentially reverse achieved successes in tobacco control by serving as a gateway to cigarette smoking among youths (Jaber et al., 2015; Soneji et al., 2014).

Despite its documented harm, the growing prevalence of waterpipe smoking has been met with a poor regulatory response globally (Maziak et al., 2015). At the epicenter of the waterpipe smoking epidemic, countries in the Eastern Mediterranean region are in urgent need of effective tobacco control strategies that take into account the specific context of waterpipe smoking (Salloum et al., 2016). Implementation of the Framework Convention on Tobacco Control (FCTC) in the region has been limited, and only a select number of countries have maintained enforcement of its policies (Kheirallah et al., 2016). Even with full enforcement of the FCTC, waterpipe tobacco control will still require additional measures because its use patterns vary from cigarette smoking (Jawad et al., 2014). For example, waterpipe smoking is associated with a particular setting – the waterpipe café (hookah lounge or bar), which has been exempt from clean indoor air laws even in Western jurisdictions (Salloum et al., 2016). In addition to clean indoor air laws, the café setting has implications on the application of packaging and labeling requirements, age restriction, sanitation, and pricing. Youths are particularly vulnerable to social and environmental influences that promote tobacco use, and are exposed to the café setting, in addition to waterpipe packaging that promotes deceptive information that conceals the harms associated with waterpipe smoking (Nakkash and Khalil 2010; Vansickel, et al., 2012). In Jordan, Palestine and Lebanon, although health warnings are required on all tobacco products, they have been authorized and developed for cigarette packs only (Heydari et al., 2013). Therefore, waterpipe products carry textual health warnings for smoking in general or specific to cigarettes. In Egypt, waterpipe packaging includes pictorial health warnings related to smoking in general, and in some cases, warn of the consequences of cigarette smoking (Heydari et al., 2013). Meanwhile, the Gulf Cooperating Council countries have been implementing waterpipe-specific pictorial warnings (Islam et al., 2016)

Inquiry into the understanding of waterpipe smoking in the region has focused to a greater degree on the socio-cultural context of waterpipe tobacco smoking rather than health and policy considerations (Afifi et al., 2013; Akl et al., 2015; Khalil et al., 2013). In addition to the dynamics of waterpipe smoking as a social activity, a comprehensive regulatory approach should consider other contextual factors, such as access and affordability, the role of tobacco flavors, and health warning labels. As such, qualitative research methods can provide preliminary evidence into key contextual constructs related to waterpipe smoking to inform regulatory frameworks. The current research aimed to improve our knowledge of the policy-relevant context of waterpipe smoking among young waterpipe smokers across six countries in the Eastern Mediterranean region, with a particular focus on health warnings and factors that influence the demand for waterpipe tobacco smoking (e.g., brands, flavors, nicotine content, and prices).

Materials and Methods

Design, setting and sampling

This study was conducted in 2016 across six Eastern Mediterranean countries: Bahrain, Egypt, Jordan, Lebanon, Palestine, and the United Arab Emirates (UAE). The in-depth interviews were planned as a preliminary step to inform the design of an experimental study to evaluate waterpipe-specific health warning labels and attributes of waterpipe café menus impacting youth demand for smoking. Participants were recruited from among young adult students (18-29 years) at collaborating universities. Participants were from both genders and had previously tried waterpipe tobacco smoking. Across all study sites, participants were recruited from university campuses using announcements, flyers, word of mouth and electronic media, following a snowball sampling technique. Research assistants screened prospective participants for eligibility and informed consent was obtained in case of eligibility. Data collection was planned for 10 participants from each site and continued until thematic saturation was reached, representing the point at which no new information emerged from additional interviews (Walker 2012).

Data collection instruments and procedures

The interview guide was developed with input from all authors and covered the following topics: experience with waterpipe tobacco smoking, and policy-relevant topics that have been previously shown to impact the demand for waterpipe smoking, including health warning labels and choice of waterpipe tobacco (brands, flavors, nicotine content, and prices) (Salloum et al., 2015). Given the objectives of the parent study (described above), the interviews did not focus on other policy areas, such as indoor air laws; advertising, promotion, and sponsorship; or cessation programs. Participants were then presented with cards depicting waterpipe-specific pictorial health warning labels that had been developed by researchers at the American University of Beirut (Figure 1) (Nakkash and Khalil, 2010) and previously evaluated using quantitative methods in a sample of United States youths (Islam et al., 2016). A trained interviewer consented participants, explaining the purpose of the research and its voluntary nature, that confidentiality was ensured and that participants could end the interview at any time. Private interviews were conducted in colloquial Arabic and lasted 45 minutes on average. All interviews were audio-recorded and transcribed in their original language then translated into English, in order to preserve the fidelity of language-specific constructs and avoid errors that can occur when translation occurs at the point of transcription. The study protocol was approved by institutional review boards at all participating institutions.

Analysis

Directed content analysis was used to analyze the English-translated transcripts in NVivo v.11 (QSR International). With a directed approach, analysis starts with a theory or relevant research findings as guidance for initial codes (Hsieh and Shannon, 2005). A coding scheme was created and finalized after 2 independent

Table 1. Number of Completed Interviews, by Gender and Country

Country	Female	Male	Total
Bahrain	3	3	6
Egypt	5	5	10
Jordan	5	4	9
Lebanon	5	4	9
Palestine	4	5	9
United Arab Emirates	5	5	10
Total	27	26	53

Participating institutions, Bahrain, Arabian Gulf University; Egypt, Ain Shams University; Jordan, Jordan University of Science and Technology, University of Jordan; Lebanon, American University of Beirut; Palestine, Birzeit University; United Arab Emirates, Dubai Medical College, Zayed University

researchers practiced coding 5 transcripts. Development of additional codes and themes was inductive as the details of the discussions guided us through building the concepts and assumptions. The final coding scheme consisted of 5 themes.

Results

A total of 53 interviews were completed across the 6 countries (Table 1), as follows: Bahrain (n=6), Egypt (n=10), Jordan (n=9), Lebanon (n=9), Palestine (n=9), and the UAE (n=10). Participants were young adults (aged 18-29 years) and included 27 females and 26 males.

The occurrence of the 5 themes emerging from the data (i.e., waterpipe product characteristics; patterns of waterpipe tobacco smoking; the waterpipe café; perceived health consequences; and health warning labels) along with sub-themes is presented in Table 2. Although perceived health consequences do not constitute a policy theme per se, they represent an important mechanism through which different policy-relevant components and attributes can influence waterpipe use (Salloum et al., 2016).

Across the six countries, the most discussed themes were those related to health warning labels (range: 27.6% - 38.2%), product characteristics (range: 20.8% - 44.4%), and patterns of waterpipe smoking (15.0% - 43.2%). In cross-country comparisons, 44.4% of discussions in Jordan and 44.1% in Bahrain focused on product characteristics. Discussions of health warning labels were most prevalent in Bahrain (38.2%) and

Table 2. Representation of Themes and Sub-Themes within Interviews

Theme	Sub-theme	BAH	EGY	JOR	LEB	PAL	UAE	Range
Theme 1: Product Characteristics	- Price	10.50%	8.90%	8.40%	1.40%	9.00%	4.60%	1.4% - 10.5%
	- Flavors	15.50%	10.40%	19.70%	6.20%	8.70%	8.50%	6.2% - 19.7%
	- Nicotine content	8.10%	6.70%	5.50%	2.10%	4.90%	4.10%	2.1% - 8.1%
	- Brands and types	9.90%	6.40%	10.80%	2.90%	16.00%	3.60%	2.9% - 16.0%
Total: Theme 1		44.10%	32.50%	44.40%	26.40%	27.80%	20.80%	20.8% - 44.4%
Theme 2: Patterns of waterpipe smoking	- Smoking frequency	4.40%	2.60%	2.60%	8.90%	3.00%	5.30%	2.6% - 8.9%
	- Waterpipe initiation	2.80%	3.70%	2.00%	1.80%	4.30%	7.50%	1.8% - 7.5%
	- Access and source	0.00%	1.80%	0.00%	0.20%	2.00%	1.20%	0.0% - 2.0%
	- Motivation for regular smoking	0.00%	3.30%	4.50%	3.60%	2.30%	5.10%	0.0% - 5.1%
	- Place of smoking	2.40%	12.50%	3.30%	0.90%	4.90%	8.50%	0.9% - 12.5%
	- Peer influence	3.60%	7.30%	5.80%	5.50%	6.10%	9.50%	3.6% - 9.5%
	- Approval of male relatives (women)	2.10%	0.70%	0.00%	1.90%	4.10%	6.10%	0.0% - 6.1%
Total: Theme 2		15.00%	21.80%	18.20%	22.70%	26.70%	43.20%	15.0% - 43.2%
Theme 3: Waterpipe Café	- Ambience, attraction	0.00%	0.70%	0.00%	2.30%	3.10%	1.50%	0.0% - 3.1%
	- Social context	0.00%	1.50%	0.00%	1.00%	1.10%	0.50%	0.0% - 1.5%
	- Differences by venue	0.00%	0.40%	0.80%	1.60%	1.40%	1.00%	0.0% - 1.6%
Total: Theme 3		0.00%	2.60%	0.80%	4.90%	5.60%	3.00%	0.0% - 5.5%
Theme 4: Perceived health consequences	- Secondhand smoke	0.00%	0.00%	0.00%	0.30%	0.70%	1.50%	0.0% - 1.5%
	- Perceived health consequences	0.00%	6.30%	2.20%	6.80%	2.70%	1.20%	0.0% - 6.8%
	- Attitudes toward cessation	2.80%	4.40%	2.50%	2.10%	5.30%	4.60%	2.1% - 5.3%
	- Hygiene (café)	0.00%	0.40%	0.00%	0.10%	0.30%	0.20%	0.0% - 0.4%
Total: Theme 4		2.80%	10.70%	4.60%	9.10%	8.60%	7.30%	2.8% - 10.7%
Theme 5: Health Warning Labels	- Knowledge, attitudes, experiences	10.80%	10.10%	9.20%	23.30%	8.40%	8.00%	8.0% - 23.3%
	- Effectiveness	17.40%	17.50%	14.60%	9.80%	13.60%	12.10%	9.8% - 17.5%
	- Placement	10.00%	4.40%	8.30%	3.60%	9.00%	7.50%	3.6% - 10.0%
Total: Theme 5		38.20%	32.00%	32.00%	36.70%	31.00%	27.60%	27.6% - 38.2%
Total: All Themes		100%	100%	100%	100%	100%	100%	100% - 100%

BAH, Bahrain; EGY, Egypt; JOR, Jordan; LEB, Lebanon; PAL, Palestine; UAE, United Arab Emirates



Figure 1. Waterpipe-Specific Health Warning Labels

Lebanon (36.7%). Meanwhile, discussions of waterpipe smoking patterns were most prevalent in the UAE (43.2%). Specific quotes from the interviews are identified in the following section by country and gender of the participant:

Waterpipe product characteristics

Participants discussed waterpipe product characteristics that are potential targets for regulation, including price, flavors, nicotine content, and brands. Discussions of pricing ranged from those who were price sensitive to those with inelastic demand for waterpipe smoking due to dependence (i.e., price has a smaller influence on the demand for waterpipe smoking). Price was a common theme among young smokers who were faced with a limited budget. As one respondent explained:

“The first thing we do in a [waterpipe] café is ask about the price.” (Female, UAE).

This was evident in their choice of tobacco products and waterpipe cafés to visit. Participants who were regular waterpipe smokers, and those who appeared more tobacco dependent, appeared less sensitive to the price of waterpipe smoking sessions.

“I wouldn’t care ... I don’t consider the price.” (Male, Lebanon).

“[The price] does not matter. I prefer [waterpipe] over food.” (Female, Egypt).

Waterpipe tobacco flavors were salient in young smoker’s discussions of their experiences. These discussions reflected the large popularity of flavored tobacco among waterpipe smokers and the wide range of flavors available on the market. Not only were flavors associated with taste and sensory experiences, but young waterpipe smokers also perceived flavors to be associated with certain health effects (e.g., certain fruit flavors were perceived to have health benefits). Discussions reflected

that young waterpipe smokers overwhelmingly prefer flavored tobacco and that non-flavored waterpipe tobacco was reserved for elderly (traditional) waterpipe smokers.

“My favorite flavor is Double Apple because of its good taste and it enhances the mood. The head doesn’t get “clogged” with smoke quickly compared with Grape and Mint.” (Male, Jordan).

“Some flavors make you nauseous, but Lemon does not.” (Female, UAE).

“Qas (non-flavored) is smoked by old people.” (Female, Egypt).

When discussing nicotine content, participants were less knowledgeable about this topic and many expressed their surprise that waterpipe tobacco contained nicotine. Participants who were aware of the addictive nature of nicotine preferred lower levels, whereas other participants were less concerned about the consequences of nicotine compared with other constituents.

“... the nicotine part is not the part that’s bad for you...” (Female, Lebanon).

“I know about cigarettes, but I don’t know about [waterpipe], and if I knew I would choose those with lower nicotine levels.” (Male, UAE).

“Actually, I don’t know what nicotine is. Is it the same as cigarettes? I have to read about it and will see how harmful it is. If it is very harmful – no, I will smoke less [waterpipe].” (Female, Palestine).

There were various reactions with respect to brand recognition among young waterpipe smokers, with many unable to name specific brands. Those who smoked waterpipe at home were able to identify their preferred brands. In general, flavor was a more salient descriptor of waterpipe tobacco when compared with brand.

“I really don’t know because I usually go to cafés and smoke there.” (Female, UAE).

“Al Fakher is well priced and tastes good. It lasts for a long time.” (Male, Egypt).

“I choose the flavor. I don’t know much about the brands.” (Male, Bahrain).

Patterns of waterpipe smoking

Waterpipe smoking was primarily described as a social activity across all countries. Many of the discussions centered on smoking waterpipe with family or friends either at home or in a waterpipe café.

“I usually smoke with my friends. I don’t like to smoke alone.” (Male, Bahrain)

In all countries, waterpipe tobacco smoking was more socially acceptable than cigarette smoking. Participants were introduced to waterpipe smoking by friends or family members either during university or at a younger age. Despite patriarchal attitudes towards women smoking in this region, female participants acknowledged that it was more acceptable for them to smoke waterpipe compared with cigarettes.

“[My first time] was actually at home. We were taking turns smoking [waterpipe] – me, my cousin, and my aunt.” (Female, Bahrain).

“Families prevent their daughters from smoking cigarettes but not [waterpipe]. They think it is normal. All girls smoke [waterpipe] but not cigarettes though it

is more harmful from what I know.” (Female, Palestine).

“I smoke cigarettes and my mom doesn’t know. So, I can’t smoke cigarettes at home but my parents let me smoke [waterpipe] because it’s socially acceptable. My parents don’t know that I smoke cigarettes so I end up ordering a [waterpipe] instead even though I prefer not to.” (Female, Lebanon).

Waterpipes are readily accessible to young smokers. Many participants have them in their homes. In waterpipe cafés, age restrictions either do not exist, or they are not enforced.

“I just think that the bad thing about Lebanon is that its socially acceptable to smoke [waterpipe] ... and I think it’s a big problem because there is no age restriction. No one asks you for your age.” (Female, Lebanon).

“Any street you walk on, there is definitely a [waterpipe] café. I mean they are available everywhere, and they accept young people below 18.” (Male, Jordan).

Many young waterpipe smokers described themselves as social smokers. They were occasional waterpipe smokers who only used it in the presence of friends or family members. However, a few of the interviewees described dependence among young smokers, including accounts of daily waterpipe smokers and those who smoked multiple times a day.

“My friend, even if he has a wedding, he would smoke [waterpipe] then go back the wedding party, because he can’t go without it. Some people I know have to smoke [waterpipe] two or three times a day.” (Male, Palestine).

“It’s not normal how much we smoke... It doesn’t matter whether it’s the weekend or week days ... whenever I feel like it, I could order a waterpipe. (Male, Lebanon).

Many of the participants who smoked waterpipe on a regular basis were confident in their ability to quit waterpipe smoking. Because they usually smoked waterpipe with their university friends, many were planning to quit after university. Other participants smoked waterpipe because they had perceived it as less harmful than cigarettes, and several admitted that they are unable to quit.

“I’m thinking about stopping [waterpipe] smoking after college. Through college, you need it to fill up your time and have fun.” (Female, Palestine).

“I tried smoking [waterpipe] to quit cigarette smoking. I was told it would be better and lighter than smoking cigarettes, but that wasn’t the case. I ended up smoking both – [waterpipe] and cigarettes.” (Male, Palestine).

The waterpipe café

The waterpipe café, with its ambience and attraction to young waterpipe smokers, was a central theme. The café setting was closely aligned with the socio-cultural context of WTS for participants across all countries. A few participants went as far to describe the qualitative differences between a home-prepared waterpipe and one that is ordered in a waterpipe café.

“There is something about how they make it in cafés. I don’t know what they put in it... Perhaps they have more expertise in preparing the head a certain way...” (Male, Lebanon).

“It’s more of a social thing. For example, some people

never smoke unless they are out in a café with other people who are smoking.” (Female, Lebanon).

Participants discussed two types of waterpipe venues: traditional cafés typically restricted to men, and modern, mixed-gender cafés. Many of the young men interviewed regularly visited traditional waterpipe cafés because of the lower prices and more “relaxed” atmosphere. Modern cafés were described as trendier, catering to younger waterpipe smokers, and charging higher prices.

“Sometimes we go to mixed gender cafés, but most of the time, we go to cafés exclusively for men... they are less expensive and they are also more comfortable. When we feel comfortable in a café, that’s it, we don’t want to change.” (Male, Palestine).

Perceived health consequences

Participants preferred WTS over cigarettes because of its pleasant aroma. Many participants were not bothered by waterpipe secondhand smoke exposure. Few participants preferred sitting in outdoor sections of waterpipe cafés to avoid heavy smoke exposure. Participants were more concerned about secondhand waterpipe smoke exposure for children and pregnant women.

“Now obviously you shouldn’t be smoking around children... and you shouldn’t be smoking if you’re pregnant. That’s obvious.” (Male, Lebanon).

There were mixed findings with respect to health consequences. Many participants acknowledged the negative health consequences associated with waterpipe tobacco smoking but did not believe that they were as severe as those of cigarette smoking. Other participants believed that waterpipe smoking was more harmful than cigarette smoking, and that a single waterpipe session was equivalent to smoking dozens of cigarettes.

“Does it harm your health? Of course. You can develop shortness of breath and fatigue. But does it cause cancer?... No, it does not.” (Male, Palestine).

“I now have a serious sinus infection caused by [waterpipe] at a young age – and I’m only 20... it is worse than cigarette smoking because it is equal to 70 cigarettes.” (Female, UAE).

Many waterpipe smokers across all countries considered themselves social waterpipe smokers. Since they did not consider themselves to be regular waterpipe smokers, they were not concerned about waterpipe cessation. Meanwhile, a few participants expressed concern about waterpipe dependence and lack of confidence to quit waterpipe tobacco smoking.

“I convince myself that I am not a smoker, but I think I am. But when it comes to [waterpipe], I don’t think anyone can be addicted. It doesn’t make sense to me. (Male, Lebanon).

“I want to quit, and I don’t wish for anyone to start smoking [waterpipe].” (Female, Egypt).

Participants also expressed concern about hygiene when visiting waterpipe cafés, especially with the sharing of waterpipe hoses. Relevant to hygiene, many venues were offering their clients disposable hoses for one-time use. In some instances, this was referred to as a “healthy” hose. Another solution for regular waterpipe smokers was to bring their own hoses to cafés.

“In cafés, I only like to smoke waterpipes with the single use hose – it’s called the ‘healthy’ hose.” (Male, Palestine).

“When I go to a new café, I bring my own hose.” (Female, Lebanon).

Health warning labels

Overall, participants were unaware of waterpipe-specific health warning labels. Many of them were familiar with the concept of health warning labels from cigarette packs. However, they explained that they were not exposed to the waterpipe tobacco packs in cafés because the waterpipes are prepared by the staff.

“I only see them on cigarette packs. The [waterpipes] are served ready to smoke, so we don’t see the packs. I don’t even know what they look like.” (Female, Egypt).

Participants had various reactions when presented with the 8 different waterpipe-specific pictorial health warnings. While some participants were not concerned by the health warning messages shown to them, others were surprised about specific messages. For example, many were surprised to learn that waterpipe tobacco contains the same ingredient found in rat poison. Other warning labels that were found to be effective by study participants were the warning about the harms of waterpipe smoking to pregnancy outcomes and the graphic warning depicting oral disease.

“Cancer of the mouth, lungs, and lips. I know cigarette smokers that cover the pictures on the package to hide them.” (Male, Egypt).

“Why would a woman smoke while pregnant? That’s stupid! She can wait 9 months.” (Female, UAE).

When asked about effective placement of health warning labels, participants suggested placing the warnings on the waterpipe device itself, and more specifically on the mouthpiece, where it would be most visible. Other suggestions included placing health warnings in café menus.

“You can’t see the package when you order because they prepare it for you.” (Male, UAE).

“I think it’s a good idea to place it on the mouthpiece because you hold it all the time.” (Female, Jordan).

Discussion

University students from the Eastern Mediterranean region described waterpipe tobacco smoking as a social activity and perceived it as a safer alternative to cigarettes. Waterpipe smoking is considered socially acceptable for both men and women, in some cases to the point of inducing demand for waterpipe products even among those who prefer cigarettes. The results confirm previous qualitative research findings that waterpipe smoking involves socio-cultural dynamics that are far more pronounced than health considerations, especially among youths (Afifi et al., 2013). Unlike previous studies, we investigated policy-relevant themes, concluding that waterpipe smoking is widely accessible and affordable among young people due to inconsistent enforcement of minimum age laws and low waterpipe tobacco prices. Raising waterpipe tobacco tax rates would make waterpipe

smoking less affordable for youth.

While for some, the health effects of secondhand waterpipe exposure on children and pregnant women may be “obvious”, for most smokers there continues to be a lack of knowledge about the associated health effects of waterpipe smoking. Therefore, appropriate product labeling and enforcement of health warnings are warranted, including the disclosure of product constituents or chemical yields, and prohibitions on potentially misleading packaging or labeling information with respect to reduced health risk (Salloum et al., 2016). Further, tobacco flavoring creates pleasant aromas that can contribute to the misperception of a safe product and encourage waterpipe smoking. In addition, tobacco flavors contribute to the appeal of waterpipe smoking to youth, and flavor bans for waterpipe tobacco can reduce this appeal as previously demonstrated by bans on flavored cigarettes (Courtemanche, et al., 2017).

In general, tobacco control policies in the Eastern Mediterranean region have focused on addressing cigarette smoking, without addressing the specific context of waterpipe smoking (Jawad et al., 2014). Discussions with young waterpipe smokers suggest that waterpipe-specific health warning labels may be effective at communicating the harmful consequences and the addictive nature of waterpipe tobacco smoking and combating misperceptions about reduced harm. Even though four of the countries in this study have implemented pictorial health warning labels on waterpipe tobacco packs, interviewees were not familiar with these warnings because they were not regularly exposed to them. This finding calls for governments to consider enforcing health warnings on waterpipe tobacco packages and in other places where waterpipe smokers will see them on a regular basis: on the waterpipe device, in the café, and in café menus. As such, significant adaptations of labeling and health warning approaches to the waterpipe are needed to effectively communicate toxic constituents and potential health risks to consumers (Salloum et al., 2016).

This study relied on face-to-face interviews and, as such, social desirability bias is possible. In addition, views of the interviewees may not cover the range of national opinions on waterpipe smoking. Furthermore, dialects differ by country, and some slight language based nuances might have been missed during the translation process. To minimize this threat, we consulted with the respective country team when there was uncertainty on how to interpret a certain theme. Although the transcripts had been translated into English prior to coding, both coders were bilingual (English/Arabic) and had access to the original-language audio recordings, which reduces the methodological inconsistencies related to language barrier management (Squires 2009). Despite these limitations, the study has several strengths including the focus on policy-relevant discussions and the substantial number of interviews across 6 countries in the region.

In conclusion, university students engaged in discussions about policy-relevant themes related to waterpipe smoking, and interacted with waterpipe-specific health warning labels. Results of this research have implications for governments, suggesting the importance

of adopting a comprehensive regulatory framework for waterpipe tobacco smoking addressing waterpipe products, the waterpipe café setting, and its marketing environment (Salloum et al., 2016). There is also a need for governmental and non-governmental organizations in health education and promotion to reverse the misperceptions about harm reduction and the social norms associated with waterpipe smoking.

Declarations

Ethics approval and consent to participate

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. Study procedures and terms were approved by the Institutional Review Boards of all participating institutions.

Consent for publication

Not applicable.

Availability of data and material

Please contact authors for data requests.

Competing interests

None declared.

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Authors' contributions

Design and conception of the study: RGS, RN, and MMM. Acquisition of data: NAR, RH, JT, AM, AY, KAK, LEK, RN. Data analysis: RGS, MMM, LEK, RPT, EJJ. Manuscript drafting and revision: all authors. Final approval of manuscript: all authors.

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