



Review

Waterpipe tobacco smoking: The critical need for cessation treatment



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ABSTRACT

Background: Waterpipe use has spread globally, and has substantial negative health effects and nicotine dependence potential. A growing literature addresses cessation-related experiences of waterpipe users, but this literature has not been summarized nor is guidance available on developing and testing cessation interventions.

Method: Authors gathered key empirical papers on waterpipe cessation-related topics, including observational studies about users' perceived ability to quit, interest in quitting, quit rates, and cessation trials. Based on this review, recommendations are made to guide the development and rigorous evaluation of waterpipe cessation interventions.

Results: Many users want to quit and make quit attempts, but are unsuccessful at doing so on their own; therefore, developing and testing waterpipe cessation interventions should be a priority for global tobacco control efforts. Early efforts have tested waterpipe cessation interventions designed for, or adapted from, cigarette smoking programs.

Conclusions: Waterpipe-specific cessation programs that address unique features of waterpipe smoking (e.g., its cultural significance, social uses, and intermittent use pattern) and characteristics and motivations of users who want to quit are needed. Recommendations are provided to move waterpipe cessation intervention development forward.

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1. Introduction

Waterpipe (also known as hookah, shisha, and narghile) is a centuries-old method of smoking tobacco with origins in the Middle East and Indian sub-continent (Maziak et al., 2004). Waterpipe use declined throughout most of the twentieth century, but surged in these regions during the 1990s (Rastam et al., 2004; Ray, 2009), driven by the invention of flavored and easier-to-use tobacco, a growing café culture, and expanding internet availability and globalization (Maziak et al., 2015). Waterpipe use has now spread to most of the world, and is particularly popular among young people (Akl et al., 2011; Maziak et al., 2015). For example, among a sample of over 105,000 students from 152 universities in the United States (U.S.), 30.5% had ever used a waterpipe, and 8.4% had done so within the past month (Primack et al., 2012). Among young people, waterpipe use has rapidly become the most popular form of tobacco (second only to cigarettes) in the U.S., and is now more popular than cigarettes in several Middle East countries, including Lebanon and Jordan (Akl et al., 2011; Alzyoud et al., 2013; Mzayek et al., 2012; Tamim et al., 2007; Zoughib et al., 2004).

Despite common perceptions that waterpipe is less harmful than cigarettes (Akl et al., 2013), waterpipe delivers large amounts of toxicants, and is associated with many of the same adverse health outcomes as cigarette smoking (Akl et al., 2010). Compared to smoking a single cigarette, a single waterpipe session produces levels of expired carbon monoxide (CO) and blood carboxyhemoglobin that are eight and three times higher, respectively (Eissenberg and Shihadeh, 2009). Similarly, during a waterpipe session, levels of carcinogenic polycyclic aromatic hydrocarbons and lung-damaging aldehydes are 3–200 and 4–27 times higher, respectively, compared to smoking a single cigarette (Gmeiner et al., 1997; Rashidi et al., 2008; Sepetdjian et al., 2008), and waterpipe users have 5–10 times greater urinary concentrations of the carcinogenic tobacco-specific nitrosamines derivative 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanol (NNAL) than cigarette smokers (Ali et al., 2013). Consistent with these data, there is growing evidence that waterpipe use is associated with significant lung cancer, respiratory illnesses, coronary heart disease, low birth weight, and periodontal disease (Akl et al., 2010; Sibai et al., 2014).

Waterpipe delivers substantial amounts of nicotine, raising concerns about dependence potential. A typical waterpipe smoking session delivers 1.7 times the nicotine dose of a single cigarette (Eissenberg and Shihadeh, 2009), and the nicotine absorption rate in daily waterpipe users is equivalent to smoking 10 cigarettes/day (Neegaard et al., 2007). Such high levels of nicotine exposure raise concerns about nicotine dependency among young people, leading to progressively increased waterpipe use and/or a switch to cigarettes. However, research shows that waterpipe progression varies by country. While most waterpipe users in U.S. colleges maintain low levels of use over time (51% continue to use waterpipe four years later, but only infrequently and/or in social occasions; Dugas et al., 2014), a sizeable proportion of users in other countries such as Syria and Jordan increase their consumption over time. For

example, in Syria, 43% established waterpipe smokers reported that their use had increased over time (Maziak et al., 2004). A similar increase was found among Jordanian students; those who ever smoked waterpipe (non-daily) in 7th grade gained 40% cumulative hazard probability for progression in frequency of use by the time they reached 10th grade (Jaber et al., In Press).

Greater frequency of waterpipe use is associated with many signs of dependence. In a study of established waterpipe users (six years or over) in Syria, frequency of use was positively associated with participant's subjective judgment of their dependency on waterpipe, as well as other related behaviors: smoking alone versus with others, smoking mainly at home versus outside, smoking more frequently since initiation, carrying waterpipe with them in case it is "needed," and considering access to waterpipe while choosing cafes or restaurants (Maziak et al., 2004, 2005). Furthermore, in a laboratory study, waterpipe users who smoked for at least six months and an average of 5.2 times/week, experienced withdrawal symptoms while abstaining (Rastam et al., 2011), and relief while smoking (Maziak et al., 2009; Rastam et al., 2011). In another lab study, a sample of established waterpipe smokers (had smoked eight years or over) who abstained for 24 hours and then smoked waterpipe *ad libitum*, reported that their urge to smoke, craving, and restlessness were relieved after smoking, while the effects of nicotine increased, including dizziness, nausea, and lightheadedness (Maziak et al., 2009). Among dual waterpipe/cigarette smokers, waterpipe smoking suppresses abstinence-induced withdrawal and craving comparable to cigarettes (Rastam et al., 2011).

In sum, waterpipe use is a growing phenomenon associated with significant toxicant exposure and numerous health risks, leading to dependence and increased use in a sizeable proportion of users. These findings indicate the pressing need to develop a knowledge base about how to assist waterpipe users in quitting.

2. What we know, and don't know, about waterpipe cessation

Despite the rapid rise in waterpipe use globally, and its potential for harm and addiction, there is only a small, but growing, body of literature on whether waterpipe users are confident in their ability to quit, interested in quitting, likely to make a quit attempt, and succeed in doing so. To identify published articles on these topics, we searched several research databases, including PubMed, PsycINFO, CINAHL, and OmniFile Full Text Mega, combining search strings for tobacco use method (waterpipe or shisha or hookah or narghile or arghile or goza or hubble bubble) and topical area (cessation or treatment or intervention or program or quit or quitting or confidence or motivation or interest). We supplemented this with searches of relevant reviews (Akl et al., 2011, 2013, 2015; Maziak et al., 2015) and reference sections of empirical articles. Below, we review the literature on subjective factors related to waterpipe cessation, quit rates, and cessation interventions.

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