

gOPINION

EDITORIAL VIEWPOINT

The Waterpipe: A New Global Threat to CV Health?

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Tobacco smoking continues to be the number one preventable cause of morbidity and mortality, contributing to millions of deaths every year and wreaking havoc on the welfare of families and communities worldwide. Most of the brunt of the tobacco epidemic is borne by developing countries, a trend that is likely to accelerate [1]. Several evidence-based interventions and policies have been advanced in the past decades to limit smoking initiation and help dependent smokers quit. Although these have been successful in general, they have primarily focused on cigarette smoking. Yet, for many youths worldwide, tobacco use and addiction is maintained by means other than the cigarette. In particular, over the past decade, waterpipe smoking has dramatically become the most widespread tobacco use method among youth in the Eastern Mediterranean Region (EMR) and is rapidly spreading globally [2].

The waterpipe, known in many cultures under different shapes and names (e.g., hookah, shisha, narghile), is a centuries-old tobacco-use method that has traditionally been associated with Middle Eastern societies. The emergence of waterpipe smoking as a global threat to public health is evidenced by the sharp increase in the past decade of studies, news, and professional reports devoted to the waterpipe [3–8]. In the waterpipe, charcoal-heated air passes through a perforated aluminum foil separating the charcoal from the flavored tobacco (a.k.a. Maassel) to become smoke that cools as it bubbles through the water on its way to the smoker. The passage of smoke through water underlies much of the widespread misperception about waterpipe's "reduced" harm and addictiveness [9]. Avail-

able evidence however, suggests that waterpipe smoking is addictive and is associated with smoking-related diseases such as lung cancer, respiratory disease, and low birth weight [10]. Despite these worrisome trends, tested policies and interventions to combat waterpipe smoking are still nascent. The triad of increasing popularity, harmful and addictive properties, and lack of effective policies represent the main pillars of the waterpipe epidemic that will be discussed later in this paper.

THE GLOBAL EPIDEMIC OF WATERPIPE SMOKING

Epidemiological trends of waterpipe smoking are very alarming, and what started in the 1990s as a "social" phenomenon among youths in the EMR soon became a global trend [2]. In the EMR, prevalence estimates of waterpipe smoking among youth, have already surpassed those of cigarette smoking, and the rest of the world is catching up. Studies show that about one-quarter of youths in societies of the EMR are current (past month) waterpipe smokers [5]. Recent evidence from disperse populations and societies worldwide print a worrisome picture of a global spread (e.g., United States, Canada, United Kingdom, Estonia, Germany, Denmark, Pakistan, Iran, South Africa, France, Australia) [11]. For example, waterpipe smoking is steadily becoming the second most popular form of tobacco use among college students in the United States, as seen from a large survey ($n = 3,770$) of students from 8 universities in North Carolina. According to this survey, ever waterpipe

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smoking was reported by 40% of students, whereas current waterpipe smoking was reported by 17%, which is second only to cigarettes [12]. The global spread of waterpipe smoking among youths is best revealed by the Global Youth Tobacco Survey; the largest surveillance to date of tobacco use among youths with 209 surveys conducted in 95 countries. Time trends from the Global Youth Tobacco Survey (1999 to 2008) involving more than half a million 13- to 15-year-olds worldwide show that while cigarette smoking is either stable or declining worldwide, other forms of tobacco are showing a rising trend, most notably waterpipe smoking [13]. In epidemiological terms, such trends covering vast geographical territories and diverse societies and encompassing several age groups can very unlikely mean a passing fad, but signify an epidemic that has taken hold among youths, and with the potential only to exacerbate unless we do something about it.

WATERPIPE ADDICTIVE AND HARMFUL PROPERTIES WITH EMPHASIS ON CARDIOVASCULAR HEALTH

In 1997, Macaron et al. [14] first showed nicotine exposure in waterpipe smokers by measuring cotinine in their urine, a finding that has been replicated since. Our own work in waterpipe smokers demonstrated dependence features of failed quit attempts, self-perception of being “hooked” on the waterpipe, use escalation over time, behavioral adaptations to ensure access, and abstinence-induced withdrawal that is suppressed by subsequent waterpipe use [2]. For example, in a random sample of 268 waterpipe users in Aleppo, 28% wanted to quit and 59% had made an unsuccessful quit attempt in the past year. Belief in one’s ability to quit was inversely related to perceived dependence [13]. Case histories from waterpipe users provide another line of evidence of its addictiveness: “I like to dominate everything, but the narghile has completely dominated me” [15]. As important, perhaps, is our finding that the waterpipe may mediate failed quit attempts in cigarette smokers, which can seriously undermine tobacco-control efforts [16,17].

While high-quality studies of the long-term health effects of waterpipe smoking are still lacking, available evidence implicates the waterpipe in cancer, respiratory disease, and low birth weight [8]. Smoke from a waterpipe contains many of the toxicants found in cigarette smoke, including

nicotine that produces dependence, CO that causes cardiovascular disease, and polycyclic aromatic hydrocarbons that cause cancer [2]. In fact, due to the involvement of charcoal, some of the important smoke toxicants (e.g., polycyclic aromatic hydrocarbons, CO) are produced at much greater levels in waterpipes compared with cigarettes [18,19]. Furthermore, even though intermittent use of a waterpipe can imply reduced exposure, it is important to note that the amount of smoke inhaled in a single waterpipe session averages about 150 times that of a single cigarette [19].

Studies of the acute effects of waterpipe smoking on the cardiovascular system have reported a similar picture to the one seen with cigarette smoking. For example, waterpipe smoking is associated with an increase in heart rate, systolic and diastolic blood pressure, and markedly impaired baroreflex sensitivity [5,20]. However, the long-term effects of waterpipe smoking on the cardiovascular system have not yet been studied. This is perhaps due in part to the relative novelty of the current waterpipe epidemic compared with the known latency between smoking initiation and the development of serious smoking-related cardiovascular outcomes such as coronary ischemia and myocardial infarction. Available evidence, however, suggests that the cardiovascular system can be at particular risk from waterpipe smoking. Given that CO is among the most important cardiovascular toxicants, the fact that waterpipe smokers are exposed to high CO levels and for extended periods can be particularly alarming. This is supported by emerging reports of waterpipe-related emergency room admissions due to acute CO intoxication, an adverse event that has not been reported with cigarette smoking [2]. Particulate matter, another important toxicant for the cardiovascular system is also produced at higher levels during waterpipe smoking compared with cigarettes [21–23].

THE FAILURE OF TOBACCO CONTROL POLICY TO ADDRESS WATERPIPE SMOKING

Despite alarming trends of waterpipe use, there is a failure of policies and regulations to address waterpipe smoking. For example, there is a perception that a safer product can be reinforced by widespread deceptive and promotional descriptors on waterpipe products (e.g., contains 0% tar and 0.05% nicotine, diet, herbal, tobacco free, healthy), as well as the exemption of waterpipe venues from

most indoor air and minors' access laws [2,24–26]. Moreover, the Framework Convention on Tobacco Control (FCTC), the first global treaty intended to reduce tobacco use, is formulated with the cigarette and the tobacco industry in mind [2,24]. In fact, even in places where FCTC policies are enforced, waterpipe products do not usually comply with FCTC restrictions. For example, recent studies show that most waterpipe products do not comply with FCTC's size provisions for health warnings, and display false and deceptive descriptors about their content of harmful substances such as nicotine and tar [24,27]. The same situation is also noted in countries that have their own national tobacco-control policies. For example, the Family Smoking Prevention and Tobacco Control Act in

the United States prohibits the sale of flavored cigarettes, but flavored waterpipe tobacco is not prohibited.

RECOMMENDATIONS

Waterpipe smoking bears all the signs of a burgeoning global epidemic with grave potential on future tobacco-related morbidity and mortality. Given waterpipe use's global reach and its serious public health implications, we need to act quickly with a comprehensive response of evidence-based interventions and policies. Failure to do so will likely lead to a surge in smoking-related morbidity and mortality that could have been prevented otherwise.

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