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REVIEW

The growing epidemic of water pipe smoking: Health effects and future needs

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Summary
Water pipe smoking (WPS), an old method of tobacco smoking, is re-gaining widespread popularity all over the world and among various populations. Smoking machine studies have shown that the water pipe (WP) mainstream smoke (MSS) contains a wide array of chemical substances, many of which are highly toxic and carcinogenic for humans. The concentrations of some substances exceed those present in MSS of cigarettes. Despite being of low grade, current evidence indicates that WPS is associated with different adverse health effects, not only on the respiratory system but also on the cardiovascular, hematological, and reproductive systems, including pregnancy outcomes. In addition, association between WPS and malignancies, such as lung, oral and nasopharyngeal cancer, has been suggested in different studies and systematic reviews. Despite its long standing history, WPS research still harbors a lot of deficiencies. The magnitude of toxicants and carcinogen exposures, effects on human health, as well as the addiction and dependence potentials associated with WPS need to be studied in well-designed prospective trials. Unfortunately, many of the tobacco control and clean indoor policies have exempted water pipes. World wide awareness among the public, smokers, and policymakers about the potential health effects of WPS is urgently required. Furthermore, stringent policies and laws that control and ban WPS in public places, similar to those applied on cigarettes smoking need to be implemented.

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Introduction

Cigarettes remain the most common form of consumed tobacco worldwide. However, another old form that is re-gaining popularity is water pipe (WP). The history of water pipe goes back to around four centuries ago in India [1] and its use has been a traditional habit in Asia and North Africa. While the use of water pipe has decreased in these regions during the last century [1], this social habit is witnessing resurrection since the early 1990's, not only in Eastern Mediterranean (EM) and North Africa, but also in the U.S., Europe, and some countries of South America such as Brazil [2] and even among new populations like college students and youth [3,4]. Despite the growing burden of this public health problem, high-quality trials looking at the long-term effects of water pipe smoking are still lacking, and those available carry some methodological limitations [5].

In this review, we will highlight the prevalence of WPS use in different countries and among various population categories, the smoking topography, and the constituents of the WPS including carcinogens and carbon monoxide. We will also discuss the acute and long-term adverse effects (pulmonary and extrapulmonary) of WPS, as well its effects on pregnancy and fertility. Moreover, we will review the pattern of use and dependence on WPS and studies that have compared WPS to cigarette use.

Searching the literature

Most of the major databases of medical literature (e.g. PubMed, Medline, and Embase) have not yet assigned medical subject headings (MeSH) terms for WPS, a fact that makes comprehensive search difficult. We were able to find at least 32 names of WPS in the English literature, 8 different names of the tobacco forms used in WPS, and 11 terms for one of these forms, the moassel (Table 1). A PubMed search of the 32 different names of WPS and the 11 different terms of moassel up until June 2013, revealed 321 articles from reviews, case reports and research studies. The majority were of the epidemiological nature.

Description of modern water pipe

A modern water pipe is mainly made up of five parts: the head, the body, the water bowl, a hose, and a mouthpiece (Fig. 1). Around 10—20 g of tobacco are placed in the head [6]. Burning charcoal is placed on the head, separated from the tobacco by a fenestrated aluminum foil [7]. The body is formed of a metallic tube, often decorated with metal or wood, extending from the head to the water bowl, half-immersed in water, while the hose emerges from the top of the water bowl and ends with a mouthpiece from which the user inhales [2]. As the user inhales from the mouth-piece, vacuum is created in the water bowl, sucking smoke from the head through the body into water bowl. The passage of smoke through the water causes bubbles. Finally, the smoke will pass to the user via the hose [2].

The most commonly used tobacco for WPS is called "Moassel". Most moassels made for export are produced in Bahrain and Egypt where tobacco is fermented with molasses and fruit essence. Moassel is moist and pliable, making it easier to use than other WPS tobaccos. In