Original Research

Prevalence and characteristics of water-pipe smoking in Canada: results from the Canadian Tobacco Use Monitoring Survey

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ARTICLE INFO

ABSTRACT

Objectives: To investigate the prevalence and characteristics of water-pipe smoking (WPS) nationally in Canada.

Study design: This study was a cross-sectional study.

Methods: Data from the Canadian Tobacco Use Monitoring Survey 2011 and 2012 was used. Outcomes investigated were ever and current WPS. Demographic, socio-economic and smoking-related variables were included in a multivariable logistic regression model to determine associations with the outcomes.

Results: Prevalence of WPS was 8.9% for ever and 0.8% for current WPS (1.8% among <18 years old and 4.0% among 18–24 years old). The highest prevalence of ever WPS was in Quebec (11.3%) and of current WPS in Alberta (1.2%). Age was the strongest predictor for WPS with an odds ratio = 47.86, 95% confidence interval: 37.97–60.33 for current WPS for those aged <18 years compared to 35 + years. Male gender, urban residence, being single, speaking another language at home (not English/French), higher education, cigarette smoking and marijuana use were also significantly associated with increased WPS.

Conclusions: Multiple factors impact WPS, with the younger population having the highest prevalence. This necessitates further research into the attitudes of this age group to better focus health promotion efforts.

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Introduction

Water-pipe smoking (WPS) (also known as hookah, shisha, narghileh) is a centuries-old tradition that is commonly practiced in multiple parts of the world including China, India and the Middle East.[1] Smoke is generated by heating a piece of charcoal placed on top of a perforated sheet of aluminium foil, underneath which a tobacco mixture (often flavoured) is located.[2] This flavoured heated air is bubbled in water to cool before being inhaled by the smoker through a hose.[2] Since water pipes were invented before tobacco was commonly used, the instrument itself may have been used to smoke

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other materials like hashish or opium.[3] However, nowadays it is commonly used to smoke flavoured forms of tobacco around the globe including Asia, Europe and North America.[4]

Water-pipe tobacco smokers perceive WPS as less harmful and less addictive than traditional cigarettes.[5] Contrary to these perceptions, however, WPS exposes users to numerous toxicants and chemicals that are sometimes greater in amount than those produced by cigarette smoking.[6] Studies using machine generated smoke have shown that, compared to one cigarette, one episode of WPS, which typically lasts for about an hour, generates 1.7 times the nicotine, 8.4 times the carbon monoxide, 36 times the tar (dry particulate matter that is nicotine-free)[6] and considerably higher amounts of heavy metals.[7] Moreover, WPS and cigarette smoking yield similar amounts of various other chemicals including nitric oxide and carbonylic compounds.[7] In addition, some toxicants such as benzene are mainly produced by the burning charcoal and are, therefore, present in much higher amounts in WPS compared to cigarettes.[7]

Consequently, WPS has been associated with numerous detrimental effects on different body systems including the cardiovascular and respiratory systems.[8] Effects of WPS on the cardiovascular system include increases in heart rate and blood pressure as well as an increased risk of coronary artery disease.[8] As for the respiratory system, WPS has been associated with chronic bronchitis, emphysema and chronic obstructive pulmonary disease.[8] Moreover, WPS has been associated with multiple forms of cancer including lung, gastric and oesophageal cancer.[8] Other negative health outcomes related to WPS include periodontal disease, obstetrical complications and poor neonatal outcomes (including low birth-weight and neonatal death).[8]

Global trends indicate that even though cigarette use is either stable or declining in many areas, the use of other forms of tobacco, particularly WPS, is increasing.[4] A systematic review performed by Akl et al.[9] showed that the prevalence of current WPS in the Middle East ranged from 2% to 25% among school students, 6—28% among university students and 9—15% among adults, the higher ends of these statistics being from studies done in Lebanon. WPS is on the rise not only globally, but also in North America.[4] In the United States of America (USA), the overall prevalence of ever WPS among adults 18 years and older was 9.8%, the highest being in the District of Columbia at 17.3%.[10] The prevalence of WPS among university students in the USA was 8.4% (current) and 30.4% (ever).[11] Furthermore, between 2011 and 2015 WPS increased among high-school students in the USA from 4.1% to 7.2%.[12] Generally speaking, the prevalence of WPS tends to be higher in males,[4,9—11,13—16] high socio-economic status,[4] and increases with alcohol use, cigarette smoking[9,11] and in Middle Eastern or South Asian ethnicity.[17]

Thus far, national studies looking at WPS trends in Canada have utilised the Youth Smoking Survey (YSS) (2006—2013), which focussed on students in grades 6—12.[13—15,18,19] Results from YSS 2010 reported 10.1% ever use and 4% current use of water pipes among students in grades 9—12.[14] These statistics increased significantly in the YSS 2012/2013 cycle where ever use was 14.3% (42% increase) and use within the last 30 days was 5.4% (35% increase).[15] These alarming statistics highlight the importance of studying WPS in Canada among other age groups. The objective of the present study was to determine the prevalence and characteristics of WPS among different age groups in Canada on a national scale.

Methods

This study was a secondary data analysis of the data collected by Statistics Canada. For this type of study (secondary data analysis), institutional consent requirements are waived. The final two cycles (2011 and 2012) of the Canadian Tobacco Use Monitoring Survey (CTUMS), an annual survey examining tobacco use among Canadians aged 15 years or older in all 10 provinces were used for this analysis. Residents of the Yukon, Northwest territories, Nunavut and full-time residents of institutions were not included in the survey. This cross-sectional survey was conducted using a two-phased stratified random sampling of telephone numbers. In the first phase, random digit sampling was used to select households. Even though only households with landlines were included in the survey, all estimates were weighted to include the 14% of the target population who do not have landlines. In the second phase, one or two individuals (or none) were selected for participation based on household composition, to increase the representation in the sample of the population most at risk (individuals belonging to 15—19 and 20—24 year age groups). Applying weights in the analysis adjusts for this increased representation. The questionnaire was administered over the phone in either English or French. Data for the 2011 cycle of CTUMS was collected between February and December of 2011, resulting in 20,703 respondents with a household response rate of 78.9% and a person response rate of 83.9%. Data for the 2012 cycle of CTUMS was collected between February and December of 2012, resulting in a total of 19,285 respondents with a household response rate of 83.5% and a person response rate of 83%. Access to this data was granted by the Research Data Centre (RDC) at York University. Additional details about this survey can be found at the CTUMS page on the Statistics Canada website.[20]

The two main outcomes of the current study were 'ever use' and 'current use' of water pipes, and assessed by the following yes or no questions: 'Have you ever tried a tobacco water-pipe, also known as hookah, sheesha, nargeelay, hubble-bubble or gouza to smoke tobacco?' and 'In the past 30 days, have you smoked a tobacco water-pipe?', respectively. These questions meet the definitions and criteria set forth by the Expert Panel on Water-pipe Assessment in Epidemiological Studies.[21,22] Covariates examined included: demographic factors—gender, Aboriginal status (asked by the question 'Are you an Aboriginal person, that is, First Nations, Métis or Inuk/Inuit? First Nations include status and non-status Indians?'), province of residence, rural residence (information obtained from the variable 'characteristics of the community'), marital status, language spoken at home and age; socio-economic factors—level of education and current work status (asked by the question 'Are you currently working at a job or a business?'); and smoking-related factors—household smoking (asked by the question 'Does anyone in your household smoke cigarettes?'), cigarette smoking and marijuana use (asked by the question 'Have you ever used or tried marijuana,