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Abstract

Background: Little is known about dual use of waterpipe tobacco and cigarettes, especially in countries where both are prevalent.

Aims: This study aimed to assess demographic correlates, patterns of use and quit behaviours of waterpipe users in Pakistan who also smoke cigarettes.

Methods: Data were taken from a randomized controlled trial in Pakistan that assessed smoking cessation in 510 adult waterpipe users, stratified on concurrent cigarette use. Logistic regression analysis was done to assess the association between waterpipe tobacco users who also smoke cigarettes (dual use) and their demographic characteristics, smoking history and quit behaviour. Unadjusted odds ratios (OR) and adjusted OR (ORa) and 95% confidence intervals (CI) were determined.

Results: Dual use was significantly associated with younger age (ORa = 0.36, 95% CI: 0.19–0.70) and middle-school educational level (11–15 years), versus no formal education, (ORa = 2.01, 95% CI: 1.15–3.50). Dual use was also associated with smoking less than all day versus all day (defined as continuously for several hours) (ORa = 2.71, 95%: CI 1.73–4.25) and younger age at starting smoking (ORa = 0.95, 95% CI: 0.93–0.98). No association was found between dual use and sex, marital status, duration of smoking, nicotine dependence or quit history.
Conclusion: Waterpipe tobacco users who also smoke cigarettes differ from waterpipe-only users, particularly in demographic characteristics. More research is needed to explore the interaction between these two smoking behaviours. Health promotion and cessation interventions in Pakistan should consider tailoring their approach to account for the unique characteristics of dual waterpipe and cigarette users.

Keywords: waterpipe, hookah, shisha, cigarettes, tobacco, Pakistan


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Introduction

Waterpipe tobacco use is a centuries old practice in Middle Eastern and South Asian cultures, usually among older males in rural settings (1). The 1990s saw the mass manufacture of flavoured mo’assel (honeyed) waterpipe tobacco, which gained popularity in young people in these regions and spread to North American and European countries (2,3). The Middle East and South Asia have the highest prevalence of waterpipe tobacco use globally. However, according to the Global Youth Tobacco Survey, more than 10% of schoolchildren were current (past 30 days) users in the Czech Republic, Estonia, Hungary, Latvia, Poland, Romania, Slovakia, Slovenia and Ukraine (4). The 2017 National Youth Tobacco Survey in the United States of America (USA) reported that 3.3% of high-school students were current waterpipe users (5).
The global rise of waterpipe tobacco smoking, and indeed other non-cigarette tobacco products, has led to an increasing prevalence of dual and polytobacco use, which is a public health concern. Modelling estimates suggest that waterpipe tobacco users who also use cigarettes, smoke both products more frequently and intensely than those who only use one smoking method, thereby exposing them to even more tobacco-related harm (6). A recent systematic review has shown that waterpipe tobacco use predicts later initiation of cigarette smoking (7). In addition, a randomized controlled trial found that some smokers who successfully quit cigarettes were found to then start using waterpipe tobacco (8). Smoking the waterpipe to complement or substitute for other types of tobacco use undermines the public health gains made in tobacco control and requires more investigation.

While much research exploring the reasons for waterpipe tobacco smoking has been done (9,10), few studies have examined dual use of the waterpipe and cigarettes. Cigarette smoking tends to fulfill an individual need that may include coping with stress and satisfying nicotine cravings. Waterpipe tobacco smoking, however, is often described as a pleasurable experience that centres on socializing with others (11). Nearly all research on the differences between dual and waterpipe-only tobacco use has been done in the USA or the United Kingdom, and such studies are generally limited to assessing sociodemographic differences (12–17). Only a few studies have assessed patterns of use in more detail. For example, in a small sample of Arab-Americans in the USA, dual waterpipe and cigarette users were found to be more dependent on cigarettes and had more barriers to stopping smoking than cigarette-only users (18). In a large cross-sectional study in the Islamic Republic of Iran, dual waterpipe and cigarette users were more likely to be male and smoke waterpipe tobacco more regularly and in different venues compared with waterpipe-only users (19). This suggests that dual users may respond differently to interventions to control waterpipe use, such as health awareness campaigns and behavioural change techniques, but more research is needed to confirm this assumption in different settings.

To our knowledge, only one study in the Islamic Republic of Iran (19) and another in schoolchildren in Jordan (20) have assessed dual waterpipe tobacco and cigarette use outside of North American and European settings. This is of concern given that both waterpipe tobacco and cigarette use are far more prevalent in the Middle East and South Asia than elsewhere (21). Attitudes to tobacco use, quitting and tobacco control policies may also be different in dual users (15,16). Pakistan, in particular, has a unique waterpipe tobacco context that is largely unexplored and users of waterpipe tobacco in Pakistan are among the most nicotine-dependent globally (22,23). This is the result of a national ban on flavoured mo’assel waterpipe tobacco (24) and the predominant use of an unflavoured and traditional tobacco type that has a high nicotine content (25). Little is known about the patterns of use of unflavoured waterpipe tobacco in areas where it is used and it is unclear whether dual waterpipe tobacco and cigarette users differ from waterpipe-only users in Pakistan. This has implications for the design of tobacco cessation interventions and tobacco control in general.
This study aimed to assess the demographic characteristics, patterns of use and quit behaviour of waterpipe tobacco users in Pakistan who also smoke cigarettes compared to those who only use the waterpipe.

**Methods**

**Study setting, design and sample**

Data were analysed from participants recruited to a randomized controlled trial in 2016 testing the effect of varenicline on smoking cessation among adult waterpipe smokers in Pakistan (23). The trial protocol and full methods are published elsewhere (26). Briefly, the study recruited adult participants from four districts of Punjab, Pakistan, who smoked waterpipe tobacco daily (>25 days a month) for at least six months. Concurrent cigarette use was employed as a stratifying variable in the study design based on the prevalence of dual use found in a previous smoking cessation trial in Pakistan (22). Recruitment was done in hospitals through distribution of posters and leaflets and in the community through local media and community networks. People were eligible for inclusion in the trial if they intended to quit waterpipe use, but were excluded if they had used pharmacotherapy for tobacco dependence in the past 30 days; were pregnant, lactating or planning to become pregnant; had a medical condition requiring hospitalization; had a previous allergic reaction to varenicline; had a history of heart disease, stroke, epilepsy or mental health conditions; or if they currently used smokeless tobacco or other substances (including alcohol misuse) besides smoked tobacco. Ethical approval for the randomized controlled trial was obtained from the National Bioethics Committee of the Pakistan Medical Research Council and the Research Governance Committee at the University of York, United Kingdom. Informed consent was obtained from each participant.

**Measures**

A questionnaire developed on the existing literature (27–29) was distributed. This questionnaire recorded demographic data, smoking patterns and history, motivation to quit, withdrawal symptoms and dependency measures (based on the Lebanon Waterpipe Dependence Scale score). The outcome measure of interest for the current study was dual waterpipe and cigarette use. Waterpipe use was defined as smoking at least 25 days a month for at least the past six months, and cigarette use was defined as smoking cigarettes at least once in the past 30 days. Demographic information recorded included age, sex, marital status, educational level and occupation. Waterpipe smoking history included: daily use (all day, defined as many continuous hours of smoking at a time/less than all day); length of smoking sessions (smoking without a break) in minutes; smoking duration in years; age at starting smoking; and total dependency score based on the Lebanon Waterpipe Dependence Scale. This tool is adapted from the Fagerstrom Test for Nicotine Dependence and DSM-IV for substance addiction and has been...
validated in other low- and middle-income countries (29,30). Waterpipe quit history variables included: previous quit attempts (yes/no), and, if yes, the number of previous quit attempts, time since last quit attempt and longest abstinence time.

**Statistical analysis**

Data were analysed descriptively using frequency counts and percentages for categorical variables and data and the mean and standard deviation (SD) for continuous variables (or the median and interquartile range if the data were skewed). Demographic characteristics, waterpipe smoking history, waterpipe quit history and quit outcome were cross-tabulated by dual use of waterpipe and cigarettes. We then constructed logistic regression models to test the relationship between dual waterpipe and cigarette use and the independent variables. We checked for collinearity between independent variables by assessing the variance inflation factor, which was less than two for all variables. Model 1 examined associations without adjusting for confounding and presents the unadjusted odds ratios (ORs) and 95% confidence intervals (95% CIs). Variables that were statistically significant at P