Drug and Alcohol Dependence 145 (2014) 217–223

Contents lists available at ScienceDirect

Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdep

Double trouble: Exploring the association between waterpipe tobacco smoking and the nonmedical use of psychoactive prescription drugs among adolescents

Leona Zahlan[a], Lilian Ghandour[b,*], Nasser Yassin[c], Rima Afifi[d], Silvia S. Martins[a]

[a] Department of Epidemiology, Columbia University Mailman School of Public Health, 722 West 168th Street, New York, NY, USA
[b] Department of Epidemiology and Population Health, Faculty of Health Sciences, American University of Beirut, Bliss street, Riad el Solh, 11072020 Beirut, Lebanon
[c] Department of Health Management and Policy, Faculty of Health Sciences, American University of Beirut, PO Box 11-0236, Riad El Solh, Beirut 1107 2020, Lebanon
[d] Department of Health Promotion and Community Health, Faculty of Health Sciences, American University of Beirut, PO Box 11-0236 Riad El Solh, Beirut 1107 2020, Lebanon

ARTICLE INFO

Article history:
Received 20 May 2014
Received in revised form 19 October 2014
Accepted 20 October 2014
Available online 28 October 2014

Keywords:
Adolescent
Waterpipe
Nonmedical use
Smoking
Prescription drugs
Lebanon

ABSTRACT

Background: In youth, both waterpipe tobacco smoking (WTS) and nonmedical use of prescription drugs (NMUPD) are globally growing concerns. This study assesses for the first time the lifetime and past-year associations between WTS and four classes of psychoactive prescription drugs.
Methods: Cross-sectional data (2011) on 986 high school students attending public and private high schools in Beirut (Lebanon) was analyzed. Schools were selected using proportionate random cluster sampling from a comprehensive list of schools provided by the Ministry of Education.
Results: Almost half (46%) had tried WTS compared to 25% who had ever tried cigarettes. Lifetime prevalence estimates of NMUPD were: pain relievers (8.2%), sedatives/tranquilizers (5.6%), stimulants (3.5%), antidepressants (2.5%), and sleeping pills (2.3%). WTS was associated with increased odds of sedatives/tranquilizer use (OR = 3.22, 95% CI: 1.25, 8.25), pain reliever use (OR = 4.31, 95% CI: 2.02, 9.17), and sleeping medication use (OR = 8.31, 95% CI: 2.37, 29.20), controlling for sex, age, school type, and other substance use. For cigarettes, the associations were consistently either weaker or non-existent, except with stimulant use (OR = 5.29, 95% CI: 1.55, 18.05).
Conclusions: While public health professionals have watched with caution the global prevalence of youth cigarette use–worldwide, an insidious alternative form of tobacco use has grown. Further research is needed to understand the unique risk factors and motives associated with WTS and how these relate to NMUPD in order to inform the development of effective intervention programs and policies that support youth positive health decisions.

1. Introduction

Waterpipe tobacco smoking (WTS)—also known as nargileh, hookah, shisha, and hubble-bubble smoking is an emerging global epidemic in the past two decades (Maziak, 2013, 2011; Nakkash et al., 2011). The Global Youth Tobacco Survey (GYTS), a school-based survey assessing changes in tobacco use over time among 13–15 years old in 100 global sites, showed an unchanged prevalence of cigarette smoking in 61 sites, a decreased prevalence in 27 sites, concurrent with a rise in other tobacco use (particularly due to WTS) in 34 sites (Maziak, 2011; Warren et al., 2009). In the U.S., WTS is becoming more prevalent (Cobb et al., 2010) and is the second most smoked tobacco product among university students after cigarettes (Primack et al., 2013). Surveys of high school students in the U.S. indicated a lifetime prevalence of around 11%, and one prospective study among first-year female college students found a 61% increase in lifetime prevalence of WTS after their first year of college (Barnett et al., 2009; Fielder et al., 2013).

WTS is misperceived as less harmful and addictive than cigarette smoking (Smith-Simone et al., 2008), when emerging research

* Corresponding author. Tel.: +961 1 350000x4643; fax: +961 1 744470.
E-mail addresses: leonazahlan@gmail.com (L. Zahlan), lg01@aub.edu.lb, lilian.ghandour@gmail.com (L. Ghandour), ny05@aub.edu.lb (N. Yassin), ra15@aub.edu.lb (R. Afifi), ssm2183@columbia.edu (S.S. Martins).

http://dx.doi.org/10.1016/j.drugalcdep.2014.10.020
0376-8716/

clearly indicates that WTS is comparable or worse to cigarette smoking. A smoke machine, created to emulate the actual waterpipe puff parameters, indicated that the smoke from the waterpipe contains many of the same toxicants found in cigarette smoke, including large amounts of nicotine, CO, and tar (nicotine-free dry particulate matter; NFDPM), hydrocarbons, carcinogens, and heavy metals (Cobb et al., 2010; Shihadeh, 2003). In a recent systematic review, WTS was linked to lung cancer, respiratory illness, low birth weight, and periodontal disease (Akl et al., 2010), in addition to severe coronary artery disease (Sibai et al., 2014).

In the eastern Mediterranean region, WTS is widespread among youth (Maziak, 2013, 2011; Nakkash et al., 2011). In Lebanon, for example, the prevalence of WTS exceeded that of cigarette smoking in 2003 (29.6% vs. 11.4%) among a sample of 2443 private and public school students (El-Roueiheb et al., 2008). Similarly, in Damascus (Syria), a higher prevalence of WTS (23.5% vs. 10.9% cigarette smoking) was noted in 2006–2007 among 570 medical students (Almerie et al., 2008). In Irbid (Jordan), a longitudinal study among college students, conducted between 2008 and 2011, showed a higher prevalence of WTS than cigarette smoking at every time point in the study (McKelvey et al., 2013). Recent research also suggests that waterpipe smoking at an earlier age may increase the likelihood of cigarette smoking (Jensen et al., 2010; McKelvey et al., 2013).

Another growing global public health concern, described as the fastest growing drug problem in the U.S. reaching epidemic levels, is the nonmedical use of prescription drugs (NMUPD; CDC, 2012). Reports from the United Nations Office on Drugs and Crime (UNODC), based mainly on data from the U.S. and Europe, indicate that young people are substituting the use of illicit drugs with prescription drug use, a shift that may be explained by another misperception that prescription drugs are safer than illicit drugs (UNODC, 2011). Some of the most common prescription drugs that are abused are: opioids, such as hydrocodone, oxycodone, and fentanyl; central nervous system (CNS) stimulants such as dextroamphetamine and methylphenidate; and CNS depressants, such as pentobarbital sodium and benzodiazepines. Young people obtain these non-prescribed psychoactive prescription medications from either friends or family, pharmacies, or by visiting several doctors to obtain many prescriptions (UNODC, 2011). Rise of NMUPD among adolescents is particularly problematic and worrisome because exposure to these medications could lead to addiction or overdose, experimentation with other drug use and risky behaviors such as unsafe sexual practices, not to mention interference with adolescent brain development (UNODC, 2011). Despite concern by many international bodies such as the UNODC and CDC, only one study in the past decade has investigated the issue of NMUPD among youth in the Eastern Mediterranean region, and found similar concerning patterns of use and motivations as in the U.S. (Ghandour et al., 2012).

In the U.S., NMPUD has been associated with the use of other substances including alcohol and tobacco, but namely cigarette smoking (Bali et al., 2013; Fiellin et al., 2013; Matzger and Weisner, 2007), as well as illegal drugs, including marijuana (Matzger and Weisner, 2007). For instance, Bali et al. (2013) found that people who used alcohol in the past year had more than double the odds of NMUPD compared to non-past year users (OR = 2.37, 95% CI = 1.91–2.93). Similarly, a study conducted among university students from Lebanon showed that nonmedical opioid users were more likely to use marijuana, ecstasy, cocaine/crack, and alcohol problematically compared to medical users of opioids (Ghandour et al., 2013). Recently Bali et al. (2013) found that cigarette use more than doubled the odds of NMUPD. Earlier, McCabe et al. (2005) had reported that nonmedical benzodiazepine anxiolytic users were 4 times as likely as non-users to report past month cigarette use. Tetrault et al. (2008) had similarly shown that cigarette smokers aged 12 or older were twice as likely as non-smokers to use prescription opioids nonmedically.

Despite the recent rising global use of WTS, no study has yet investigated the association between WTS and NMUPD. This present study aims to examine the lifetime and past-year associations between WTS, cigarette smoking and nonmedical use of five different classes of prescription drugs.

2. Material and methods

2.1. Study design and participants

A cross-sectional survey was conducted on a representative sample of high school students attending private and public vocational and formal schools in Beirut (capital city of Lebanon) and its immediate northern and southern suburbs. In Lebanon, 70% of youth aged 15–19 years are enrolled in an educational institution with no differences by gender (UNODC, 2011). The schools were selected using proportionate random sampling given a comprehensive list of schools provided by the Ministry of Education and Higher Education (MEHE). A total of 24 schools participated (school response rate: 68%); student response rate in the participating schools was 57.4% ($n = 986$).

Data collection took place between October, 2010 and March, 2011, following authorization from the MEHE, and ethical approval from the Institutional Review Board (IRB) at the American University of Beirut. Parental consent was obtained and assent forms were distributed to all students describing the objectives of the study, stressing anonymity at the level of the student (no identifiers were collected), and confidentiality at the level of the school (data analyzed aggregately across all schools). The voluntary nature of the participation was also stressed, and students were given the right to refuse participation at any point and to refuse responding to any question. Students who agreed to participate completed the paper and pencil questionnaire in their usual classroom under the supervision of a research team member, and in the absence of any teachers.

2.2. Waterpipe and cigarette smoking

Waterpipe smoking was assessed using one question asking the students to report whether they considered themselves to be a non-waterpipe smoker, a former waterpipe smoker (even if once), or a current waterpipe smoker. Former and current WTS were combined to represent 'lifetime WTS smokers'. Cigarette smoking was assessed similarly.

2.3. Nonmedical use of prescription drugs (NMUPD)

Lifetime and past 12-month nonmedical use of five main psychoactive prescription drug categories were assessed including sedatives/tranquilizers (e.g., Xanax, Rivotril/Rivo, Lexotanil/Lexo, Valium, Ativan), pain relievers (e.g., Vicodin, Tylenol with codeine, morphine, cough syrups, Dulsana/simo, Tramal, Darvocet), stimulants (e.g., Ritalin, "stay-awake pills"), sleeping pills, (e.g., Ambien) and antidepressant medication (e.g., Prozac, Zoloft, Effexor). Market available trade names were given as examples to increase identification and reduce information errors. Nonmedical use of these medications was defined as *using prescription drugs that were prescribed for somebody else, using the medications for longer periods than prescribed for them by their own doctor, or using the medications to get high for reasons other than what the medication is intended for.*