Drug and Alcohol Dependence xxx (2015) xxx–xxx

Contents lists available at ScienceDirect

Drug and Alcohol Dependence

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

Tobacco and e-cigarette use amongst illicit drug users in Australia

Rachel Sutherland[a,*], Natasha Sindicich[a], Gavin Entwistle[a], Elizabeth Whittaker[a], Amy Peacock[b], Allison Matthews[b], Raimondo Bruno[b], Rosa Alati[c], Lucy Burns[a]

[a] National Drug and Alcohol Research Centre, UNSW, Australia
[b] School of Medicine (Psychology), University of Tasmania, Australia
[c] School of Public Health and the Centre for Youth Substance Abuse Research, University of Queensland, Australia

ARTICLE INFO

Article history:
Received 27 February 2015
Received in revised form 20 October 2015
Accepted 23 October 2015
Available online xxx

Keywords:
E-cigarettes
Electronic cigarettes
ENDS
Tobacco
Smoking
Illicit drugs

ABSTRACT

Objective: To examine the rates and patterns of tobacco and e-cigarette use amongst two samples of illicit drug users in Australia.
Method: Data were obtained from the 2015 Illicit Drug Reporting System (IDRS) and the 2015 Ecstasy and Related Drugs Reporting System (EDRS). These studies comprised cross-sectional samples of 888 people who inject drugs (PWID) and 763 regular psychostimulant users (RPU).
Results: Tobacco was consumed by the majority of both samples, however, use in the 6 months preceding interview was significantly higher amongst PWID (92.2%) than RPU (82.4% [OR 2.53 95% CI 1.86–3.44]). Inversely, PWID were less likely to have a history of e-cigarette use: 31.5% of PWID reported lifetime use of e-cigarettes (vs. 57.0% of RPU [OR 0.35 95% CI 0.28–0.42]) and 18.1% reported use in the 6 months preceding interview (vs. 33.7% of RPU [OR 0.44 95% CI 0.35–0.55]). PWID were more than three times as likely than RPU to report using e-cigarettes as a smoking cessation tool (OR 3.09 95% CI 2.03–4.71), but were less likely to use e-liquids that contained nicotine (OR 0.52 95% CI 0.32–0.83). Higher levels of poly drug use, daily tobacco use, recent use of synthetic cannabinoids and employment status were found to be significantly associated with e-cigarette use.
Conclusion: The use of e-cigarettes was relatively common amongst Australian samples of PWID and RPU. Whilst the majority of PWID reported using e-cigarettes as a smoking cessation tool, it appears that RPU are using them for experimental or recreational purposes.

1. Introduction

Tobacco smoking continues to decline at the population level in Australia. Recent data from the National Drug Strategy Household Survey (NDSHS; AIHW, 2014) indicates that daily smoking has decreased significantly amongst people aged 14 years and older, from 15.1% in 2010 to 12.8% in 2013. However, there are particular cohorts in which the rate of tobacco smoking remains significantly higher than the population average. Tobacco use has been found to be particularly prominent amongst populations of illicit drug users, with previous studies reporting rates of use that range from 71% to 96% (Cogger et al., 2008; Mcketin et al., 2010; Richter et al., 2002; Ross et al., 2002; Sindicich and Burns, 2015; Stafford and Burns, 2015). Those who continue to smoke despite increasing pressures to quit may represent a particular subpopulation of smokers who are more resistant, or 'hardened' in their smoking behaviours (Clare et al., 2014) and, as such, it is important to consider alternatives which may help reduce rates of tobacco smoking amongst these groups.

E-cigarettes offer one possible alternative, providing a new option for individuals who are unable or unwilling to quit by permitting total or partial replacement of smoked tobacco without making any commitment to reduce or abstain from recreational nicotine use (Dockrell et al., 2013). Instead of burning tobacco, e-cigarettes use a heating element which vaporises a mixture of chemicals, often known as 'e-liquids' (Grana et al., 2014). These liquids usually contain flavouring agents and carrier substances, and may be purchased with or without nicotine; the nicotine content can vary between 0 and 20 mg/ml depending on the brand (Trehy et al., 2011). The first nicotine based e-cigarette was patented in 2003 and the global e-cigarette market is currently estimated to be worth US$3 billion (WHO, 2014); in January 2014 there were reported to be 466 different brands and 7,764 unique flavours available (Zhu et al., 2014).

* Corresponding author at: National Drug and Alcohol Research Centre, University of New South Wales, Sydney, NSW 2052, Australia.
E-mail address: rachels@unsw.edu.au (R. Sutherland).

http://dx.doi.org/10.1016/j.drugalcdep.2015.10.035
0376-8716/

The legality of e-cigarettes is complex and varies across countries and jurisdictions. In Australia, e-cigarettes have not been approved for use by the Therapeutic Goods Administration and as such it is illegal to sell e-cigarettes that contain nicotine. Evidence regarding the efficacy of e-cigarettes as a smoking cessation tool is mixed (see Harrell et al., 2014) and public health experts remain divided as to the health implications of e-cigarette use. Nevertheless, it has been found that e-cigarettes, particularly older brands, are often marketed on their advantages over conventional cigarettes and promoted as effective smoking cessation aids (Zhu et al., 2014); subsequently, they are often viewed as a tool to quit smoking conventional cigarettes (Brown et al., 2014; Choi and Forster, 2013; Czoli et al., 2014; Goniewicz et al., 2013; Kralikova et al., 2013; Vickerman et al., 2013). A systematic review of 49 studies looking at the awareness, use, reactions to, and beliefs about e-cigarettes found that the most common reasons for using e-cigarettes were quitting smoking and using a product that is healthier than cigarettes (Pepper and Brewer, 2014).

There is limited information regarding rates of e-cigarette use and the socio-demographic profile of consumers. International research suggests relatively high rates of use, particularly amongst people who already smoke. For example, it has been estimated that 20.3% of smokers, 4.7% of ex-smokers and 1.2% of lifetime non-smokers in the European Union (approximately 29.3 million adults) have a lifetime history of e-cigarette use (Vardavas et al., 2014). In addition, the lifetime use of e-cigarettes has doubled in several countries between 2008 and 2012 (Grana et al., 2014) and prevalence has increased amongst various age groups (Chapman and Wu, 2014). In the Australian context, rates of current use increased from 0.6% in 2010 to 6.6% in 2013 (Yong et al., 2014). However, these studies are limited to current and former smokers and there appear to be no existing studies which have looked at the use of e-cigarettes amongst illicit drug users. With this in mind, and in the context of high levels of smoking and low levels of cessation amongst illicit drug users, this study will investigate the rates, patterns and correlates of tobacco and e-cigarette use amongst people who inject drugs (PWID) and regular psychostimulant users (RPU) in Australia.

2. Method

2.1. Study design

This paper uses data from the 2015 Illicit Drugs Reporting System (IDRS) and the Ecstasy and Related Drugs Reporting System (EDRS), two Australian national monitoring studies funded by the Australian Government Department of Health. These studies are aimed at detecting emerging trends in illicit drug markets and have been conducted in all states and territories of Australia since 2000 and 2003, respectively. Both studies have ethical approval from the University of New South Wales Human Research Ethics Committee.

To compare rates of e-cigarette use amongst our IDRS and EDRS samples with general population estimates, this paper draws upon the 2013 National Drug Strategy Household Survey (NDSHS), which collects data on alcohol, tobacco and illicit drug consumption amongst the general population in Australia. In 2013, the NDSHS collected data from 23,855 Australians aged 12 and over and, for the first time, individuals were asked about their use of e-cigarettes in the 12 months preceding interview. Further in-depth details of the survey are reported elsewhere (AIHW, 2014)

2.2. Participants and procedure

IDRS participants were recruited through drug treatment services and peer referral, and were selected on the basis of at least monthly injection of illicit drugs in the 6 months prior to interview (hereafter referred to as people who inject drugs (PWID)). EDRS participants were recruited through street-press advertisements, online forums and peer referral, and were selected on the basis of at least monthly use of psychostimulants in the 6 months preceding interview (hereafter referred to as regular psychostimulant users (RPU)). In both studies, participants had to be 16 years of age or older, have resided in the city where the interview took place for at least 12 months prior to the interview, and were non-random self-selected samples. Face-to-face 1 h structured interviews were conducted by trained interviewers with participants at a negotiated time and location. All information provided was confidential, and participants were reimbursed AUD$40 for their time. EDRS interviews were conducted from March to July 2015, and IDRS interviews were conducted from May to August 2015.

Further in-depth details of the methodology are described elsewhere (Stafford and Burns, 2015; Sindicich and Burns, 2015).

2.3. Measures relevant to the current study

In addition to demographic questions, participants were asked about their lifetime and past 6 month use of licit and illicit substances, including both tobacco and e-cigarettes. Participants who had used e-cigarettes in the past 6 months were then asked if they had used them as a smoking cessation tool, and whether the e-cigarette contained nicotine, cannabis, neither or both. Participants in both studies completed the Severity of Dependence Scale (SDS; Gossop et al., 1995) for stimulants; IDRS participants also completed the SDS for opioids. Cut-off scores of ≥4 and ≥5 were used to measure stimulant dependence (Topp and Mattick, 1997) and opioid dependence (Castillo et al., 2010), respectively. EDRS participants were asked if they had binged on stimulants in the past 6 months (defined as stimulant use for 48 h or more without sleep), and in both samples the number of illicit drug classes used in the past 6 months was used to measure levels of poly drug use (maximum of 22 drug classes for IDRS participants and 28 drug classes for EDRS participants).

Participants in both studies were administered the Kessler 10 (K10) Psychological Distress Scale (Kessler et al., 2003), a 10-item screening measure of psychological distress with a five-point response scale (1 'none of the time' to 5 'all of the time'). A cut-off score of ≥22 (score range 10–50) was used to measure high to very high psychological distress (Andrews and Slade, 2001). The K10 has been shown to be a reliable and valid screening tool for current affective disorders amongst drug users, with high internal consistency (Cronbach's $\alpha = 0.84$) and high predictive accuracy for the presence of Diagnostic and Statistical Manual IV affective disorder diagnosis (77%; Hides et al., 2007)

The Alcohol Use Disorders Identification Test (AUDIT), a 10-item scale, was administered to EDRS participants to identify individuals with potential alcohol-related problems (Saunders et al., 1993). A cut-off score of ≥8 was used to measure hazardous and harmful alcohol use (Babor et al., 2001). The AUDIT-C, a three-item shorter version, was administered to IDRS participants, with a score of ≥5 indicating the need for further assessment (Haber et al., 2009). The AUDIT has been shown to be internally consistent even when used with diverse samples and in a broad range of settings (Reinert and Allen, 2002).

2.4. Statistical analysis

2.4.1. IDRS/EDRS data. The sample was divided into three groups based on their e-cigarette use in the 6 months preceding interview: no use; infrequent use (i.e., <6 days of use); and frequent use (i.e., ≥6 days of use). Pearson's χ^2 was used to determine statistical significance between groups and adjusted residuals were used to analyse which cell differences contributed to the overall χ^2 results. An adjusted residual score of greater than 2.0 or below −2.0 indicated that the cells differed significantly. The Benjamini–Hochberg procedure was applied to control the false discovery rate and was used because it yields much greater power than the widely administered Bonferroni technique (Thissen et al., 2002).

Variables found to be significant based on univariate comparisons were entered into separate multivariate logistic regression models for PWID and RPU, along with variables that have previously been shown to be associated with tobacco smoking: specifically gender (WHO, 2003); age (Jha et al., 2002); unemployment (De Vogli and Santinello, 2005); and poor mental health (Hirshbein, 2015; Jorm, 2008). To allow comparability across the two samples, the same variables were entered into the regression models for both PWID and RPU. The referent group comprised participants who reported no e-cigarette use in the past 6 months. Associations were set for statistical significance at $p < 0.05$. All analyses were conducted using IBM SPSS software, Version 22.

2.4.2. NDSHS data. Analyses were conducted using SAS Enterprise Guide 6.4, taking into account the effects of complex sampling methods. Data were weighted to correct for differential response rates and to account for over-sampling in some of the smaller jurisdictions. Strata and cluster variables were used in the analyses to account for the multilevel stratification of recruitment of the sample.

3. Results

3.1. Demographics

Eight hundred and eighty-eight IDRS participants were interviewed in 2015. Briefly, 66.8% of PWID were male with a median age of 42 years (range 17–71), 97.7% were of English speaking background, 57.5% were tertiary qualified (this includes university and trade qualifications), 1.6% were students, 83.3% were unemployed and 47.2% were currently in drug treatment. Over half (55.1%) had

Please cite this article in press as: Sutherland, R., et al., Tobacco and e-cigarette use amongst illicit drug users in Australia. Drug Alcohol Depend. (2015), http://dx.doi.org/10.1016/j.drugalcdep.2015.10.035