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Electronic Cigarettes: Awareness, Recent Use, and Attitudes Within a Sample of Socioeconomically Disadvantaged Australian Smokers

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Abstract

Introduction: Electronic cigarette (e-cigarette) awareness, trial of e-cigarettes in the past 12 months, source and perceptions of safety and effectiveness was assessed within a disadvantaged sample of adult Australian smokers receiving welfare aid.

Methods: A cross-sectional survey was administered to clients who smoke at two community service organizations in New South Wales, Australia from October 2013 to July 2014. E-cigarette awareness, trial in past 12 months, sources of e-cigarettes and perceptions of the safety and effectiveness of e-cigarettes to help people quit were assessed along with sociodemographic and smoking-related variables.

Results: In total, 369 participants completed the survey (77% response rate). Awareness and trial of e-cigarettes were reported by 77% (n = 283) and 35% (n = 103) of the sample, respectively. E-cigarettes were most commonly obtained from friends/strangers followed by tobacco shops (tobacconists). Trying e-cigarettes in the past 12 months was significantly associated with positive perceptions of their safety (odds ratio [*OR*] = 1.8, 95% confidence interval [CI] = 1, 3.1) and effectiveness (*OR* = 1.9, 95% CI = 1.1, 3.2). Motivation to quit tobacco smoking was also significantly positively associated with positive perceptions of e-cigarette safety (*OR* = 1.2, 95% CI = 1.1, 1.4) and effectiveness (*OR* = 1.2, 95% CI = 1.0, 1.3).

Conclusions: Rates of awareness and trial of e-cigarettes within a disadvantaged sample of Australian smokers are comparable to rates found within representative samples of the general Australian population. Previously trying e-cigarettes and higher levels of motivation to quit were associated with more positive perceptions of e-cigarette safety and effectiveness.

Implications: This study demonstrates that socioeconomically disadvantaged smokers are aware of and accessing e-cigarettes in a country with relatively high restrictions covering e-cigarette sale and use.

Introduction

In high income countries, the highest prevalence of smoking is concentrated in the most disadvantaged groups in society. Rates of smoking are highest amongst people with the lowest level of income (25%–30%)[1]; people with a mental illness (32%)[2]; people with alcohol and other substance use disorders[3]; people who are homeless (73%)[4]; Indigenous people (31%–52%)[5–7]; and prisoners (78%–84%).[8,9] Individuals within these groups often experience multiple forms of disadvantage, for example, people who are homeless are more likely to experience mental illness.[10] These groups have been identified as priority targets for smoking cessation research,[11] recognizing the need for novel approaches.

Electronic cigarettes (also known as electronic nicotine delivery systems or e-cigarettes) have recently emerged as potential smoking cessation aids for smokers. E-cigarettes deliver an aerosol usually consisting of a carrier solution (typically propylene glycol and/or vegetable glycerol), flavorings and often, but not always, nicotine. In Australia, possession and/or use of an e-cigarette containing nicotine without a prescription from a medical practitioner is illegal in all states.[12] It is legal to possess and use e-cigarettes that do not contain nicotine, however sale may be unlawful in some Australian states.[12] This is in contrast with the United States and many parts of Europe where there are relatively few restrictions placed on marketing and purchase of e-cigarettes with or without nicotine.[13]

The two strongest arguments for the use and regulated promotion of e-cigarettes within the tobacco control research field are that e-cigarettes represent a safer alternative to tobacco cigarettes and can be used to aid current smokers to quit smoking. Two trials have demonstrated that using an e-cigarette containing nicotine is associated with increased likelihood of cessation at 6 months follow-up compared to using e-cigarettes without nicotine.[14] However the safety and effectiveness of e-cigarettes have not yet been established.[14,15] Another argument is to promote the long-term use of e-cigarettes as a method of harm reduction for smokers unable to quit, such as those from disadvantaged groups who are heavily nicotine dependent and have made numerous unsuccessful quit attempts.[16,17]

Awareness and use of e-cigarettes appears to be increasing over time in both the international literature[18] and in Australia.[13] Surveys assessing smokers and ex-smokers awareness of e-cigarettes in the United Kingdom, United States, Australia, and Canada found an overall awareness of 46% in 2013.[19] In Australia and the United Kingdom, awareness of e-cigarettes had increased to 91% in 2014.[13] Estimates of ever use ranged from 8% in 2013 across smokers and smokers in the United Kingdom, United States, Australia and Canada to 35% in Australia and the United Kingdom in 2014. In 2014, estimates of current e-cigarette use in the general population range from 1% to 6%.[18] Levels of awareness and ever use in current and former smokers are generally lower in Australia compared to the United Kingdom[13] and United States.[19] This may be due in part to the differences in regulations covering e-cigarettes between these countries and Australia.

To date, only two US-based studies exploring awareness and use of e-cigarettes within disadvantaged groups have been published. In a sample of opioid dependent smokers, levels of e-cigarette awareness (99%), ever use (73%) and use in the past 30 days (33%) were higher than levels found within the general US population.[20] In a national probability sample of smokers and nonsmokers, those reporting a mental health condition were significantly more likely to have tried e-cigarettes (15%) than those without (7%).[21] Levels of current use in this probability sample were higher for those with a mental health condition (9%) than those without (5%), however this difference was not significant.

Data concerning e-cigarette use in disadvantaged groups in Australia are lacking. Comparing awareness, use and attitudes across countries may provide insight on the impact of different regulatory environments. If e-cigarettes develop a stronger evidence base as a smoking cessation aid or harm reduction strategy, information about awareness, use and perceptions of e-cigarettes is needed to shape policy. A better understanding of the awareness, use and perceptions of e-cigarettes within a highly socioeconomically disadvantaged group of smokers will also help inform the current limited research agenda on smoking and disadvantaged groups.

Aims

Within a sample of socioeconomically disadvantaged smokers, this study aims to examine:

1. The percentage of participants who (1) have ever heard about e-cigarettes and (2) have tried e-cigarettes in the past 12 months;
2. The most common ways e-cigarettes are obtained;
3. Perceptions of e-cigarette safety, cost, and effectiveness as an aid to quit;
4. Whether perceptions of e-cigarettes are associated with use.

Methods

Study Design

A cross sectional survey was conducted at two nongovernment community service organizations (CSO) in New South Wales, Australia, from October 2013 to July 2014. The study aimed to sample priority groups with high smoking prevalence rates including people who are homeless, unemployed, with mental illness, and of Aboriginal and/or Torres Strait Islander background. Although these groups are hard to reach, recruitment via CSOs represents an effective mechanism for obtaining a representative sample.[11,22] Both CSO sites provided financial and material assistance to clients experiencing financial hardship.

Participants

Eligible participants were (1) clients of the CSO, (2) aged 18 years or older, (3) not under the influence of alcohol or other drugs at time of recruitment, (4) not too distressed to complete the survey, and (5) current daily or occasional smokers. Self-reported smoking status was assessed using the following two items (1) "Do you currently smoke tobacco products? " with the following response options (a) Yes daily (b) Yes at least once a week (c) Yes but less often than once a week and (d) No, not at all and (2) "Have you smoked at least 100 cigarettes or a similar amount of smoking in your life?" (a) Yes (b) No or (c) Not sure. Current smokers were defined as self-reported daily or occasional smokers who had smoked at least 100 cigarettes in their lifetime.

Procedure

CSO staff informed all clients about a health survey being conducted at the organization and clients were asked to approach the Research Assistant for more information. RAs provided an Information Statement and assessed client eligibility. Survey completion was taken as consent. The survey was administered via a touchscreen computer. The Research Assistant provided assistance in completing

the survey where necessary. The survey included 40 items in total and the mean completion time was 16.2 minutes (ranged from 9.2 to 21.3 minutes).Only those data relating to e-cigarettes are presented in this article. Participants received a $10 grocery card gift voucher as reimbursement for completing the survey. Ethics approval was granted by the University of Newcastle's Human Research Ethics committee.

Measures

Sociodemographic Variables

Age, gender, Aboriginal and/or Torres Strait Islander (Indigenous) status, education, housing status, weekly net income, and source of income were assessed.

E-cigarette Awareness, Ever Use, Source and Perceptions

Participants were presented with an image of an e-cigarette (Supplementary File 1) along with a brief description of e-cigarettes before they were presented with e-cigarette questions. The description read: "The following questions are about electronic cigarettes or e-cigarettes. An e-cigarette (like the one shown on the left here) uses a battery and may also light up or have smoke (vapour) coming from it like a real cigarette". To assess awareness, participants were asked "Before now, have you ever heard of electronic cigarettes or e-cigarettes?" and to assess use in the past 12 months they were asked "In the last 12 months, have you ever tried electronic cigarettes or e-cigarettes, even just one time?". Participants who reported trying e-cigarettes in the past 12 months were asked from where they had obtained e-cigarettes with response options: (1) internet/online; (2) tobacco shop (tobacconist); (3) friend or stranger; (4) while travelling overseas; or (5) other. Participants could select multiple responses. Perceptions of e-cigarettes were assessed on a Likert-type scale from one (strongly disagree) to five (strongly agree) with the following statements "E-cigarettes can help people quit smoking tobacco", "I would switch to e-cigarettes if they were cheaper than tobacco cigarettes", "E-cigarettes are safer to use than tobacco cigarettes" and "I would give e-cigarettes a go to help me quit smoking".

Additional Covariates

Quit attempts in the past 12 months were assessed by asking all current smokers "Have you made a serious attempt to quit smoking in the last 12 months? By serious attempt I mean you decided that you would try to make sure you never smoked again (Yes/No)?".[23] Motivation to quit was assessed on a 10-point Likert scale where 1 = very low, 10 = very high.[24] Nicotine dependence was assessed using the two-item Heaviness of Smoking Index with higher scores indicating higher levels of nicotine dependence.[25] Self-efficacy was assessed using the following: "If you decided to give up smoking completely in the next 6 months, how sure are you that you would succeed?" (1) Not at all sure, (2) Slightly sure, (3) Moderately sure, (4) Very sure, or (5) Extremely sure.[23]

Data Analysis

Percentages and 95% confidence intervals [CIs] were calculated for the number of respondents indicating they were aware of e-cigarettes and those who had responded ever trying e-cigarettes. Chi-square analysis was carried out to investigate differences in the proportion of participants strongly agreeing or agreeing to the four statements assessing perceptions of e-cigarettes. Binary logistic regression was used to examine whether having tried e-cigarettes in the past 12 months was associated with agreement that e-cigarettes can assist with quitting and that e-cigarettes are safer, adjusting for demographic and smoking characteristics.

The variables included in logistic regression models were: e-cigarette use in past 12 months, age, gender, Heaviness of Smoking Index, Indigenous status, highest level of education, motivation to quit, quit attempt in the last 12 months and self-efficacy. As two sites were used as recruitment centers for this survey, recruitment site was included as a covariate to control for any differences by centre. Collinearity of variables was checked using Variance Inflation Factors (VIFS) and linearity assumption for continuous variables and the (log) outcome were examined. Crude and adjusted odds ratios, with 95% CIs and *P* values were calculated for variables in the model. Consideration was made at each step that the removal of each nonsignificant variable did not negatively affect either the fit of the model (measured by significant change in likelihood ratio test or more than four point increase in Akaike Information Criterion [AIC]) or change the estimates for remaining variables by no more than 10%. SAS 9.4 (SAS Institute Inc, Cary, NC) was used for all analyses.

Results

Response Rates

Of the 606 clients attending the two centers during the study period, 478 (78%) clients were eligible to take part and invited to see the Research Assistant for more information about the study. Reasons for ineligibility included being a nonsmoker ($n = 96$), being under the influence of alcohol or other drugs ($n = 5$), distress ($n = 3$), and being aged under 18 years ($n = 5$). Of eligible clients, 369 (77%) individuals consented and gave complete survey data.

Sociodemographic Characteristics of the Sample

The sample of participants was highly socioeconomically disadvantaged (Table 1). Individuals self-reporting as Aboriginal and/or Torres Strait Islander made-up 21% ($n = 60$) of the sample, compared to 2.2% of the population in New South Wales.[26] The sample displayed exceptionally low income with 71% ($n = 261$) reporting income well below the Australian single-person "poverty line" of $500 per week[27] and 91% ($n = 337$) dependent on government benefits as their main source of income.

Awareness, Past 12-Month Use and Source of Obtaining E-Cigarettes

Seventy-seven percent of the sample ($n = 283$) said they had heard of e-cigarettes and of those individuals, 36% ($n = 103$) had used e-cigarettes at least once in the past 12 months (Table 2). The most common sources for obtaining e-cigarettes were from a friend or stranger (52%, $n = 53$) followed by from a tobacco shop (40%, $n = 41$). The "other" response category included obtaining e-cigarettes from the internet and overseas (9%, $n = 18$).

Perceptions of E-Cigarettes

Participant perceptions of e-cigarettes are reported in Table 3. Significantly higher proportions of participants who had tried e-cigarettes at least once in the past 12 months either agreed or strongly agreed that e-cigarettes are safer to use than tobacco cigarettes (58% vs. 44%, $P = .03$) and that e-cigarettes can help people quit smoking (51% vs. 34%, $P < .01$) compared to those who had not tried e-cigarettes within the past 12 months. No significant difference was

Table 1. Demographics by Awareness and Use of E-Cigarettes in the Past 12 Months

Characteristic	Class/statistic	Not aware of e-cigarettes (n = 86)	No (n = 180)	Yes (n = 103)	Total (N = 369)
Age	mean (*SD*)	39 (10)	41 (12)	38 (12)	40 (11)
Gender	Male	39 (26%)	70 (47%)	41 (27%)	150 (41%)
	Female	47 (21%)	110 (50%)	62 (28%)	219 (59%)
Indigenous status[a]	Aboriginal and/or Torres Strait Islander status	18 (23%)	35 (45%)	25 (32%)	78 (21%)
	No	68 (23%)	145 (50%)	78 (27%)	291 (79%)
Highest level of education	Primary school	14 (23%)	28 (46%)	19 (31%)	61 (17%)
	Secondary or less	63 (27%)	110 (47%)	63 (27%)	236 (64%)
	Tertiary qualifications	9 (13%)	42 (58%)	21 (29%)	72 (20%)
Housing status	Own house	1 (9.1%)	6 (55%)	4 (36%)	11 (3.0%)
	Rental house	34 (24%)	69 (49%)	39 (27%)	142 (38%)
	With family or friends/ hotel, motel/no home, street living	15 (28%)	17 (32%)	21 (40%)	53 (14%)
	Supported accommodation/ government housing	34 (22%)	85 (56%)	33 (22%)	152 (41%)
	Other	2 (18%)	3 (27%)	6 (55%)	11 (3.0%)
Marital status	Separated/divorced/never married or single/widowed	64 (22%)	144 (48%)	89 (30%)	297 (80%)
	Married/defacto/living with partner	22 (31%)	36 (50%)	14 (19%)	72 (20%)
Weekly income amount (net)	Less than $200 per week	33 (33%)	44 (44%)	23 (23%)	100 (29%)
	Between $201–$400 per week	34 (21%)	78 (48%)	49 (30%)	161 (47%)
	More than $400 per week	10 (13%)	43 (55%)	25 (32%)	78 (23%)
Source of income	Paid employment (either full or part time)	6 (33%)	6 (33%)	6 (33%)	18 (4.9%)
	Government pension or benefit	77 (23%)	167 (50%)	93 (28%)	337 (91%)
	Other	3 (21%)	7 (50%)	4 (29%)	14 (3.8%)
Do you currently smoke tobacco products?	Daily smoker	76 (22%)	163 (48%)	99 (29%)	338 (92%)
	Occasional smoker	10 (32%)	17 (55%)	4 (13%)	31 (8.4%)
Heaviness of Smoking Index	mean (*SD*)	3 (2)	3 (2)	3 (2)	3 (2)
Number of cigarettes smoked per day	mean (*SD*)	14.4 (8.6)	15.6 (9.8)	17.7 (11.0)	15.9 (10.0)
Quit attempt in last 12 months	Yes	66 (22%)	150 (50%)	87 (29%)	303 (82%)
Motivation to quit	mean (*SD*)	5.4 (2.2)	5.4 (2.4)	5.4 (2.4)	5.4 (2.4)
Self-efficacy levels	Low	46 (23%)	97 (48%)	59 (29%)	202 (55%)
	Moderate	23 (23%)	50 (50%)	27 (27%)	100 (27%)
	High	17 (25%)	33 (49%)	17 (25%)	67 (18%)
Site of recruitment	Site A	10 (15%)	29 (45%)	26 (40%)	65 (18%)
	Site B	76 (25%)	151 (50%)	77 (25%)	304 (82%)

[a]Aboriginal and/or Torres Strait Islander status was collapsed into Indigenous vs. non-Indigenous for all analyses due to low cell numbers.

found between those who had tried e-cigarettes and those who had not tried e-cigarettes regarding whether they would use e-cigarettes if they were cheaper than tobacco cigarettes or the intention to use cigarettes in order to quit smoking.

After adjusting for demographic and smoking characteristics, the odds of agreeing that e-cigarettes can help people quit smoking tobacco were 1.9 times higher in participants who had tried e-cigarettes, compared to those who had not (95% CI = 1.1, 3.2). Odds of agreeing that e-cigarettes can help people quit smoking were also higher for those who had higher levels of motivation to quit smoking (odds ratio [*OR*] = 1.2, 95% CI = 1.0, 1.3). All other variables were nonsignificant (Table 4).

The odds of agreeing with the statement that e-cigarettes are safer to use than tobacco cigarettes were 1.8 times higher in participants who had tried e-cigarettes, compared to those who had not (95% CI = 1.0, 3.1). Females (*OR* = 2.0, 95% CI = 1.2, 3.3) and participants with higher levels of motivation to quit (*OR* = 1.2, 95% CI = 1.1, 1.4) also had higher odds of agreeing that e-cigarettes are safer to use than tobacco cigarettes. All other variables were nonsignificant.

Discussion

In this sample of adult welfare recipient smokers, 77% of participants were aware of e-cigarettes and of those, 37% reported trying an e-cigarette within the past 12 months. To our knowledge this is one of the first studies to examine e-cigarette awareness, use and perceptions within a disadvantaged sample in Australia. Most participants reported obtaining e-cigarettes from friends or strangers or from a tobacco shop (tobacconist). Trying e-cigarettes within the past 12 months was associated with positive perceptions of the safety of e-cigarettes and e-cigarettes as an aid to quit smoking. Additionally, higher motivation to quit smoking was also associated with positive perceptions of the safety and effectiveness of e-cigarettes to help smokers quit.

Levels of awareness reported in the current study are comparable to levels reported in a study conducted with a representative sample of the Australian population in 2014[13] and slightly lower than estimates within the United Kingdom (2014), United States, and Canada (2013).[13,19] Estimates of e-cigarette trial in the current sample were slightly lower (36%) than estimates of ever use in a national sample of current smokers with a mental health condition in the United States (40%).[21]

Obtaining e-cigarettes from a friend or stranger reflects research that shows that people first try e-cigarettes on their friends' or family's recommendation.[28] Both initiation and cessation of tobacco use is known to be influenced by social networks,[29] and this may be occurring fore-cigarette use.

Table 2. Awareness, Past 12 Months Use of E-Cigarettes and Source of E-Cigarettes

Characteristic	Frequency (%)
Variable	
Awareness	
Yes	283 (76.7%)
No	86 (23.3%)
Of those who are aware of e-cigarettes (n = 283)	
Tried e-cigarettes in the past 12 months	
Yes	103 (36.4%)
No	180 (63.6%)
Source of e-cigarettes[a]	
Tobacco shop	41 (18.6%)
Friend	53 (22.7%)
Other[b]	18 (9.1%)

[a]Participants could select more than option.
[b]NB "Other" category includes internet, travelling overseas, and "other".

Consistent with previous literature, e-cigarettes were perceived as safer to use than tobacco cigarettes[30,31] and as aids to help individuals quit smoking tobacco cigarettes[31,32] by a large proportion of the sample. However, around half of the sample appears misinformed or unsure about whether e-cigarettes are less risky than cigarettes. This reflects data from the United Kingdom suggesting that while usage rates have increased, individuals still report uncertainty regarding the safety of e-cigarettes compared to tobacco cigarettes.[33] Also consistent with the previous literature, ever trying e-cigarettes was associated with positive perceptions of the safety and effectiveness of e-cigarettes to help smokers quit.[31]

Motivation to quit tobacco smoking was significantly associated with ever trying e-cigarettes. This reflects research that suggests smokers experiencing forms of disadvantage including substance use disorders and mental health conditions may be more likely to ever use e-cigarettes than smokers in the general population.[20,21]

Implications

These results highlight the need for high-quality evidence from randomized controlled trials about the safety and effectiveness, or otherwise, of e-cigarettes given current rates of ever use. As awareness of e-cigarettes continues to grow, use may also increase.[28] If research confirms the effectiveness of e-cigarettes for cessation or harm reduction, they may become a useful intervention for smokers from socioeconomically disadvantaged groups who have not been able to quit smoking with existing methods. It is important to educate the public regarding what is known and what is not known about the safety of e-cigarettes based on current scientific knowledge. Similarly, the public should be kept up to date as evidence grows regarding the effectiveness of e-cigarettes as a cessation aid or harm reduction tool. If the eventual evidence supports these potential benefits of e-cigarettes, they may be an important intervention to target to smokers from socioeconomically disadvantaged groups.[19,34]

Concerns have been raised about the potential for e-cigarettes to increase (and not reduce) the disparities in harms from smoking as new technologies and innovations have historically contributed to increasing disparities in health between disadvantaged and more advantaged individuals who have more capacity to access and benefit from these technologies.[35] However, our study demonstrates that socioeconomically disadvantaged smokers are accessing this technology, even within a country with highly restrictive laws covering their sale and use. Discussions about how to regulate e-cigarettes should consider the potential impact of such regulations on disadvantaged smokers, who may benefit most from access to less harmful alternatives.

Table 3. Perceptions of E-Cigarettes

Perception	Strongly disagree	Disagree	Don't know	Agree	Strongly agree
E-cigarettes can help people quit smoking tobacco.	38 (13.4%)	22 (7.8%)	109 (38.5%)	64 (22.6%)	50 (17.7%)
Would switch if cheaper than tobacco cigarettes	58 (20.5%)	42 (14.8%)	69 (24.4%)	58 (20.5%)	56 (19.8%)
Safer to use than tobacco cigarettes.	32 (11.3%)	23 (8.1%)	88 (31.1%)	75 (26.5%)	65 (23%)
I would give e-cigarettes a go to help me quit smoking	52 (18.4%)	32 (11.3%)	63 (22.3%)	69 (24.4%)	67 (23.7%)

Table 4. Multivariate Analysis Examining Characteristics Associated With Ever Use in the Current Sample

	Agreeing that e-cigarettes can help people quit smoking tobacco		Agreeing that e-cigarettes are safer to use than tobacco cigarettes	
	Adjusted		Adjusted	
Parameter	*OR* (95% CI)	*P*	*OR* (95% CI)	*P*
Tried e-cigarette (Yes)	1.9 (1.1, 3.2)	.03	1.8 (1.0, 3.1)	.04
Age	1.0 (0.98, 1.0)	.98	1.0 (0.99, 1.0)	.15
Gender (female vs. male)	1.3 (0.74, 2.1)	.39	2.0 (1.2, 3.3)	.01
Heaviness of Smoking Index	1.1 (0.89, 1.3)	.50	1.1 (0.9, 1.3)	.36
Indigenous vs. non-Indigenous	1.4 (0.74, 2.5)	.32	0.78 (0.42, 1.5)	.44
Highest level of education	—	.07	—	.85
Secondary or less vs. primary school	1.7 (0.8, 3.7)	.17	0.86 (0.42, 1.8)	.69
Tertiary qualifications vs. primary school	2.7 (1.1, 6.5)	.02	1.0 (0.44, 2.3)	.99
Motivation	1.2 (1.0, 1.3)	.02	1.2 (1.1, 1.4)	<.01
Quit attempt in last 12 months (yes)	1.1 (0.55, 2.1)	.82	0.95 (0.49, 1.8)	.88
Self-efficacy	—	.83	—	.70
Slightly sure vs. not at all sure	1.2 (0.58, 2.5)	.63	1.3 (0.63, 2.7)	.48
Moderately sure vs. not at all sure	0.91 (0.45, 1.8)	.80	1.3 (0.65, 2.6)	.47
Very sure vs. not at all sure	0.88 (0.36, 2.1)	.77	1.4 (0.57, 3.3)	.47
Extremely sure vs. not at all sure	1.7 (0.47, 6.0)	.42	0.59 (0.16, 2.2)	.43
Site (Site A vs. Site B)	0.62 (0.32, 1.2)	.16	1.4 (0.73, 2.8)	.30

CI = confidence interval; *OR* = odds ratio.

The cost of e-cigarettes may be an important factor to consider. Research to date on the cost of e-cigarettes has shown mixed evidence, with some studies reporting that smokers perceive e-cigarettes to cost less than tobacco cigarettes and other studies reporting the opposite.[36,37] Within this study, a high proportion of smokers agreed they would switch to e-cigarettes if they were cheaper than tobacco cigarettes. As e-cigarette technology increases and cheaper e-cigarette models emerge on the market, it is important to examine the perceptions of the cost of e-cigarettes[38] and how this effects uptake and stopping use of e-cigarettes within disadvantaged groups, for whom cost may be especially important. Nicotine-containing e-cigarettes are likely to be more effective as a cessation aid than non-nicotine e-cigarettes, however should one gain registration as a therapeutic good, it is likely to only be available on private prescription which may make this option unaffordable for disadvantaged smokers.

Strengths and Limitations

The main strength of this cross-sectional survey is its large sample of highly disadvantaged smokers with high rates of homelessness, poverty and indigenous status, often referred to as hard-to-reach.[39] This was achieved by approaching smokers through a CSO. While this means that the conclusions are limited to similar populations of disadvantaged Australian smokers seeking assistance from CSO, they may also be generalizable to disadvantaged smokers in other high-income countries where e-cigarettes that contain nicotine are not legal.

As this was a cross-sectional survey, we are unable to determine whether positive experiences with e-cigarettes lead to positive perceptions, or if positive perceptions of e-cigarettes meant participants were more likely to try e-cigarettes. It is plausible that both perceptions and experience affect one another simultaneously.

Another limitation includes the assessment of ever use of e-cigarettes (and not current use). Longitudinal information on the uptake, current use and cessation of e-cigarettes is needed in disadvantaged groups. Additionally, the items used to assess e-cigarette use did not distinguish between nicotine and non-nicotine e-cigarette models, and the image depicting e-cigarettes was only an early generation "ciga-like" model. Participants may have been more able to recognize newer generation e-cigarette models and thus answered "no" when indicating ever use. Therefore, estimates of ever use in this study may underestimate the true rates of ever use in this sample. This study provides a preliminary investigation into use of e-cigarettes among a highly disadvantaged population of smokers. Future studies should seek to increase the knowledge around current use of e-cigarettes (as definitions of current use are refined[40]) and to distinguish between nicotine and non-nicotine models and the subsequent generations of e-cigarette models.

Factors including current use of e-cigarettes, frequency of use, patterns of use including dual use, reasons for use and stopping use of e-cigarettes were not assessed in this study. Future studies should assess these within disadvantaged groups as awareness and use of e-cigarettes increases. Reasons for use may be particularly important to assess as previous research suggests there may be different typologies of e-cigarette users based on the reasons they have for using e-cigarettes.[28]

Conclusion

Awareness and use of e-cigarettes in this disadvantaged sample were similar to rates reported in a study conducted with a representative sample of the Australian population. Perceptions of e-cigarettes were

positive and broadly reflected those reported in the international literature. There is a need for high-quality evidence about the safety and effectiveness, or otherwise, of e-cigarettes, to guide appropriate policy-making concerning these products.

Supplementary Material

Supplementary File 1 can be found online at http://www.ntr.oxfordjournals.org

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Declaration of Interests

None declared.

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