Change in smoking intentions of university students in New Zealand following simulated cigarette price increases: results of the first of two cross-sectional surveys

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ABSTRACT

AIM: Increasing cigarette prices is one of the most effective strategies to reduce smoking. This study examined changes in smoking intentions of university students following simulated price increases.

METHOD: Data came from a 2018 cross-sectional survey of university students. The sample comprised 187 current smokers (47% aged <21 years, 53% ≥21 years; 60% male, 40% female; 10% Māori, 90% non-Māori and 18% current vapers). Students were asked how their smoking behaviour would change if the price of a packet of their regular cigarettes or RYO tobacco was increased by $5.00, $10.00, $15.00 or >$15.00.

RESULTS: The proportion of students who would smoke the same amount declined substantially, while students who would switch to e-cigarettes increased by large margins at price increases of $5.00, $10.00 and $15.00. Quit intentions increased at all price levels, but were stronger among younger students and females. Males were almost twice as likely to switch to e-cigarettes as females. Overall, more students would quit than switch to e-cigarettes.

CONCLUSION: Results show that increasing cigarette prices by ≥$15.00 per packet could lead to significant reductions in smoking among university students. Follow-up data is required to assess the differential effects of price increases on vaping.

Smoking remains one of the leading causes of preventable death and illness in New Zealand and elsewhere. Each year about 5,000 people in New Zealand die because of smoking or second-hand smoke exposure. Further, smoking is also a major contributor to mortality differences between Māori and non-Māori non-Pacific people (New Zealand European), with Māori having disproportionately high mortality rates compared with non-Māori.

Data from the New Zealand Health Survey show that in 2018/2019, 14.2% of adults aged 15 years or older were current smokers (ie, smoked at least once a month) and the smoking prevalence was highest among Māori compared with non-Māori (Māori 34%, Pasifika 24.4%, New Zealand European/Other 12.4%, Asian 8.4%). The smoking prevalence of young adults aged 18–24 years was 19.2% in the general population and 11.1% among university students.
The New Zealand Government has a goal of becoming a smokefree nation by the year 2025 (ie, the Smokefree 2025 goal). The definition of ‘smokefree’ here is generally considered to be five percent or less of the adult population (ages 15 years or older) smoking. The goal was informed by the need to reduce the health and economic burden of smoking for the population, particularly Māori. Since its inception in 2011, the Government has introduced a number of measures to reduce smoking, including annual tobacco tax increases, restrictions on tobacco display in retail outlets and smokefree prisons, among others.

Increasing the price of cigarettes is an integral part of New Zealand’s comprehensive tobacco control programme and is considered one of the most effective tobacco control measures. Evidence suggests that higher prices prevent smoking initiation among youth; promote cessation; reduce the number of ex-smokers who return to smoking, and lower consumption among youth and adults who continue to smoke. Young adults (aged 18–24) are a crucial demographic for both the tobacco industry and tobacco control; it is therefore important to consider the potential impact of high prices on smoking among this demographic.

This paper examines changes in smoking intentions of university students following a simulated four-level cigarette price increase. The author tests a number of hypotheses, including that increasing proportions of students would: 1) cut down on smoking, 2) switch to other tobacco products, 3) switch to electronic cigarette (e-cigarette), 4) quit smoking, as cigarette prices increase.

Method

Data came from the first of two cross-sectional surveys of university students from eight New Zealand universities. The survey was conducted between 1 March and 1 May 2018 as part of the author’s PhD thesis project and collected data on the prevalence and patterns of cigarette smoking and electronic cigarette use, and perceptions on the Smokefree 2025 goal. Students enrolled at any university in New Zealand were eligible to participate. The project was advertised online (student association Facebook pages and magazines) and in-person by research assistants (RAs) from participating universities. Online adverts included a link to the questionnaire, while RAs distributed and collected paper questionnaires. Random sampling was not possible because of lack of access to complete enrolment lists of students from the universities. Participation was voluntary and participants were required to consent before proceeding to complete the questionnaire, which took about five minutes. Additional information on the survey, sample and procedures used has been described elsewhere.

Participants

A total of 2,180 participants took part in the survey: 46 were excluded because they were not eligible to participate and 280 were excluded because they did not have complete data for weighting. Of the remaining 1,854 participants, 187 were current smokers (ie, smoked at least once a month) and their data (demographic characteristics and smoking intentions) were included in the current paper (Figure 1 summarises the selection process).

Survey measures

Participants were asked: “How would your smoking change (if at all) if the price of a packet of your regular cigarettes or roll your own (RYO) tobacco was increased by $5.00, $10.00, $15.00 or >$15.00?” The response options were as follows: “I would smoke the same amount that I smoke today”; “I would smoke less than I smoke today”; “I would switch to other tobacco products”; “I would switch to electronic cigarette (e-cigarette)”; “I would stop smoking cigarettes altogether”, and “Don’t know”.

Data analysis

Data analysis was done descriptively using IBM SPSS Statistics 25 and the results reported as overall proportions, and by age and gender with associated 95% confidence intervals (CI). Responses were weighted to account for undersampling and oversampling based on gender (male and female) and university size.

Ethics approval

The University of Canterbury Human Ethics Committee approved the study (research ethics ID: HEC 2017/42/LR-PS).
Results

One hundred and eighty-seven students were included: 47% aged <21 years, 53% aged 21 or older (≥21 years); 60% male, 40% female; 10% Māori, 90% non-Māori, and 18% currently vaped (ie, used an e-cigarette at least once a month).

The smoking intentions of participants according to simulated price increases are displayed in Table 1 and Figure 2. The proportion of students who indicated that they would continue to smoke the same amount declined, while the proportion of students who indicated that they would switch to e-cigarettes increased at all price levels. The proportion of students who indicated that they would quit increased by large margins at all price levels.

Table 2 presents the results of changes in smoking intentions by age and gender, focusing on switching to e-cigarettes and quitting. The proportion of students who indicated that they would quit increased with increasing prices, in both age groups and gender. These increases were stronger in younger students (<21 years) than in older students (≥21 years), and in females than in males. The proportions of students who indicated that they would switch to e-cigarettes increased by large margins across age groups and among males for the first three price levels ($5.00, $10.00 and $15.00), but overall, more students indicated that they would quit rather than switch to e-cigarettes.
Table 1: Change in smoking intentions following simulated cigarette price increases of $5.00, 10.00, 15.00 or >15.00 per packet.

<table>
<thead>
<tr>
<th>Intentions to smoke</th>
<th>$5.00</th>
<th>$10.00</th>
<th>$15.00</th>
<th>&gt;$15.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would smoke the same amount that I smoke today</td>
<td>55.1 (47.0–63.0)</td>
<td>25.8 (19.2–33.3)</td>
<td>18.7 (12.9–25.8)</td>
<td>17.9 (12.1–24.9)</td>
</tr>
<tr>
<td>I would smoke less than I smoke today</td>
<td>33.5 (26.2–41.5)</td>
<td>40.9 (33.2–48.9)</td>
<td>20.0 (14.0–27.2)</td>
<td>15.2 (9.9–22.0)</td>
</tr>
<tr>
<td>I would switch to other tobacco products</td>
<td>2.5 (0.7–6.4)</td>
<td>13.2 (8.4–19.5)</td>
<td>16.8 (11.3–23.6)</td>
<td>7.3 (3.7–12.7)</td>
</tr>
<tr>
<td>I would switch to e-cigarettes</td>
<td>1.9 (0.4–5.4)</td>
<td>7.5 (4.0–12.8)</td>
<td>18.7 (12.9–25.8)</td>
<td>19.9 (13.8–27.1)</td>
</tr>
<tr>
<td>I would stop smoking cigarettes altogether</td>
<td>7.0 (3.5–12.1)</td>
<td>11.9 (7.4–18.0)</td>
<td>26.5 (19.7–34.1)</td>
<td>39.1 (31.2–47.3)</td>
</tr>
<tr>
<td>Total</td>
<td>158 (100.0)</td>
<td>159 (100.0)</td>
<td>155 (100.0)</td>
<td>151 (100.0)</td>
</tr>
</tbody>
</table>

Discussion

The findings indicate that increasing cigarette prices by $15.00 or more per packet would lead to substantial reductions in cigarette consumption, increase switching to e-cigarettes, and promote quitting. These findings are consistent with previous research that regards high prices as the most effective single intervention to reduce smoking.8,11–13 Consistent with previous studies, the findings also suggest that the impact of higher prices is likely to be felt more strongly by younger smokers than older smokers,15–18 and by female smokers than male smokers.15

Figure 2: Change in smoking intentions following simulated cigarette price increases of $5.00, 10.00, 15.00 or >15.00 per packet.

Note: To plot a linear scale, cigarette price indicated as >$15.00 was assumed to be $20.00.
Table 2: Change in smoking intentions following simulated cigarette price increases of $5.00, 10.00, 15.00 or >15.00 per packet; by age and gender.

<table>
<thead>
<tr>
<th>Price increase per packet of cigarettes or RYO tobacco</th>
<th>Smoking intentions</th>
<th>Age (years)</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt;21 (%)</td>
<td>≥21 (%)</td>
</tr>
<tr>
<td>$5.00</td>
<td>I would switch to e-cigarettes</td>
<td>1.5 (0.0–7.9)</td>
<td>2.2 (0.3–7.9)</td>
</tr>
<tr>
<td></td>
<td>I would stop smoking</td>
<td>8.8 (3.3–18.2)</td>
<td>5.6 (1.9–12.6)</td>
</tr>
<tr>
<td>$10.00</td>
<td>I would switch to e-cigarettes</td>
<td>8.2 (3.1–17.0)</td>
<td>7.1 (2.6–14.7)</td>
</tr>
<tr>
<td></td>
<td>I would stop smoking</td>
<td>19.2 (10.9–30.1)</td>
<td>5.9 (1.9–13.2)</td>
</tr>
<tr>
<td>$15.00</td>
<td>I would switch to e-cigarettes</td>
<td>21.4 (12.5–32.9)</td>
<td>16.7 (9.4–26.4)</td>
</tr>
<tr>
<td></td>
<td>I would stop smoking</td>
<td>38.6 (27.2–51.0)</td>
<td>15.5 (8.5–25.0)</td>
</tr>
<tr>
<td>&gt;$15.00</td>
<td>I would switch to e-cigarettes</td>
<td>21.1 (12.3–32.4)</td>
<td>20.0 (11.9–30.4)</td>
</tr>
<tr>
<td></td>
<td>I would stop smoking</td>
<td>50.7 (38.6–62.8)</td>
<td>30.0 (20.3–41.3)</td>
</tr>
</tbody>
</table>

A 2014 study of New Zealand smokers that looked at simulated demand for tobacco cigarettes in the presence and absence of e-cigarette availability found that demand for regular cigarettes at ‘current’ market prices decreased by 42.8% when e-cigarettes were available. This supports one of the current paper’s findings that increasing proportions of smokers intended to switch to e-cigarettes as prices increased. Two studies concluded that e-cigarettes were potentially substitutable for regular cigarettes and another found that a 10% increase in cigarette prices was associated with a 40% increase in e-cigarette sales.

An interesting finding in this paper is that more students would quit than switch to e-cigarettes when cigarette prices go up. This significant finding warrants follow-up data to establish a clear picture of the differential effects of increasing cigarette prices on vaping. If confirmed, it may imply that smokers in this population group (university students) have low nicotine addiction or are less interested in vaping, or both. It could also mean that e-cigarettes might not after all, discourage quitting as previously feared by some health experts.

This study provides useful evidence for the likely impacts higher cigarette price increases on smoking might have on university students and possibly other tertiary students (institutes of technology, polytechnics, wānanga, etc). Compared with individuals who do not have a tertiary education, tertiary students are more likely to be lighter smokers to be aware of e-cigarettes and to have tried vaping. Combined, these factors might make tertiary students (in general) more responsive to cigarette price increases. Thus, while the findings support research hypotheses (reductions in smoking; increased switching to vaping, and increased quitting, when prices increase), actual behaviour changes may be influenced by nicotine dependence and knowledge and use of tobacco alternatives such as e-cigarettes.
Limitations
This study is subject to a number of limitations. The survey (source of data) did not employ random sampling, which may increase the risk for volunteer bias. This bias could lead to underestimation or overestimation of prevalence estimates. However, data were weighted by gender and university size to make it more representative of the university student population. Secondly, the small sample size (and smaller sub-groups) did not allow for significance tests to be performed. Confidence intervals for estimates were provided to supplement reported estimates. Lastly, the question used in this study had not previously been validated.

Conclusion
These results suggest that raising the price of cigarettes or RYO tobacco by $15.00 or more per packet above regular retail prices could result in significant numbers of students cutting down on smoking, switching to e-cigarettes or quitting altogether thus advancing public health. However, repeat data are necessary to establish a clear picture of the differential effects of cigarette price increases on switching to vaping.

Competing interests:
Nil.

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