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Brief report
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The Use of Cigarette Package Inserts to Supplement Pictorial Health Warnings: An Evaluation of the Canadian Policy

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Abstract

Background: Canada is the first country in the world to require cigarette manufacturers to enclose package inserts to supplement the exterior pictorial health warning label (HWL). In June 2012, Canada implemented new HWL package inserts that include cessation tips accompanied by a pictorial image. This study aims to assess the extent to which adult smokers report reading the newly mandated HWL inserts and to see whether reading them is associated with making a quit attempt.
Methods: Data were analyzed from an online consumer panel of Canadian adult smokers, aged 18–64 years. Five waves of data were collected between September 2012 and January 2014, separated by 4-months intervals (n = 1,000 at each wave). Logistic generalized estimating equation (GEE) models were estimated to assess correlates of reading inserts and whether doing so is associated with making a quit attempt by the subsequent wave.
Results: At each wave, between 26% and 31% of the sample reported having read HWL package inserts at least once in the prior month. Smokers who read them were more likely to be younger, female, have higher income, intend to quit, have recently tried to quit, and thought more frequently about health risks because of warning labels. In models that adjusted for these and other potential confounders, smokers who read the inserts a few times or more in the past month were more likely to make a quit attempt at the subsequent wave compared to smokers who did not read the inserts.
Conclusions: HWL package inserts with cessation-related tips and messages appear to increase quit attempts made by smokers.

Introduction

Canada was the first country to implement pictorial health warning labels (HWLs) on tobacco packaging in 2000. Many countries have since followed the Canadian example and either have or plan to have pictorial warnings on cigarette packs. Pictorial warnings have been shown to be more effective than text-only warnings in increasing consumer understanding of smoking-related risks and promoting cessation.[1–4] Thus, while the content, size, number, location, and

rotation periods for pictorial warnings differs across the world, the growing number of countries to implement these warnings represents significant progress in global tobacco control.

The printing of pictorial warnings on the exterior of the cigarette package is not the only way to communicate with consumers. Cigarette manufacturers have often utilized package onserts and inserts to communicate with consumers, typically offering promotions and discounts on products. Since 2000, Canada was also the only country to supplement external pack warnings with text only package inserts that disseminate cessation related messages. In June 2012, Canada implemented eight new rotating HWL package inserts with colored graphics to replace the text only inserts (http://www.tobaccolabels.ca/countries/canada). These HWL package inserts were also enhanced in terms of content. They provide behavioral recommendations for quitting and emphasize the benefits of quitting. This additional information goes beyond the basic provision of a quitline number and/or cessation website as mandated by some countries as part of their graphic health warnings. The new inserts contrast with the loss-framed pictorial warnings on the pack exteriors in Canada, providing messages that are consistent with communication recommendations that suggest that fear-arousing messages should be followed by behavioral recommendations to help escape the source of the fear.[5] However, the added impact of these inserts, if any, has not yet been assessed.

The current study explores the extent to which adult smokers report reading the newly mandated HWL package inserts and whether reading the inserts is associated with making a quit attempt.

Methods

Sample

Data were analyzed from an online consumer panel of Canadian adult smokers aged 18–64 years, provided by Global Market Insights (GMI: www.gmi-mr.com). Recruitment of participants involved sending invitation emails to panel participants of eligible age and who were known smokers, as well as from general population samples for which smoking status was unknown. Eligibility criteria included having smoked at least once in the prior month and at least 100 cigarettes in their lifetime. Participants were followed over time. Follow up procedures involved sending invitation emails to respondents who had previously participated in the survey in earlier waves. Those include respondents who continued to smoke as well as respondents who have quit smoking. Data were collected in September 2012 (Wave I), January 2013 (Wave II), May 2013 (Wave III), September 2013 (Wave IV) and January 2014 (Wave V). The sample was replenished with smokers to maintain a sample size of 1,000 participants at each wave. Follow-up rates were 58% from Wave I to Wave II, 57% from Wave II to Wave III and from Wave III to Wave IV, and 66% from Wave IV to Wave V.

Measures

Reading HWL Package Inserts

At each wave, participants were asked: "In the last month, how often have you read the health warnings on the inside of cigarette packs?" with response options "not at all," "once," "a few times," "often," and "very often."

Quit Attempts

At each wave, participants were asked if they tried to quit in the prior four months, with positive responses coded as 1 and negative responses coded as 0. Participants who responded "don't know" (n = 31 out of 4,873 observations) were also coded as 0.

Covariates

Socio-demographic variables were indicator coded and included sex, age (18–24; 25–34; 35–44; 45–54; 55–64), race (White vs. non-White), educational attainment (high school or less; some college or university; completed university or higher), and annual household income ($29,999 or less; $30,000 to $59,999; $60,000 or more). Smoking-related variables included intention to quit within the next six months (yes = 1, no = 0); daily or non-daily cigarette consumption, and heaviness of smoking index (HSI) (range 0–6) that was constructed using number of cigarettes per day and time to first cigarette.[6] Additional covariates included self-efficacy to quit and cognitive response to HWLs. Self-efficacy to quit was measured with the question "if you decided to give up smoking completely in the next 6 months, how sure are you that you would succeed?". Responses "not at all," "a little," and "moderately" were coded as low/moderate self-efficacy and responses "very" and "extremely" were coded as high self-efficacy. Cognitive response to HWLs was assessed with the question "To what extent do the warning labels on cigarette packages make you think about the health risks of smoking?", adapted from prior research that showed the predictive validity of the variable.[7] Responses ranged from "not at all" to "extremely" on a 9-point scale and were categorized into tertiles (low, moderate, high) cognitive response. To adjust for potential effects from prior participation in the study, a variable was created to indicate the number of waves in which the participant was involved (range 1–5), with a higher number indicating more time in the sample.

Analysis

All analyses were conducted using Stata version 13. We began with descriptive statistics of the full sample. First, participants were classified into whether they did or did not report reading HWL package inserts in the prior month and unadjusted and adjusted logistic generalized estimating equation (GEE) models were estimated to examine correlates of reading package inserts. Then, participants were classified into those who reported not reading package inserts, those who read the inserts only once, and those who read the inserts at least few times in the prior month. To examine whether reading HWL package inserts was associated with making a quit attempt at a subsequent wave, we ran unadjusted and adjusted logistic GEE models regressing quit attempt at time $t + 1$ on the frequency of reading the package inserts in the last month at time t. The analytic subsample for this analysis (n = 2,252 observations) included only participants who were followed up for at least two successive waves. All GEE models adjusted for the following potential confounders measured at time t: age, sex, race, education, income, daily versus nondaily cigarette consumption, nicotine dependence (measured by HSI), quit intention, prior quit attempt, wave of survey administration, time in sample, cognitive response to HWLs, and perceived self-efficacy to quit.

Results

Sample Characteristics

Table 1 presents sample characteristics (n = 4,805 observations, n = 2,692 people). Fifty six percent of the sample were females and 32% had high school education or less. Approximately half of the sample had no intention to quit within the next six months and had

Table 1. Sample and Subsample Characteristics, Wearout Study, Canada, Wave 1–5

	Analytic sample (n = 4,805)	Analytic subsample (n = 2,252)
Age		
18–24	12%	8%
25–34	22%	20%
35–44	22%	21%
45–54	21%	24%
55–64	22%	27%
Gender		
Male	44%	48%
Female	56%	52%
Race		
White	85%	86%
Non-White	15%	14%
Education		
High school or less	32%	29%
College or some university	45%	44%
Completed university or higher	23%	27%
Income		
$29,999 or less	26%	25%
$30,000–59,999	32%	30%
$60,000 or more	42%	45%
Heaviness of smoke index	2.36 (2.32)	2.52 (1.53)
Cigarette consumption		
Nondaily	18%	17%
Daily	82%	83%
Quit intention in next six months		
No	56%	58%
Yes	44%	42%
Quit attempt in the past four months		
No	59%	62%
Yes	41%	38%
Time in sample		
1 wave	54%	0%
2 waves	23%	49%
3 waves	12%	27%
4 waves	7%	15%
5 waves	4%	9%

Note. Heaviness of smoke index: mean (*SD*), (range 0–6).

not attempted to quit in the prior four months. About 82% were daily smokers. Characteristics of those included in the analytic subsample to predict quit attempts at the subsequent wave (n = 2,252) are also presented in Table 1.

Reading HWL Inserts in Cigarette Packs

At each wave, between 26% and 31% of the sample reported having read HWL inserts at least once in the prior month, with 9%–12% reporting having read HWL inserts once a month and 16%–19% reporting having read them a few times or more.

Table 2 shows the results from GEE model examining factors associated with reading package inserts. We observed that older smokers and females were less likely than 18–24 year-old smokers and males to read the inserts ($AOR_{35–44 \text{ vs. } 18–24}$ = 0.69, 95% CI = 0.53–0.91; $AOR_{45–54 \text{ vs. } 18–24}$ = 0.44, 95% CI = 0.33–0.59; $AOR_{55–64 \text{ vs. } 18–24}$ = 0.54, 95% CI = 0.40–0.72, and $AOR_{\text{female vs. male}}$ = 0.82, 95% CI = 0.70–0.97). Non-White participants were more likely to read HWL package inserts (AOR = 1.49, 95% CI = 1.20–1.85) compared to White participants. Those with higher income were more likely to have read inserts at least once in the past month ($AOR_{\$30,000–\$59,999 \text{ vs. } \$29,999 \text{ or less}}$ = 1.24, 95% CI = 1.01–1.52; $AOR_{\$60,000 \text{ or more vs. } \$29,999 \text{ or less}}$ = 1.26, 95% CI = 1.03–1.54). Relatively higher HSI was associated with greater odds of reading inserts, but only in the adjusted model (AOR = 1.11, 95% CI = 1.05–1.18). Furthermore, in both unadjusted and adjusted models, reading inserts was more likely among those who intended to quit ($AOR_{\text{yes vs. no}}$ = 1.23, 95% CI = 1.04–1.43), had recently tried to quit ($AOR_{\text{yes vs. no}}$ = 1.30, 95% CI = 1.10–1.53), and had stronger cognitive responses to health warning labels ($AOR_{\text{moderate vs. low cognitive response}}$ = 2.51, 95% CI = 2.06–3.05; $AOR_{\text{high vs. low cognitive response}}$ = 4.60, 95% CI = 3.82–5.53).

Reading HWL Package Inserts and Quit Attempts

As shown in Table 3, a third (33%) of those who did not read HWL inserts tried to quit by the subsequent wave, whereas 50% of those who read HWL inserts once and 59% of those who had read them a few times or more had tried to quit. In the fully adjusted GEE model, we found statistically significant relationship between reading the HWL package inserts and making a quit attempt at the subsequent wave (Table 3). Those who have read the inserts few times or more in the prior month were more likely to make a quit attempt at the subsequent wave compared to those who never read the inserts ($AOR_{\text{few times or more vs. not at all}}$ = 1.57, 95% CI = 1.16–2.11). In this fully adjusted model, age, sex, race, income, wave of data collection, time in sample, and self-efficacy to quit were not associated with making a quit attempt at a subsequent wave. However, higher education ($AOR_{\text{university vs. high school or less}}$ = 1.43, 95% CI = 1.05–1.96), cigarette consumption ($AOR_{\text{daily vs. nondaily}}$ = 0.53, 95% CI = 0.37–0.75), quit intention ($AOR_{\text{yes vs. no}}$ = 2.21, 95% CI = 1.75–2.80), prior quit attempts ($AOR_{\text{yes vs. no}}$ = 4.81, 95% CI = 3.72–6.22), and cognitive response to pictorial warnings ($AOR_{\text{high vs. low cognitive response}}$ = 1.47, 95% CI = 1.13–1.92) were all associated with making a quit attempt at a subsequent wave.

Sensitivity Analysis

Because data for the current study were from unknown sampling frame that may not be representative of the general population of smokers in Canada, we created weights to weight the data to sex, age, and educational profiles of nationally representative data on smokers in Canada. In a sensitivity analysis, all models reported in this paper were estimated again while adjusting for the weights. The pattern of results from each model was similar in direction, magnitude, and significance to the results presented in our tables and would not have changed any of our conclusions (results are not presented and available on request).

Discussion

This study suggests that Canadian smokers who read cigarette package inserts are more likely to try to quit, even after controlling for traditional predictors of cessation and cessation-related responses to pictorial warning labels. The frequency of reading inserts appeared relatively stable over time, with 25%–31% of our sample reading inserts at least once in the prior month. Package inserts have the potential for reaching large numbers of smokers because they are included with all factory-made cigarette packs and that so many smokers regularly attend to these messages suggests that their population-level impact may be significant. Not surprisingly, not all smokers report paying attention to health messages on packs, whether via inserts or prominent pictorial warnings at a given point

Table 2. Unadjusted and Adjusted Odds Ratios of Reading Cigarette Package Inserts, Canada, Wave 1–5

		Unadjusted (n = 4,805)		Adjusted[a] (n = 4,540)	
	%	*OR*	(95% CI)	*AOR*	(95% CI)
Age					
18–24	39	1	–	1	–
25–34	35	0.81	(0.65–1.02)	0.79	(0.62–1.02)
35–44	30	0.67**	(0.53–0.85)	0.69**	(0.53–0.91)
45–54	21	0.41***	(0.31–0.53)	0.44***	(0.33–0.59)
55–64	21	0.42***	(0.33–0.55)	0.54***	(0.40–0.72)
Sex					
Male	29	1	–	1	–
Female	27	0.86	(0.74–1.00)	0.82*	(0.70–0.97)
Race					
White	26	1	–	1	–
Non-White	41	1.81***	(1.49–2.20)	1.49***	(1.20–1.85)
Education					
High school or less	29	1	–	1	–
College or some university	24	0.76**	(0.64–0.89)	0.75**	(0.63–0.90)
Completed university+	37	1.26*	(1.03–1.54)	1.11	(0.88–1.40)
Income					
$29,999 or less	24	1	–	1	–
$30,000–59,999	29	1.17	(0.97–1.14)	1.24*	(1.01–1.52)
$60,000 or more	30	1.22*	(1.01–1.46)	1.26*	(1.03–1.54)
Heaviness of smoke index		0.99	(0.94–1.03)	1.11***	(1.05–1.18)
Cigarette consumption					
Nondaily	33	1	–	1	–
Daily	27	0.88	(0.75–1.04)	1.08	(0.87–1.33)
Quit intention					
No	23	1	–	1	–
Yes	36	1.58***	(1.39–1.80)	1.23*	(1.04–1.43)
Quit attempts					
No	22	1	–	1	–
Yes	39	1.68***	(1.47–1.92)	1.30**	(1.10–1.53)
Wave					
1	31	1	–	1	–
2	26	0.80**	(0.68–0.93)	0.75*	(0.60–0.93)
3	28	0.86	(0.73–1.01)	0.90	(0.72–1.12)
4	30	0.92	(0.78–1.09)	0.94	(0.75–1.19)
5	27	0.82*	(0.69–0.98)	0.87	(0.67–1.11)
Time in sample					
1 wave	30	1	–	1	–
2 waves	27	0.89	(0.78–1.01)	1.01	(0.84–1.20)
3 waves	25	0.83*	(0.70–0.97)	0.86	(0.68–1.08)
4 waves	29	0.96	(0.78–1.18)	0.95	(0.71–1.28)
5 waves	26	0.82	(0.62–1.08)	0.81	(0.55–1.19)
Cognitive responses to HWLs					
Low	11	1	–	1	–
Moderate	31	2.68***	(2.23–3.22)	2.51***	(2.06–3.05)
High	42	5.00***	(4.21–5.93)	4.60***	(3.82–5.53)
Self efficacy to quit					
Low/moderate	27	1	–	1	–
High	33	1.15*	(1.001–1.33)	1.01	(0.86–1.19)

Note. AOR = adjusted odds ratio; HWL = health warning label; OR = odds ratio.

[a]Adjusted model includes all variables shown in the table.

*p < .05; **p < .01; ***p < .001.

in time. However, with repeated exposures there is a greater chance that smokers will respond to the health information. An encouraging finding from this study is that there is no evidence for wear-out of attention toward package inserts, which suggests that their impact may be sustainable over time.

Future research should examine the relationship between individual-level changes in attention to inserts and quit behavior, as inserts may become particularly important as smokers contemplate quitting. Inserts could influence quitting by enhancing self-efficacy to quit, and we found a significant correlation between self-efficacy and reading inserts; however, the directionality of this association was not clear, and its statistical significance was not maintained when we controlled for socio-demographics and smoking-related behavior. We found some evidence that smokers with relatively higher income

Table 3. Unadjusted and Adjusted Odds Ratios of Trying to Quit by Follow-Up

		Unadjusted (n = 2,252)		Adjusted[a] (n = 2,058)	
	%	*OR*	(95% CI)	*AOR*	(95% CI)
Read HWL inserts					
Not at all	33	1	–	1	–
Once	50	1.42*	(1.08–1.86)	1.23	(0.86–1.75)
Few times/often/very often	59	1.89***	(1.50–2.39)	1.57**	(1.16–2.11)
Age					
18–24	53	1	–	1	–
25–34	53	0.94	(0.65–1.35)	1.02	(0.64–1.61)
35–44	41	0.63*	(0.42–0.92)	0.75	(0.47–1.21)
45–54	35	0.51**	(0.34–0.74)	0.71	(0.44–1.14)
55–64	33	0.45***	(0.30–0.66)	0.66	(0.41–1.05)
Sex					
Male	42	1	–	1	–
Female	40	0.88	(0.71–1.09)	0.88	(0.70–1.10)
Race					
White	39	1	–	1	–
Non-White	50	1.49**	(1.14–1.95)	0.98	(0.72–1.34)
Education					
High school or less	37	1	–	1	–
College or some university	37	1.08	(0.85–1.36)	1.00	(0.77–1.30)
Completed university+	52	1.72***	(1.30–2.30)	1.43*	(1.05–1.96)
Income					
$29,999 or less	36	1	–	1	–
$30,000–59,999	41	1.18	(0.92–1.52)	1.07	(0.81–1.41)
$60,000 or more	42	1.24	(0.97–1.59)	0.89	(0.67–1.16)
Heaviness of smoke index		0.84***	(0.79–0.89)	0.98	(0.90–1.06)
Cigarette consumption					
Nondaily	62	1	–	1	–
Daily	35	0.45***	(0.36–0.57)	0.53***	(0.37–0.75)
Quit intention					
No	24	1	–	1	–
Yes	61	2.91***	(2.38–3.56)	2.21***	(1.75–2.80)
Prior quit attempt					
No	20	1	–	1	–
Yes	72	7.69***	(6.14–9.64)	4.81***	(3.72–6.22)
Wave					
1	42	1	–	1	–
2	42	1.05	(0.88–1.25)	1.07	(0.74–1.56)
3	39	0.98	(0.80–1.19)	0.92	(0.64–1.33)
4	41	1.05	(0.86–1.28)	1.07	(0.74–1.54)
Time in sample					
2 waves	39	1	–	1	–
3 waves	42	1.11	(0.96–1.28)	1.15	(0.83–1.57)
4 waves	41	1.04	(0.86–1.26)	1.19	(0.83–1.73)
5 waves	45	1.11	(0.88–1.40)	1.13	(0.71–1.78)
Cognitive response to HWLs					
Low	28	1	–	1	–
Moderate	34	1.28*	(1.02–1.62)	0.86	(0.64–1.15)
High	57	2.36***	(1.89–2.95)	1.47**	(1.13–1.92)
Self efficacy to quit					
Low/moderate	36	1	–	1	–
High	50	1.52***	(1.27–1.81)	1.11	(0.87–1.43)

Note. AOR = adjusted odds ratio; HWL = health warning label; OR = odds ratio.

[a]Adjusted model adjusts for all variables shown in the table.

*p < .05; **p < .01; ***p < .001.

were somewhat more likely to read inserts than those with low income. This pattern of results differs from what has been found for pictorial warnings, for which effects may be stronger among smokers with relatively lower educational attainment.[2,3,8] Future research should determine what cessation messaging works best amongst more disadvantaged groups where smoking is concentrated. Nevertheless, our models predicting subsequent cessation attempts controlled for income and education, suggesting that reading inserts help with cessation independent of these and other important cessation predictors.

Our study has several limitations. Self-reported reading of inserts may be biased. We did not find a time-in-sample effect for reporting reading inserts, suggesting that prior participation in our survey does not condition participants to be more attentive to them. Due to the small number of smokers who successfully quit over the study period, we could not adequately study successful quit behavior. Future research should focus on quit success to better gauge the public health impact of insert, although prior quit attempts also predict future quit success. Although our sample was purposefully selected to represent the general population, we cannot ascertain the generalizability of our results because participants did not come from a clearly defined sampling frame. Study ineligibility due to lack of internet use may not have substantially biased results, as 82% of Canadians are internet users,[9,10] but smoking prevalence is higher among low socioeconomic groups and it is this group that is least likely to have internet access. If smokers from low socioeconomic groups are less responsive to inserts, then we likely overestimated the population-level effects of inserts on cessation.

In spite of these limitations, this study suggests that cigarette package inserts with cessation-related tips and messages may enhance the efficacy of pictorial warning labels. Governments should consider their integration into warning label policies.

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Declaration of Interests

None declared.

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