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RESEARCH ARTICLE

The Impact of Calorie Menu Labeling on Disordered Eating and Related Psychosocial Outcomes: A Longitudinal Study Among Young Adults in Canada

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Introduction: Calorie menu labeling policies are increasingly popular worldwide; however, concerns have been raised about the potential of calorie labels to worsen disordered eating and overall psychosocial wellbeing. This study aimed to investigate the potential unintended consequences of calorie menu labeling interventions on psychosocial wellbeing among young Canadian adults.

Methods: A natural experiment was conducted using longitudinal data from 3 waves of the Canada Food Study (N=2,327, ages 16–30 years). Multiple imputations were performed to mitigate missing data and attrition across waves. Repeated-measures logistic models with difference-in-difference analysis assessed changes over time for 11 outcomes, including disordered eating, internalized weight bias, experienced weight discrimination, and indicators of psychosocial wellbeing across 4 provinces: Ontario (mandatory calorie labeling) and Alberta, Quebec, and Nova Scotia (no labeling policy).

Results: At baseline, 14% of the sample were at risk of disordered eating. Approximately half reported worrying about becoming fat (48%), and nearly one fifth experienced weight discrimination in the past year (19%). The implementation of a calorie menu labeling policy did not significantly increase the adjusted odds of disordered eating, internalized weight bias, experienced weight discrimination, nor other indicators of mental health.

Conclusions: The findings of this study contribute to the scarce literature assessing trends in disordered eating and psychosocial wellbeing in the ever-changing context of nutrition policy. The implementation of a mandatory calorie menu labeling policy in Ontario did not seem to elicit disordered eating among young adults, although the impact on people with pre-existing disordered eating and eating disorders is unknown.

INTRODUCTION

Nutrition labeling on menus has gained traction worldwide as a means of supporting healthy eating.[1,2] Menu labels draw attention to characteristics of foods and beverages at the point of purchase using numeric information (e.g., caloric, sodium, sugars, or saturated fats content) or interpretive images to represent the healthfulness of the food (e.g., traffic light labeling, high in designations).[1,3] Labels are intended to inform consumer decisions and encourage food industry transparency and reformulation efforts.[4] There is a growing focus on calorie labels at the point of purchase, with mandatory calorie labeling policies introduced in a number of jurisdictions.[5] The Canadian

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province of Ontario was the first and only province to implement the policy, which mandates calorie labels in chains with 20 or more locations in January 2017.[3] Calorie labeling has been shown to increase noticing and use of nutrition information, especially among women, individuals with higher health literacy, and those who report dieting to lose weight.[6]

Concerns have been raised about the potential for calorie labeling to elicit unintended consequences for disordered eating (DE); harmful weight-related attitudes and behaviors (e.g., severe weight and shape concerns, caloric restriction, self-induced vomiting)[7]; as well as related constructs such as body dissatisfaction, internalized weight biases, and food-related mental distress.[8–12] Each of these constructs is associated with increased risk of eating disorders, which severely impact quality of life and have a high case mortality rate.[13,14] It is hypothesized that the widespread presence of calorie labels on restaurant menus may exacerbate eating pathology directly by heightening individuals' preoccupation with calories and anxiety surrounding food choices[15] and indirectly by emphasizing individual agency in food choices and reinforcing the negative weight-related beliefs (i.e., weight bias) that drive weight discrimination.[16]

To date, evidence on the potential for weight-related initiatives such as calorie menu labeling to elicit negative consequences related to eating disorders is limited to studies conducted in experimental settings[9,10,17,18] and sheds little light on the real-world impact of labeling policies. One experimental campus-based study found that the introduction of calorie labels did not worsen eating pathology,[10] although hypothetical studies have found that individuals with eating pathology report greater use of labels[9] and that individuals with eating disorders report ordering significantly fewer or more calories than individuals without eating disorders, depending on their diagnosis.[17] Qualitative and mixed-methods investigations in Canada, the United Kingdom, and the U.S. have identified concerns about eating disorders with respect to calorie labeling, including worsened body image, increased food shame and guilt, and the facilitating role of labels (e.g., using labels as a tool to support restriction).[11,16,19–21]

Given the public health burden of DE,[22] it is critical to evaluate the unintended consequences of nutrition policies, such as calorie labeling, on DE risk. To address this gap in the literature and inform future policy efforts, a difference-in-differences analysis was conducted to examine the associations between the implementation of a mandatory calorie labeling policy and the prevalence of DE, internalized weight bias, experienced weight discrimination, and associated indicators of psychosocial wellbeing among Canadian young adults—a critical age range in which DE peaks[23]—over 3 years. This natural experiment was conducted across jurisdictions without calorie labeling policies and those that introduced calorie labeling policies during the study period and, to the authors' knowledge, is the first quantitative study to evaluate the potential real-world impacts of calorie labeling on mental health.

METHODS

Study Sample

The Canada Food Study was a national cohort survey of youth and young adults (aged 16–30 years) that explored eating patterns and trends over time.[24] The study was reviewed by and received ethics clearance from the University of Waterloo Office of Research Ethics (#21631). All participants provided electronic consent.

In Wave 1 (October–December 2016), participants were recruited by research assistants through in-person intercept sampling at malls, transit hubs, parks, and other shopping districts in 5 urban centers (Edmonton, Alberta; Halifax, Nova Scotia; Montreal, Quebec; Toronto, Ontario; and Vancouver, British Columbia). Eligible participants resided in 1 of the 5 cities; were aged between 16 and 30 years; had access to the Internet and a laptop, desktop computer, or tablet; and had not previously been enrolled in the study.

Study sample recruitment details can be found in the Appendix (available online) and technical reports.[24,25] Three waves of data (2016, 2017, 2018) were used. The final data set included 3,000 respondents. Participants were excluded from this analysis if they had moved provinces between study waves (n=79) or if they were living in a nonstudy province (n=564) because the analyses relied upon them living in the same province across waves. Participants were also excluded if their gender identity changed across waves (n=37) to allow for comparisons across gender identity at follow-up. After exclusions, 2,327 (77.5%) participants were included in the final sample.

Measures

One province (Ontario) introduced a mandatory calorie menu labeling policy during the study period (January 2017, after Wave 1 data collection), which mandated that all food service establishments with at least 20 locations were required to display the amount of calories per item at the point of ordering/purchase.[3] Another province had voluntary labeling measures in place prior to the start of data collection (British Columbia) and was

thus excluded. The remaining provinces (Alberta, Nova Scotia, and Quebec) had no labeling policies. Thus, similar to previous research,[6] a single binary condition variable was created to identify participants' exposure to calorie labeling policy depending on their province of residence. The outcomes were compared across 2 conditions: mandatory labeling policy and no menu labeling policy. Provinces with no menu labeling legislation were considered the reference.

DE was assessed using a 3-item measure[26] that includes 1 attitudinal (preoccupation with thinness) item from the Eating Attitudes Test (EAT) and 2 behavioral (self-induced vomiting and binge eating) measures. For the attitudinal item, endorsement was indicated by a response of often, usually, or always being preoccupied with a desire to be thinner. For the behavioral items, endorsement was indicated by responses of ever engaging in self-induced vomiting in the past 3 months and binge eating once a month or more in the past 3 months.[26] This 3-item measure has higher specificity and better sensitivity than behavioral items alone when compared with more comprehensive measures such as EAT-26 or EAT-48.[26] In addition to examining single items, a binary composite variable was derived to identify participants who had no indication of DE and those who may have DE, as indicated by endorsement of the attitudinal and at least 1 behavioral item.[26]

A single item from the Body Image States Scale[27] was used to assess body dissatisfaction ("Right now I feel _____ with my body size and shape"). There were 9 potential response options ranging from extremely satisfied to extremely dissatisfied, which were collapsed into neutral/satisfied and dissatisfied to dichotomize the variable. Internalized weight bias was assessed using a single item from the Anti-Fat Attitudes Questionnaire regarding worry about becoming fat,[28] to which participant responses were categorized as neutral/disagree and agree, which were subsequently labeled no and yes, respectively. Weight discrimination was measured by asking participants how often they have been bullied or harassed, excluded, or treated unfairly because of their weight over the past 12 months, with any response other than never as indicative of experienced weight discrimination, similar to previous research.[29]

Single items querying experiences of anxiety and depression (categorized as yes or no within the last 12 months) were adopted from the Population Assessment of Tobacco and Health study.[30] Single items assessing life stress (*Thinking about the amount of stress in your life, would you say that most days are...* collapsed into *not at all/a bit stressful* and *very/extremely stressful*) and mental health (*In general, would you say your mental health is...* with categories collapsed into *poor/fair* and *good/excellent*) were derived from the Canadian Health Measures Survey.[31]

Age at baseline, gender identity, racial/ethnic identity, perceived income adequacy, and weight perception were identified as potential confounders on the basis of previous research demonstrating their associations with weight-related behaviors and nutrition information use.[9,32–34] Participants self-identified their gender identity[35]; those who identified as transgender men (n=2) and transgender women (n=2) on the original survey question were included in the man and woman categories, respectively. Racial/ethnic identity was measured using a question from the Canadian Community Health Survey[36] and classified into White, Chinese, South Asian, Black, Indigenous inclusive (includes multiracial), and multiracial/other; the latter category included participants who selected more than 1 race/ethnicity or did not respond to this item, to minimize missing data. Perceived income adequacy was assessed by asking, *Thinking about your total monthly income, how difficult or easy is it for you to make ends meet?* Responses were categorized as *difficult, neither easy nor difficult, easy*, or *don't know/refuse to answer*. Participants were also asked to identify whether they perceived themselves as underweight, just about right, or overweight.[36] Finally, participants self-reported their city and province of residence at each wave.

Statistical Analysis

Analyses were conducted using SAS (Version 9.4, SAS Institute, Cary, NC). Poststratification sample weights were constructed for the final sample by age and sex using population estimates from the Canadian Census[37] for each wave. For the descriptive statistics, sample weights for each year were applied in SAS using a weight statement. For the longitudinal analysis, sample weights were based on the characteristics at baseline compared with those at the 2016 census.

Descriptive statistics were generated for each outcome variable and confounders at each wave. Sensitivity analyses, by Rao-Scott chi-square tests of association and a cut off of $p<0.05$, were conducted to assess differences in confounders between participants in the analytic sample and those who were excluded.

Data were subject to whole-wave and within-wave missingness (i.e., there were missing data for variables of interest for individuals who had responses for all waves, and there were individuals lost to attrition), so multiple imputation methodology was used to retain all eligible participants in the analysis. Data were assumed to be missing at random. Multiple imputation is a robust method that addresses data missing at random by

replacing missing values with plausible values on the basis of responses to other observed items over several iterations.[38] Details about the multiple imputation process are included in the Appendix (available online).

For modeling each repeated-measures binary response, a population-averaged (marginal) model was applied using generalized estimating equations, with assumed binomial family, logit link function, and exchangeable correlation structure (details are provided in the Appendix, available online). Each model included the same confounders. Models were generated for each of the imputed data sets, and parameter estimates were pooled to account for between-imputation variance.[38] AOR and 95% CIs were calculated by exponentiating the pooled parameter estimates for each confounder and their confidence levels. A difference-in-differences analysis was conducted using the Delta method to calculate the SEs and CIs around the differences in the AORs between the mandatory labeling policy and no menu labeling policy conditions before and after the policy was put in place. The Benjamini–Hochberg procedure[39] was applied for the resulting *p*-values from all models to account for the false discovery rate using a conservative cut off of 0.05.

RESULTS

Sample characteristics are listed in Table 1. Sensitivity analyses revealed that the final sample (N=2,327) was marginally different from excluded individuals (*n*=673) on age ($p<0.001$), racial/ethnic identity ($p<0.001$), and income adequacy ($p<0.01$) (Table 1). Details about the assessment of missing data are included in the Appendix (available online).

Wave-specific estimates of each of the outcome variables of interest are displayed in Table 2. At baseline, approximately 14% of the sample had DE. Nearly one third of the sample had reported binge eating at least once in the past month (29%) and/or being preoccupied with thinness (30%). Over 71% of the sample were satisfied with their appearance, but nearly half reported worrying about becoming fat (48%), and nearly one fifth reported experiencing weight discrimination in the past year (19%).

In comparison with Wave 1, there were significant secular decreases in preoccupation with thinness (Waves 2 and 3) and binge eating (Wave 3) (Table 3). The province with the mandatory label policy had significantly higher odds of binge eating (AOR=1.37, 95% CI=1.08, 1.75) than the provinces with no policy, although the difference-in-differences estimates, assessing the difference in the odds of the outcome before and after implementation of the labeling policy compared with the difference in the no policy condition, were not statistically significant for any of the DE or weight-related outcomes (Table 3). There were also no significant differences in the change in outcomes before and after policy implementation between the 2 conditions for

Table 1. Baseline Characteristics of Weighted Sample of 2016 Canada Food Study, Included and Excluded Respondents

Variable	All N=3,000 % (*n*)[a]	Included *n*=2,327 % (*n*)[a]	Excluded *n*=673[b] % (*n*)[a]
Age, y, mean	23.3	23.0	24.2
Province			
Alberta	16.2 (485)	21.1 (477)	1.1 (8)
Nova Scotia	16.1 (482)	21.1 (475)	1.0 (7)
Ontario	24.7 (741)	32.4 (731)	1.3 (10)
Quebec	19.4 (582)	25.4 (573)	1.2 (9)
Moved provinces	2.7 (80)	0.0 (0)	10.8 (80)
Lived in a nonstudy province/ missing	20.9 (629)	0.0 (0)	84.6 (629)
Gender			
Man	50.3 (1509)	51.9 (1171)	45.4 (338)
Woman	48.3 (1448)	48.1 (1085)	48.8 (363)
Nonbinary or missing	1.4 (43)	0.0 (0)	5.8 (43)
Racial/ethnic identity			
White only	45.3 (1360)	45.6 (1029)	44.4 (331)
Chinese only	7.9 (238)	6.0 (134)	13.8 (103)
South Asian only	6.6 (199)	6.8 (153)	6.1 (45)
Black only	5.3 (160)	6.4 (145)	1.9 (14)
Indigenous inclusive	3.8 (114)	3.8 (85)	3.9 (29)
Multiracial/other or not stated/ missing	31.0 (932)	31.4 (709)	29.9 (222)
Income adequacy			
Easy	26.4 (791)	25.7 (579)	28.4 (211)
Neither easy nor difficult	36.5 (1097)	35.8 (807)	38.8 (289)
Difficult	22.0 (659)	21.8 (493)	22.3 (166)
Don't know/refuse to answer	15.1 (454)	16.7 (377)	10.4 (77)
Weight perception			
Underweight	9.2 (276)	9.7 (219)	7.6 (57)
Just about right	61.8 (1855)	61.2 (1382)	63.6 (473)
Overweight	24.9 (748)	24.7 (557)	25.6 (190)
Missing	4.1 (123)	4.4 (99)	3.2 (23)

[a]Totals for each variable may not equal 3,000 because of sample weights and rounding.
[b]Age, racial/ethnic identity, and income adequacy were significantly different between included and excluded survey respondents on the basis of Rao–Scott chi-square tests of association and a cut off of $p<0.05$.

Table 2. Prevalence of Disordered Eating and Related Psychosocial Variables of Weighted Sample, by Wave

Variable	% (*n*)[b,c]		
	Wave 1 (2016) *n*=2,327[a]	Wave 2 (2017) *n*=754[a]	Wave 3 (2018) *n*=565[a]
Disordered eating risk			
Possible disordered eating	14.4 (312)	10.0 (70)	11.0 (60)
Low disordered eating risk	85.6 (1853)	90.0 (634)	89.0 (486)
Binge eating			
Once or more a month	28.5 (615)	26.5 (188)	22.7 (123)
No binge eating	71.5 (1542)	73.5 (522)	77.3 (420)
Vomiting for weight loss			
Ever vomited in the last 3 months	5.5 (120)	4.9 (35)	5.0 (28)
No vomiting	94.5 (2053)	95.1 (680)	95.0 (519)
Preoccupation with thinness			
Preoccupied with desire to be thinner	29.8 (646)	26.0 (183)	30.1 (165)
No preoccupation with thinness	70.2 (1521)	74.0 (522)	69.8 (381)
Body satisfaction			
Dissatisfied	28.5 (619)	30.7 (218)	30.8 (168)
Neutral/satisfied	71.5 (1552)	69.3 (493)	69.2 (378)
Internalized weight bias			
Yes	47.6 (1024)	49.8 (352)	51.8 (277)
No	52.4 (1129)	50.1 (354)	48.2 (257)
Experienced weight discrimination in past year			
Yes	18.6 (355)	16.8 (119)	13.7 (75)
No	83.5 (1797)	83.1 (587)	86.3 (471)
Anxiety in past year			
Yes	68.0 (1400)	70.7 (485)	68.6 (372)
No	32.0 (660)	29.3 (201)	31.4 (170)
Depression in past year			
Yes	65.9 (1361)	70.9 (488)	67.5 (363)
No	34.1 (705)	29.1 (200)	32.5 (175)
Stress in daily life			
Very/extremely stressful	24.5 (512)	24.4 (172)	19.9 (108)
Not at all/a bit stressful	75.5 (1576)	75.6 (533)	80.1 (438)
Mental health in daily life			
Poor/fair	28.1 (588)	30.8 (216)	30.0 (163)
Good/excellent	71.9 (1501)	69.2 (485)	70.1 (383)

[a]Sample sizes are based on the number of respondents with a survey response in the respective wave; responses to individual items may be lower due to within-wave missingness.
[b]Totals for each variable may not equal the sample size because of sample weights, rounding, and missing values. Not all participants responded to each of the variables of interest.
[c]Year-specific sample weights, on the basis of age and sex, were applied to each wave.

anxiety, depression, stress, or overall mental health (Table 4).

DISCUSSION

The implementation of calorie menu labeling policies was not significantly associated with changes in DE, body dissatisfaction, internalized weight bias, experienced weight discrimination, or other general indicators of mental health among young adults in Canada. Despite concerns that calorie labeling policies may worsen psychosocial wellbeing,[8–12] there was no observed association between mandatory labeling and these constructs nearly 2 years after the implementation of the policy in Ontario.[3] The authors are unaware of any prior studies that have explored this association in a natural experiment context; however, one pre–post campus-based calorie labeling study similarly found no impact of the presence of labels on the eating pathology of university students.[10] One online survey that presented hypothetical calorie labels and scenarios to adults found that menu labeling did not influence the food orders of

Table 3. AORs of Disordered Eating and Weight-Related Outcomes in Relation to Labeling Policies (N=2,327)

	Model outcomes[a] AOR (95% CI)						
Parameters	**Disordered eating risk**	**Preoccupation with thinness**	**Self-induced vomiting**	**Binge eating**	**Body dissatisfaction**	**Internalized weight bias**	**Past year weight discrimination**
Condition (ref=no policy)							
Mandatory labels	1.33 (0.97, 1.84)	1.22 (0.95, 1.57)	1.25 (0.79, 1.97)	**1.37 (1.08, 1.75)**	0.88 (0.66, 1.17)	1.02 (0.81, 1.28)	0.82 (0.60, 1.11)
Wave (ref=1)							
Wave 2	0.83 (0.66, 1.05)	**0.80 (0.67, 0.96)**	1.14 (0.82, 1.58)	0.86 (0.71, 1.03)	1.06 (0.85, 1.34)	0.98 (0.82, 1.18)	0.85 (0.67, 1.07)
Wave 3	0.81 (0.64, 1.02)	**0.81 (0.68, 0.97)**	1.08 (0.77, 1.51)	**0.64 (0.52, 0.79)**	1.03 (0.80, 1.33)	0.95 (0.77, 1.17)	0.72 (0.57, 0.91)
Difference in difference	**Parameter estimate (95% CI)**						
Post (Mandatory: no Policy)—pre (Mandatory: no Policy)	0.83 (0.54, 1.13)	1.01 (0.74, 1.28)	1.08 (0.54, 1.61)	0.83 (0.58, 1.07)	0.98 (0.63, 1.33)	1.16 (0.83, 1.49)	1.31 (0.85, 1.77)

Note: Boldface indicates statistical significance after application of Benjamini—Hochberg procedure, accounting for the false discovery rate of 0.05 ($p<0.05$).

[a]AORs derived from logistic generalized estimating equations. All models adjusted for age, gender, racial/ethnic identity, income adequacy, and weight perception. Disordered eating risk was modeled as odds of possible risk versus low risk on the basis of a 3-item measure by Haines et al.[26] Preoccupation with thinness was modeled as odds of yes (i.e., often, usually, or always) versus no (i.e., never) being preoccupied with a desire to be thinner. Self-induced vomiting was modeled as ever engaging in self-induced vomiting in the past 3 months versus no engagement in vomiting. Binge eating was modeled as once a month or more in the past 3 months versus no engagement in binge eating. Body dissatisfaction was modeled as the odds of dissatisfied versus neutral/satisfied. Internalized weight bias and weight discrimination in past year were modeled as odds of yes versus no.

Table 4. AORs of General Psychosocial Wellbeing in Relation to Labeling Policies (n=2,877)

	Model outcomes[a] AOR (95% CL)			
Parameters	**Anxiety in past year**	**Depression in past year**	**Stress in daily life**	**Mental health in daily life**
Condition (ref=no policy)				
Mandatory labels	1.13 (0.88, 1.46)	0.94 (0.74, 1.21)	1.03 (0.80, 1.33)	1.03 (0.81, 1.31)
Wave (ref=1)				
Wave 2	1.10 (0.91, 1.32)	1.15 (0.96, 1.38)	0.99 (0.78, 1.26)	1.12 (0.93, 1.36)
Wave 3	1.10 (0.90, 1.37)	1.17 (0.97, 1.41)	0.80 (0.61, 1.03)	1.12 (0.91, 1.37)
Difference in differences	**Parameter estimate (95% CI)**			
Post (mandatory: no policy) −pre (mandatory: no policy)	1.10 (0.76, 1.44)	1.30 (0.90, 1.71)	0.89 (0.58, 1.20)	1.02 (0.73, 1.30)

Note: Boldface indicates statistical significance after application of Benjamini−Hochberg procedure, accounting for the false discovery rate of 0.05 (p<0.05).
[a]AORs derived from logistic generalized estimating equations. All models adjusted for age, gender, racial/ethnic identity, income adequacy, and weight perception. Anxiety in past year and depression in past year were modeled as odds of yes versus no. Stress in daily life was modeled as odds of very/extremely versus not at all/a bit. Mental health in daily life was modeled as odds of poor/fair versus good/excellent.

individuals with DE but did impact the orders of individuals with eating disorders.[17] This finding may suggest that the influence of calorie menu labels is more pronounced among individuals with diagnosable eating disorders than among those with subclinical DE, although the effect has not been assessed outside of experimental settings using hypothetical outcomes.

We cannot ascertain whether the introduction of labeling policies worsened existing DE or overall psychosocial wellbeing in individuals who already had it. Several qualitative studies have identified the ways in which engagement with calorie menu labels interacts with individuals' own body image, weight-related attitudes, concepts of individual versus governmental responsibility for food choices, and awareness of calories as a limited indicator of a food's healthfulness.[16,20,40,41] The temporality of the relationship is unknown; cross-sectional studies have found that the noticing and use of calorie menu labels are associated with dieting and harmful weight-related behaviors,[9,42,43] but it remains unclear whether individuals who engage in DE actively seek out labels or whether the labels exacerbate their DE. To the authors' knowledge, no studies have examined the impact of labeling policies on broader psychosocial wellbeing (i.e., anxiety, depression, stress, overall mental health), which were not impacted by the implementation of the policy in Ontario. Similar to DE and eating disorders, it may be that individuals with subclinical versus diagnosable illnesses are not as impacted.

This study may provide a roadmap for future work that strives to leverage food policy research and reduce DE risk across populations.[15] For example, the introduction of mandatory front-of-package labels in Canada that denote foods that are high in sodium, sugars, and saturated fats[44] may require researchers to investigate the impact of additional policies on mental health. Future work should also aim to explore the impact of labels and other nutrition policies among different groups and leverage larger sample sizes to examine interactions between policies and the multiple intersections of marginalized identities. For example, one recent paper identified unique contributors to calorie menu label use among sexual minority men, who may rely heavily upon labels to inform harmful weight gain−related patterns of behavior.[45]

Limitations

The findings of this study have several considerations and potential limitations. Although there was some participant attrition and missing data, data loss was mitigated using multiple imputation analysis, which is shown to reduce bias in parameter estimates compared with complete case analysis.[38] Despite loss to attrition, common in longitudinal research, the authors are unaware of another sample of this size with repeated-measures data on DE that allows for natural policy observations. The proportions of missing data, especially at later waves for particular variables such as depression and anxiety, indicate that the results should be interpreted with caution.[46] Given the number of variables that required imputation, more complex methods of imputation that may further reduce bias, such as incorporating cross-products of the outcomes across the waves, were not possible.[47] The use of analytic survey weights did allow for greater alignment between the study sample and Canadian population estimates by age

and sex, although the small sample size may have resulted in insufficient statistical power to detect a significant association.

An additional limitation was the use of brief measures to assess each of the outcomes of interest and their dichotomous operationalizations. Future research exploring the impacts of food and weight-related policies on psychosocial wellbeing will benefit from comprehensive measures of complex constructs (e.g., internalized weight bias, body dissatisfaction) that cannot be fully captured by single-item measures. One systematic review found a paucity of evidence exploring the effects of weight-related public health messages on DE, finding that only 1 study even measured DE behavior.[48] Increased measurement of DE and related constructs (e.g., weight bias and discrimination) is essential to appraise the impacts of nutrition policies on psychosocial wellbeing.[49] The frequency of eating out and frequency of exposure to calorie menu labeling were not assessed, and there are likely participants in the study who did not visit establishments impacted by the policy.

CONCLUSIONS

These findings contribute to the scarce literature assessing trends in DE and other psychosocial indicators in the ever-changing, dynamic context of nutrition policy. The implementation of a mandatory calorie menu labeling policy in Ontario, Canada was not associated with increased adjusted odds of DE nor other psychosocial outcomes among young adults. Future research should examine the differential impacts of nutrition policy on groups that are structurally excluded as well as people with more severe eating disorder pathology. Nutrition policy can be a key leverage point for the prevention of eating disorders, and this work further emphasizes the need for public health research that more holistically considers psychosocial wellbeing.

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CREDIT AUTHOR STATEMENT

Amanda Raffoul: Conceptualization, Methodology, Formal analysis, Investigation, Writing — original draft, Writing — review & editing. Jill Koechl: Formal analysis, Investigation, Writing — review & editing. David Hammond: Conceptualization, Methodology, Writing — review & editing. Joel A. Dubin: Writing — review & editing. Allison C. Kelly: Writing — review & editing. Sharon I. Kirkpatrick: Conceptualization, Methodology, Writing — review & editing, Supervision.

SUPPLEMENTAL MATERIAL

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