

The Relationship Between Body Weight Perceptions, Weight Control Behaviours and Smoking Status Among Adolescents

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ABSTRACT

Objectives: This paper examines the relation between body weight perceptions, weight control behaviours and smoking status among a representative sample of Ontario students.

Methods: Bivariate and multivariate logistic regression analysis was used to evaluate the association between smoking status and perception of being overweight, and between smoking status and specific weight control behaviours.

Results: Among females, the odds of being a smoker were significantly higher among those who perceived themselves to be overweight and who had employed weight control behaviours in the last 12 months. Among males, the adjusted odds of being a smoker was higher only among those who skipped meals in the past 12 months.

Conclusions: Body weight perceptions and the use of weight control behaviours were significantly associated with predictors of smoking among adolescent females. This suggests a need to incorporate discussion on body weight perception and body image in smoking prevention and cessation programs targeted toward adolescent females.

La traduction du résumé se trouve à la fin de l'article.

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Smoking among adolescents is a serious health problem in Canada. In 2000, 25% of Canadian youth aged 15 to 19 smoked cigarettes.¹ Known psychosocial risk factors for smoking among adolescents include the presence of other smokers in the family unit, smoking among friends, peer acceptance of smoking, age, and socio-economic status.²⁻⁴

Self-perception of body weight and weight control behaviours may also play a role in initiation and maintenance of smoking. Among female adolescents, concerns about body weight are pervasive.^{5,6} Perceptions of overweight, concerns about weight, and weight control behaviours are far more common among female than male adolescents.^{7,8} Weight perceptions and weight control behaviours are also influenced by parental and peer beliefs⁹ which in turn may influence smoking behaviours.

Concern about body weight is also more prevalent among adolescent females who smoke than among their non-smoking peers.^{9,10} Further, some adolescent girls turn to smoking as a method of weight control.^{4,11-13} Distorted perceptions of body weight among some adolescent females may lead them to try smoking as a method of weight control.

Previous studies indicate that female adolescents who expressed a greater degree of concern or dissatisfaction with their weight were more likely to smoke.¹⁴⁻¹⁶ Among males, weight concerns were, for the most part, not associated with current smoking, although those males who reported a strong desire to be as thin as possible were significantly more likely to be smokers.¹⁶ Further, teenage girls in general are more likely than their male counterparts to view smoking as a weight control strategy.¹⁶⁻¹⁸ Indeed, tobacco companies exploited these concerns by targeting women with ads that link smoking with being slim.^{19,20} As early as the 1920s, U.S. advertisements urged women to "Reach for a Lucky (Strike cigarette) instead of a sweet."²⁰

Although there is some evidence that smoking does affect body weight, the direction of causality is not clear, and the relation appears to interact with age. Studies consistently indicate that adult smokers have a lower body mass index than non-smokers,²¹⁻²³ although the physiological mechanism responsible for this

difference is unclear.²⁴⁻²⁹ In adolescent populations, however, smokers tend to weigh more than non-smokers.^{23,30} The weight-controlling properties of smoking may be slow to accumulate, and effects may only become evident after long-term use.²³

Weight control behaviours differ among adolescents according to their smoking status.³¹ Gritz and Crane's 1991 study of high school seniors determined that the use of amphetamines for weight loss was positively associated with smoking among females, but not males.⁵ They hypothesized that greater concern about body weight led female smokers to use amphetamines. In Ross and Ivis' analysis of data from the 1997 Ontario Student Drug Use Survey, female binge eaters who compensated by vomiting, using diuretics or laxatives, strict dieting or fasting, or exercising a lot were more likely to report tobacco use.³² Males who binged but did not compensate were also more likely to smoke. Wiseman et al. found higher rates of smoking among young women diagnosed as bulimic.⁹ According to Sokol and Gray, bulimics, most of whom are female, are more prone to use substances, including tobacco, to control or reduce weight.³³

In this study, we use a major provincial database to examine the independent effects of body weight perception and both moderate and extreme^{13,34} weight control behaviours on smoking status among male and female students. Our research adds to previous work in two important ways. First, research on body weight and smoking has focused on females, which does not allow for the determination of sex differences. In this study, we examine both sexes to provide a comprehensive picture. Second, we examine the association between moderate as well as extreme weight control techniques and smoking status in adolescent populations, which few previous studies have done.

METHODS

Data for this study were obtained from the 1997 Ontario Student Drug Use Survey (OSDUS), administered to 3,990 public and Catholic school students enrolled in grades 7, 9, 11 and 13 in Ontario, Canada.³⁵ The survey had an overall response rate of 77%, with 168 schools participating. The population of Ontario stu-

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TABLE I

Relationship Between Smoking Status and Weight Perception, by Sex, Grades 7, 9, 11, 13, Ontario, 1997

Sex	Weight Perception	% Smoke	Unadjusted Odds Ratio (95% CI)	Adjusted† Odds Ratio (95% CI)
Females	Overweight (n=331)	35.77	1.58 (1.21-2.07)**	1.47 (1.11-1.98)*
	About right/too thin (n=750)	26.06		
Males	Overweight (n=119)	26.95	1.13 (0.64-1.98)	1.25 (0.76-2.05)
	About right/too thin (n=761)	24.70		

Notes: * $p < 0.05$; ** $p < 0.01$

† Adjusted for socio-economic status and age

dents was stratified into four geographic areas and four grades, resulting in 16 strata. The survey inquired about a range of issues related to adolescent drug use, body weight perceptions and weight control behaviours, and psychosocial and demographic characteristics. The questionnaire stated that all information submitted would remain confidential. This biennial survey has been carried out by the Centre for Addiction and Mental Health (previously the Addiction Research Foundation) since 1977.

To explore a variety of topic areas, two questionnaires, Form A and Form B, were used. About half (2,016) of the students were randomly selected to complete the Form A questionnaire, the only version that contained questions related to weight perception and weight control behaviours.

The smoking status variable was dichotomized according to number of cigarettes smoked in the previous 12 months. Non-smokers, coded as 0, included "never" smokers, those who had smoked only one cigarette in the last 12 months, and those who had used tobacco but not within the last 12 months. Smokers, coded as 1, included those who had smoked more than one cigarette in the 12 months prior to the survey.

Weight perceptions were classified as thin/average weight (perceived self as "too thin" and "about the right weight," coded as 0, and overweight ("too fat," coded as 1. Weight control behaviours were dichotomized according to presence/absence of such behaviours in the previous 12 months. Those who did not skip meals, use diet pills, vomit or exercise "to lose weight or to keep from gaining weight" at any point during their life were coded as 0 while those who did demonstrate such behaviours were coded as 1. Perceived family financial situation was categorized as at or above average (coded as 0), or below average (coded as 1).

Statistical analysis

Data were analyzed separately for males and females. Logistic regression analysis was performed to assess relationships between weight perception and smoking status, and weight control behaviours and smoking status using Taylor series methods to adjust for clustering and other design effects.³⁶ Analyses, adjusted for perceived financial situation and age, were also performed.

RESULTS

Smoking and weight perception

Almost one third (31%) of females considered themselves to be overweight, compared to only 14% of males. More than one quarter of both females and males (29% and 26%) had smoked more than one cigarette in the past 12 months ($p > 0.05$). Weight perceptions were positively associated with smoking among females (Table I). Based on unadjusted analyses, females who believed themselves to be overweight had more than 50% greater odds of being smokers compared to those who believed themselves to be of average weight or too thin (OR = 1.58, $p < 0.01$). The adjusted odds ratio for females decreased only slightly, and the effect remained significant (OR = 1.47, $p < 0.05$). Weight perceptions were not associated with smoking among males.

Smoking and weight control behaviours

Females were more likely to smoke if they exercised to lose weight (OR = 2.60, $p < 0.001$), skipped meals (OR = 2.72, $p < 0.001$), vomited (OR=4.16, $p < 0.001$), or used diet pills (OR=6.52, $p < 0.001$) (Table II). When controlling for perceived financial situation and age, all adjusted odds ratios decreased slightly, but the associations between smoking status and weight control behaviours remained statistically significant.

TABLE II
Relationship Between Smoking Status and Weight Control Behaviours, by Sex,
Grades 7, 9, 11, 13, Ontario, 1997

Weight Control Behaviour	Females			Weight Control Behaviour	Males		
	% Smoke	Unadjusted Odds Ratio (95%CI)	Adjusted† Odds Ratio (95% CI)		% Smoke	Unadjusted Odds Ratio (95% CI)	Adjusted† Odds Ratio (95%CI)
Exercised				Exercised			
Yes (n=739)	34.62	2.60 (2.10-	2.24 (1.76-	Yes (n=331)	26.48	1.11 (0.80-	1.15 (0.79-
No (n=331)	16.92	3.21)***	2.83)***	No (n=538)	24.47	1.55)	1.66)
Skipped meals				Skipped meals			
Yes (n=406)	41.92	2.72 (2.04-	2.45 (1.84-	Yes (n=86)	37.37	1.93 (0.98-	2.36 (1.16-
No (n=680)	20.95	3.64)***	3.27)***	No (n=794)	23.58	3.80)	4.78)*
Vomited				Vomited			
Yes (n=84)	59.42	4.16 (2.23-	4.05 (2.15-	Yes (n=8)‡	15.18	0.53 (0.07-	0.37 (0.05-
No (n=991)	26.06	7.73)***	7.64)***	No (n=862)	25.31	3.90)	2.69)
Used diet pills				Used diet pills			
Yes (n=68)	69.64	6.52 (4.09-	6.28 (3.89-	Yes (n=7)‡	27.95	1.03 (0.17-	3.64 (0.54-
No (n=1008)	26.02	10.40)***	10.12)***	No (n=867)	25.05	6.54)	24.37)

Notes: * $p < 0.05$; *** $p < 0.001$

† Adjusted for socio-economic status and age

‡ Small cell size

Unadjusted odds of smoking among males who employed weight control behaviours were not statistically significant, although two of the behaviours could not be accurately assessed due to insufficient cell size. However, when perceived financial situation and age were controlled, those who skipped meals to control or maintain their weight were more likely to smoke than those who said they did not skip meals (OR=2.36, $p < 0.05$).

DISCUSSION

Adolescent females who perceived themselves as overweight were more likely to smoke than those who considered themselves average weight or too thin. This was consistent with findings from other studies that adolescent females who smoke are more likely to be concerned about their weight than their non-smoking peers.^{15,16} Our study also found that even females who utilized only moderate weight-control techniques (e.g., skipping meals or exercising) rather than more extreme methods often reported in the literature (e.g., diet pills or vomiting), were more likely to be smokers.^{5,31,32}

The perception of being overweight was not associated with smoking for male adolescents. However, males who skipped meals to control or maintain their weight were more likely to smoke, when perceived socio-economic status and age were controlled. This finding has not been reported previously.

A few potential limitations should be noted. The self-report data in this study

did not include actual height and weight measurements, so differences between *perceived* and *actual* weight could not be determined. However, other evidence indicates that dieting behaviours (and potentially smoking behaviours) are linked to *perceived* weight status, rather than to actual weight.^{7,15} Since data were collected on adolescents who attended school, findings are not generalizable to those teens who no longer attend school. Similar results, however, have been found in non-student youth. Wang et al. found that male and female high school dropouts aged 15 to 18 who believed that smoking could facilitate weight control were more likely to smoke.³⁷

This is one of the few Canadian studies to examine the effects of body weight perception and weight control techniques on adolescent smoking status in both male and female students. In addition, the effects of both moderate and more extreme weight-control methods on smoking status were examined. Although much research has been devoted to the effects of extreme weight control methods on female smoking status, this study indicates that skipping meals is also associated with adolescent male smoking behaviour. More research is needed to clarify weight control methods favoured by young males, and their relation to smoking status.

Given the cross-sectional nature of the study, further research to determine the nature of the relation between weight perception and smoking status would be beneficial in developing effective programs and

policies that address influences on smoking initiation among youth. This could be accomplished by prospectively examining body weight concerns and perceptions and smoking initiation as well as exploring other influential factors, such as peer and societal influences on both weight control and smoking behaviours.³⁸ Such a study could also assess teen beliefs about whether they smoke, at least to some extent, to control or lose weight.

If perceptions of overweight do indeed precede smoking, prevention and cessation programs would need to address the body image concerns and fear of weight gain that are prevalent in this group.^{38,39} Health education that focuses on perceptions of realistic body weight expectations along with healthy diets and exercise may be more effective in reducing the prevalence of smoking among this population than warnings about long-term health repercussions. Other factors, such as the influence of tobacco advertising, peer or family pressures, or celebrities on the social norms of adolescents who may be more vulnerable to other influences, could also be explored as potential predictors of smoking.

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RÉSUMÉ

Objectifs : Nous avons étudié le lien entre le poids perçu, les comportements de contrôle du poids et le tabagisme chez un échantillon représentatif d'étudiants ontariens.

Méthode : Par des analyses de régression logistique bi- et multidimensionnelles, nous avons évalué le lien entre le tabagisme et l'embonpoint perçu et entre le tabagisme et certains comportements de contrôle du poids.

Résultats : Chez les femmes, le risque relatif d'être une fumeuse était notablement supérieur parmi celles qui se percevaient comme faisant de l'embonpoint et qui avaient employé des méthodes de contrôle du poids au cours des 12 mois précédents. Chez les hommes, le risque relatif rajusté d'être un fumeur n'était supérieur que parmi ceux qui avaient sauté des repas au cours des 12 mois précédents.

Conclusion : Le poids perçu et l'emploi de méthodes de contrôle du poids présentaient une corrélation significative avec les prédicteurs du tabagisme chez les adolescentes. Il faudrait donc aborder la perception du poids et l'image corporelle dans les programmes de prévention et de renoncement au tabac à l'intention des adolescentes.