Predictors of Adolescent Self-rated Health

Analysis of the National Population Health Survey

Evelyn R. Vingilis, PhD, CPsych¹

Terrance J. Wade, PhD²

Jane S. Seeley, BA³

ABSTRACT

Objective: To examine what factors predict adolescents' concepts of their health.

Methods: The study, based on the longitudinal National Population Health Survey, included 1,493 adolescents who were 12-19 at the time of interview. Sex, age, grade, family structure, income, disability, chronic health problems, social supports, social involvement, school/work involvement, smoking, alcohol bingeing, physical activities, Body Mass Index (BMI) and psychological health status variables were examined. Using ordinal multivariate regression, self-rated health was regressed on all predictors, which were entered in blocks hierarchically.

Results: The analyses revealed that adolescent perceptions of health are framed not only by their physical health status, but also by personal, socio-environmental, behavioural and psychological factors. Specifically, health problems, disability, age, female status, lower income, smoking, and higher BMI were associated with lower self-rated health.

Conclusions: This study suggests that adolescent appraisals of their health are shaped by their overall sense of functioning, which includes both physical health and non-physical health dimensions.

Self-rated health is a commonly used measure that has been found to be one of the best predictors of health care utilization, cost and mortality.¹⁻⁶ Omnibus population-based studies have found that physical health status indicators, such as chronic health problems, are the strongest correlates of self-rated health.^{2,7} Yet, adolescents do not rate their health much higher than older populations, even though they report far fewer physical health problems.^{8,9} This suggests that other factors are shaping adolescent perceptions of their health.

Adolescence is the period during which lifestyle patterns of behaviour, such as tobacco, alcohol and other drug use, nutrition, physical activities, etc., are being formed. These behaviours set the stage for future morbidity and health care utilization, as risk-taking and health-compromising lifestyles are major causal factors for many health problems.¹⁰⁻¹² Furthermore, adolescence is the period of rapid physical and psychosocial changes, a period during which youth become more aware of their bodies and become more introspective.^{13,14} It is also a period of optimal physical health as youth have the lowest rates of disease and death in the western world.¹⁵ During this time, health appraisals are being shaped that may represent more youth's overall sense of psychosocial functioning than their physical functioning.¹³ "The tendency to relate general life difficulties to health problems may reflect the underlying patterns of expressing life distress in somatic rather than psychological terms,"¹³ and may explain the consistently found relationship between self-rated health and socioeconomic status (SES), family functioning, social supports, etc.^{6,16,17}

Despite the fact that adolescence seems to be a crucial period for the formation of lifestyles and perceptions of health, limited information is available on the determinants of adolescent self-rated health. The purpose of this study was to examine what factors predict adolescent self-rated health.

Predictors of self-rated health

The limited research on adolescent self-rated health led us to cast a wider net and review the literature on adolescent health behaviours and psychological well-being. This literature advanced six sets of related "person-situation" factors which suggests

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

1. Director, The Population & Community Health Unit, Family Medicine, The University of Western Ontario, London, ON

2. Institute for Health Policy & Health Services Research & the Department of Psychiatry, University of Cincinnati Medical Center, Cincinnati, OH

3. The Population & Community Health Unit, Family Medicine, The University of Western Ontario
Correspondence: Dr. Evelyn Vingilis, Director, The Population & Community Health Unit, Family Medicine, The University of Western Ontario, 100 Collip Circle, Suite 245, London, ON N6G 4X8, Tel: 519-858-5063, ext. 2, Fax: 519-858-5029, E-mail: evingili@uwo.ca

Funded by Health Canada through the National Health Research and Development Program

that personal and socio-environmental factors interact leading to behaviours, which in turn affect psychological health status, which affects personal perceptions of health. Specifically, variations in demographics, structural environment, physical health, social factors, lifestyle behaviours, and psychological health status have all been found to predict various measures of self-rated health and/or psychological well-being. While some of the abovementioned factors may directly affect adolescent self-ratings of physical health, available evidence suggests that some of these variables are more likely to influence the experience of health indirectly, through the mediating effects of other variables, such as the effects of single family status on self-rated health mediated by family financial situation.¹⁸

Using data from the Ontario Student Drug Use Survey (OSDUS), we¹⁸ presented a model predicting student self-rated health. Gender, family finances, family attachment, school achievement, tobacco use and self-esteem were significant predictors. However, the study had two limitations. First, the sample design was based on a school sample of Ontario youth. It is unknown whether the results are generalizable to a Canada-wide population of adolescent students and non-students. Second, the OSDUS did not contain any measures on physical health problems. The NPHS permits an opportunity to address these limitations because the national sample consists of adolescent students and non-students and contains two measures of physical health problems.

Based on previous work,^{10,13,18} we hypothesize that, in addition to physical health status, other factors such as demographic, structural, behavioural and psychological factors interrelate to create a sense of physical health. The interplay among these factors either “protect” the adolescent to create a positive sense of physical health, or put the adolescent at “risk” for a negative sense of physical health. Fundamental to positive self-rated health would be a positive social and economic environment, good physical health status and good social supports. These factors should be “protective,” leading to positive lifestyles and self-concept. Risk factors such as low SES, poor social supports and non-involvement in school and workplace could lead to poor lifestyles and lower sense of good health.

TABLE I

Distribution of Variables for Total Sample and Across Sex

		Total Sample (N=1,493)	Males (N=742)		Females (N=751)
Dependent Variables					
Self-rated health (%)	Poor/fair	4.20	3.28	***	5.16
	Good	23.28	21.14		25.56
	Very Good	42.94	41.54		44.43
	Excellent	29.58	34.04		24.85
Predictor Variables					
Age (mean)		15.45	15.54	ns	15.36
Income Adequacy (mean)		3.38	3.37	ns	3.39
Family Structure (%)				ns	
	Two parent	78.02	78.53		77.48
	Single parent	16.51	16.61		16.40
	Other	5.47	4.86		6.12
Disability (mean number of days)		0.41	0.41	ns	0.42
Health Status (mean health status across 8 dimensions)		0.93	0.93	ns	0.93
Social Support (mean)		0.77	0.72	***	0.81
Social Involvement (mean)		2.73	2.61	**	2.84
School/Work involvement (proportion)		0.97	0.98	ns	0.97
Body Mass Index (BMI) (%)				***	
	<20th Percentile	23.34	23.05		24.50
	Middle	57.48	54.17		60.42
	>80th Percentile	19.18	22.24	**	15.08
Smoking (%)					
	Never	60.76	64.48		56.81
	Regular	13.53	12.32		14.81
	Occasional	7.44	5.92		9.04
	Previous	18.27	17.28		19.34
Alcohol Bingeing (mean)		0.51	0.62	***	0.40
Physical Activity (%)				***	
	Inactive	36.40	26.64		46.34
	Moderate	24.45	23.30		25.63
	Active	39.15	50.05		28.03
Psychological distress (mean)		4.48	3.98	***	4.95

Significant differences across gender at * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

METHODS

Sample

The analyses were conducted using the 1994 National Population Health Survey (NPHS), in which 19,600 households were selected in the first wave from across Canada, using a two-staged, stratified, random sampling procedure. People living in Native reserves, military bases, institutions, and some remote areas in Ontario and Quebec were excluded. One person from each household was randomly selected to provide detailed personal information for the health component. A full description of National Population Health Survey (NPHS) design and other methodological issues are presented elsewhere.¹⁹

As this analysis focusses specifically upon adolescents, we confined our sample to those between ages 12 and 19 ($N = 1,493$). All analyses were computed using the standardized weighting scheme suggested by Statistics Canada.¹⁹ Appendix 1 provides a description of all measures included in the analysis.

The analysis involved two steps. First, we examined the distribution of the self-rated health and predictor variables for the

total sample and across sex. Second, we employed an ordinal logistic regression framework regressing self-rated health on all predictors, which were entered in blocks according to the previously identified person-situation factors and presupposed temporal ordering: age and sex, then structural factors, then health-related measures. This ordering presupposes that while sex and age may influence health variables, health cannot influence sex and age. Using listwise deletion of all cases with missing values, the effective sample size for the regression equations was 1,210. To better illustrate change in effect sizes when controlling for various theoretical blocks of variables, we report regression coefficients.

RESULTS

Table I presents the distribution of all variables in the analysis for the total sample. Significant sex differences were found for self-rated health, social support, social involvement, BMI, alcohol bingeing, physical activity and psychological distress. Females tended to score lower for self-rated health, health status, BMI, physical activity

TABLE II

Ordinal Logistic Regression of Self-Rated Health on Predictors (Weighted N=1,210)^{†‡}

	Model 1 ln(OR)	Model 2 ln(OR)	Model 3 ln(OR)	Model 4 ln(OR)	Model 5 ln(OR)	Model 6 ln(OR)
Age	-0.020	-0.021	0.004	-0.021	0.075**	0.076**
Sex§	-0.342***	-0.354***	-0.320**	-0.391***	-0.299**	-0.263*
Region						
Maritimes	-0.044	0.026	-0.053	-0.118	-0.073	-0.094
Quebec	0.121	0.124	0.151	0.265	0.296*	0.321*
Prairies	-0.182	-0.169	-0.108	-0.137	-0.106	-0.119
British Columbia	-0.379*	-0.369*	-0.303	-0.290	-0.336	-0.320
Income		0.173***	0.165**	0.159**	0.175***	0.126***
Family Structure¶						
Single Parent		0.180	0.251	0.322*	0.376*	0.379**
Other		0.285	0.265	0.296	0.550*	0.592*
Disability			-0.586***	-0.624***	-0.582***	-0.553***
Overall Health Status			6.189***	5.636***	5.385***	4.849***
Social Support				0.508**	0.435**	0.390*
Social Involvement				0.073***	0.052**	0.055**
School/Work Involvement				0.230	0.200	0.201
Binge Drinking					0.001	0.013
BMI ^{††}						
Bottom Quintile					-0.092	-0.094
Top Quintile					-0.690***	-0.671***
Smoking ^{‡‡}						
Current					-1.065***	-1.046***
Occasional					-0.111	-0.095
Previous					-0.615**	-0.593**
Physical Activity ^{§§}						
Moderate					-0.269	-0.276
Active					-0.378**	-0.401**
Psychological Distress						-0.041**

* p < 0.05; ** p < 0.01; *** p < 0.001

[†] Reported estimates are Logistic regression coefficients. All equations controlling for region.[‡] Fair/Poor health coded as reference category for self-rated health.[§] Male coded as reference category for sex.^{||} Ontario coded as reference category for region.[¶] Two-parent family coded as reference category for family structure.^{††} Middle three quintiles combined coded as reference category for BMI.^{‡‡} Never smoked coded as reference category for smoking.^{§§} Inactive coded as reference category for physical activity.

and alcohol binge drinking, but higher for social support, social involvement, psychological distress and smoking.

Table II presents the regression results. Model 1 indicates that sex is a powerful predictor of self-rated health where males rated their health higher than females. In Model 2, when we inserted family structure and financial situation, sex remained a significant predictor. As anticipated, adolescents who had a better financial situation at home rated their health significantly higher (OR = 1.188; 95% CI 1.070, 1.320). In Model 3, disability and overall health status were significantly associated with self-rated health. Number of disability days had a negative effect on self-rated health (OR = 0.557; 95% CI 0.447, 0.693). The composite overall health status rating had the largest effect of any variable on self-rated health. Sex and income

remained significant. In Model 4, social support and social involvement were both significant and independent predictors of self-rated health. However, the effect of single-parent family structure became a significant predictor of self-rated health with the inclusion of the social factors. In Model 5, upon insertion of the lifestyle factors, we found that youth in the top quintile (20%) of BMI (OR = 0.501; 95% CI 0.378, 0.665) and who were current (OR = 0.345; 95% CI 0.237, 0.501) or previous smokers (OR = 0.554; 95% CI 0.361, 0.851) had lower health ratings. Interestingly, youth who were in the highest tertile of physical activity had lower health ratings (OR = 0.685; 95% CI 0.529, 0.886). Previously significant factors remained significant predictors of self-rated health and age became a significant predictor. The effect of adolescent age on

self-rated health became significant with the inclusion of lifestyle factors. Finally, in Model 6, higher psychological distress was associated with lower self-rated health (OR = 0.960; 95% CI 0.927, 0.994). This effect, however, was independent of all other factors because they did not change significantly.

DISCUSSION

The results of these analyses indicate that adolescent perceptions of health are framed not only by their physical health status but also by personal, socio-environmental and behavioural factors. Not surprisingly, physical health status was the strongest predictor of self-rated health. Yet, adolescent appraisals of their physical health status appear to be quite complex, involving several components other than physical health.

Appendix 1

Description of All Measures included in Analysis

Variables	Description
<i>Dependent Variable</i> Self-Rated Health	Self-rated health was assessed by a single question which asks 'in general, would you say your health is excellent, very good, good, fair or poor?' Due to the low number of adolescents rating their health as poor or fair, these two categories were combined creating a 4-point, ordinal scale for analysis.
<i>Predictor Variables</i> Income Adequacy	Income adequacy was calculated by adjusting data on total household income by the size of household to create a 5-level variable ranging from lowest income to highest income.
Family Structure	Family structure was coded as a series of categorical variables to compare those living in a household with two parents as the reference group to those living with a single parent and to those adolescents/young adults who live in their own residence.
Physical Health Disability	<i>Disability</i> was assessed by the number of disability days derived by summing 3 questions that enquired about number of days of limited/reduced activities over the last 14 days. ²⁶
General Health	A derived measure of <i>general health</i> was composed of a generic health status index that synthesizes both quantitative and qualitative dimensions incorporating eight different dimensions of health including vision, hearing, speech, mobility, dexterity, cognition, pain and discomfort, and emotion.
Social Factors Social Support	<i>Social support</i> was based on four dimensions of perceived social support. Respondents were prompted to answer yes or no to four questions asking whether they had someone who they could confide in, count on, who could give them advice, and who makes them feel loved.
Social Involvement	<i>Social involvement</i> was assessed by two items that reflect the frequency of participation in voluntary organizations and the frequency of attendance at religious services in the last year.
School/Work Involvement	Unfortunately, no information is available to measure school interest/achievement. However, the questions: 'are you enrolled as a full- or part-time student?' and a derived variable for labour force activity for those not currently attending school were included as a proxy dichotomous measure of <i>school/work involvement</i> .
Lifestyle Behaviours Physical Activity	<i>Physical activity</i> was measured using energy expenditure values based on caloric output of various physical activities lasting over 15 minutes categorized into three groups to indicate active, moderately active and inactive. This scale was recoded into 2 dichotomous variables to compare active and moderately active individuals to inactive people (comparison group).
Body Mass Index	<i>Body mass index</i> (BMI) was examined as an indirect proxy for nutrition. The BMI is calculated by dividing weight by height squared to rate someone as being normal, underweight, overweight or obese. Since there is some debate as to appropriate use of established BMI cut-points for adolescents, ²⁶⁻²⁸ we collapsed the scale into quintiles to compare adolescents who are below the 20th percentile or above the 80th percentile for BMI to those in the three middle quintiles (reference category).
Smoking	<i>Smoking</i> was measured by a series of three categorical variables to compare current, occasional and previous smokers to those who have never smoked (reference category).
Alcohol Consumption	<i>Alcohol consumption</i> was assessed using a derived frequency measure of consumption of 5 or more alcoholic beverages in one sitting in the past 12 months to assess frequency of bingeing behaviour. This measure was selected because the use of a measure of chronic alcohol use, such as weekly consumption, among adolescents identified very small prevalence rates whereas alcohol bingeing is much more common practice among this age group.
Psychological Distress	The 6-item measure of distress is derived from a larger scale of 45 items developed at the University of Michigan; higher scores among these 6 items indicate greater distress. The inter-item reliability for this scale for the full NPHS sample was $\alpha = 0.79$. ²⁹
<i>Sociodemographic Variables</i>	Additional variables in the analysis include age, sex and region. Sex was coded as a categorical variable to compare males and females. Age was coded continuously from 12 to 19 years of age. Region was coded into 4 categorical variables to compare the Maritimes, Quebec, the Prairies (including Manitoba, Saskatchewan and Alberta), and British Columbia to the reference category Ontario.

The results support previous research that certain personal and socio-environmental factors increase the vulnerability of adolescents by influencing their lifestyles and psychological distress.^{10,13,20} Moreover, these factors influence physical health ratings. Personal factors of age and sex were found to be predictive of self-rated health. Controlling for lifestyle and psychological distress increases in age became significantly associated with increases in self-rated health. This finding is interesting because as previous studies have identified,²¹ this relationship between age and self-rated health appears to be due to ageing factors and not cohort or period effects. At the same time, lifestyle and distress increase with age and are risk factors for self-rated health. Congruent with other research, females consistently rated their health lower than males, although the sex effect was reduced somewhat with the inclusion

of lifestyle and psychological distress variables.

Socio-environmental factors also have direct effects on self-rated health. Consistent with previous research, income is an important predictor of self-rated health.^{6,16,22} Yet, the effect of income was partially mediated by lifestyle behaviours and psychological distress. The analyses also indicate the importance of social supports and involvement on perceptions of personal health, and reinforce the notion that social supports play an important role in the development of health perceptions and behaviours.^{10,20} It is interesting to note that single-parent family structure becomes a significant predictor, with higher self-rated health when social support and involvement, lifestyle variables and psychological distress are controlled for. Similarly, youth living alone becomes a significant predictor of self-rated health when we con-

trol for lifestyle variables and psychological distress. These are intriguing findings and hard to explain. It may be that a certain resiliency exists for youth living in single-parent families or alone, but this finding clearly needs more research to investigate this effect.

Behavioural factors, namely smoking, physical activity and body mass weight, also influence adolescent self-rated health. As expected, adolescents who smoke and have higher weight rated their health lower. However, a counterintuitive effect was found for the highest physical activity on self-rated health, whereby highly active adolescents rated their health more poorly. Whether this group reflects adolescents who commonly receive injuries because of their activities or who are highly concerned about their health and appearance and are active because of their concern remains to be explored. Certainly evidence indicates

that among youth aged 14-17, sports-related injuries are the leading cause of non-fatal injuries.²³ A recent study of Ohio high school students found that 40% of students were injured while exercising, playing sports or being physically active and had to be treated by a doctor or nurse during the 12 months preceding the survey.²⁴ Other studies focus on adolescent athleticism, exercise, body image and dietary practices. For example, Rainey et al.,²⁵ analyzing data from the Youth Risk Behaviour Survey developed by the US Centers for Disease Control, found that physically active youth were more likely to be trying to lose weight than sedentary non-athletes. They concluded that their and other research suggests that "high school athletic participation may exacerbate or diminish pre-existing body perceptions" (p204). However, whether or not body perceptions affect perceptions of self-rated health is unknown and a topic for further exploration.

In conclusion, these findings support Mechanic and Hansell's¹³ contention that adolescent self-assessment of health is an active process involving general cognitive and emotional strategies for understanding the self. Self-assessments of health are based on physical health status and on non-physical determinants. As Mechanic and Hansell¹³ state: "Particular physical symptoms may be given prominence or may be viewed as peripheral compared with other aspects of the self and the social environment. Understanding the determinants of such assessments will help us understand why individuals with comparable physical morbidity and physical impairment vary so widely in their levels of social disability and in their use of medical services" (p365).

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Received: January 22, 2001

Accepted: October 30, 2001

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