Weight and health among children and adolescents attending schools in Moncton, Canada

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Introduction

Obesity and overweight are now a real public health problem. This growing problem is not only found in adults, but also in children and adolescents. Overweight is a risk factor for the development of several chronic diseases such as cardiovascular and respiratory diseases, type 2 diabetes, hypertension and some forms of cancer, as well as early mortality. This increase in obesity is part of an environment that is particularly associated with food abundance, the permanent incentive to consume, but also a very important social pressure on body image.

The purpose of this study is to assess the prevalence of overweight and obesity and some associated risk factors (weight, gender, age, parental weight, and eating habits of subjects) among children and adolescents aged 6 to 17 years in the Greater Moncton Area.

Subjects & Methods

Subjects: Youth aged between 6 and 17 years attending grades one to twelfth in schools in the Greater Moncton area (NB, Canada). Out of 300 subjects who agreed to participate in the study, 263 subjects who met the established criteria were selected.

Anthropometric parameters: The height and weight of the subjects are collected through the self-administered general questionnaire. Height and weight will be used to calculate BMI. Subsequently, BMI will be extrapolated to the age-related BMI growth curves of the CDC 2000.

Assessment of eating habits: The Food Frequency Questionnaire (FFQ) is used to analyze the subjects' food intake. After three 24-hour recalls, this team pulled out 732 foods. Of these, only foods (31 items) that were consumed by more than 10% of young people (healthy weight, overweight and obese) were chosen. This list of 31 energy-dense foods will be used as a frequency questionnaire. This will allow us to compare different weight classes based on their consumption of energy-rich foods.

Statistics: Descriptive analyses were performed for all items. Pearson Chi Square tests are used to determine whether or not there is a significant difference between the average daily intake (grams) calculated for each food based on each weight category. Analysis of variance (ANOVA) is used to determine whether there were significant differences between the percentage of children who consumed the foods in question and the different weight categories. Chi-square and ANOVA analyses were evaluated with a significance level of $p < 0.05$.

Results

Table I presents socio-demographic data and the distribution of subjects by the weight categories (underweight, healthy weight, overweight, and obesity). The results reveal that 3.8% of subjects are in the underweight category, 80.6% in the healthy weight category, 10.3% in the overweight category, and 5.3% in the obesity category. It is among 14-year-olds that we find the lowest percentage of subjects in the overweight category (4.6%) while the highest percentage of overweight is found among 7-year-olds, at 42.1%. Youngest people aged 6 to 9 years have the highest percentages of the overweight category. As for the obesity weight category, the percentages of young people aged 8, 9, 10, 16 and 18 who belong to it are higher than the national average (8%), i.e. 10.5, 17.0, 10.5, 10.9 and 12.9% respectively. The average obesity rate of nine-year-olds, which is 17%, is close to the obesity rates of Off-Reserve Aboriginal Canadian youth of 20%. This average is just over twice the national average.

Table 2 shows the frequency of breakfast and main meal consumption during a week. Among young people of all weight categories, 82.1% of them consume breakfast every day. Young people who consume breakfast each day are less likely to be underweight (4.1%) or overweight (10.2%), compared to their counterparts who rarely consume breakfast (9.6% and 19.0% respectively). In addition, young people who rarely eat breakfast (71.4%) are less likely to have a healthy weight than those who consume it daily (79.7%). Among young people of all weight categories, 94.3% of them consume at least three meals a day, 5.7% consume only two meals a day and none of these young people consume less than two meals a day. Subjects who consume one meal a day or more than three meals a day are more likely to suffer from underweight than their counterparts who consume two or three meals a day. The largest percentage of young people in the healthy weight category is in the category of those who consume more than three meals a day (100%). While the highest percentage of young people in the categories overweight (10.8%), obesity (5.8%) and overweight/obesity combined (16.6%) is found in those who consume three meals a day.

Table 3 shows that the daily (average) amounts of food consumed do not differ by weight category with the exception of butter ($p = 0.09$) and instant tea ($p = 0.013$). Curiously, the subjects in the underweight category who consume more butter than their counterparts. The highest amount of daily consumption of instant tea is found in young people suffering from obesity.

Table 1. Sociodemographic characteristics according to the different weight categories

		N	Underweight Percentile < 5th (N) %	Healthy Weight 5th ≤ Percentile < 85th (N) %	Overweight 85th ≤ Percentile < 95th (N) %	Obesity Percentile≥ 95th (N) %
Subjects		263	(10) 3.8	(212) 80.6	(27) 10.3	(14) 5.3
Sex	Boys	97	(5) 5.1	(73) 75.4	(11) 11.4	(8) 8.1
	Girls	166	(5) 3.0	(139) 83.8	(16) 9.6	(6) 3.6
Age	6	3	(0) 0.0	(2) 66.7	(1) 33.4	(0) 0.0
	7	5	(0) 0.0	(3) 57.9	(2) 42.1	(0) 0.0
	8	10	(2) 21.1	(4) 39.5	(3) 28.9	(1) 10.5
	9	12	(1) 8.5	(7) 57.5	(2) 17.0	(2) 17.0
	10	10	(0) 0.0	(9) 89.5	(0) 0.0	(1) 10.5
	11	49	(2) 4.3	(40) 81.7	(4) 8.1	(3) 5.9
	12	61	(3) 5.1	(48) 78.5	(6) 9.9	(4) 6.5
	13	30	(0) 0.0	(26) 86.8	(4) 13.2	(0) 0.0
	14	23	(0) 0.0	(22) 95.4	(1) 4.6	(0) 0.0
	15	19	(0) 0.0	(18) 94.4	(1) 5.6	(0) 0.0
	16	19	(0) 0.0	(16) 83.6	(1) 5.5	(2) 10.9
	17	14	(1) 7.4	(12) 85.2	(1) 7.4	(0) 0.0
	18	8	(1) 12.9	(5) 61.3	(1) 12.3	(1) 12.9

Table 2. The frequency of consumption of breakfast and main meals during the week

	Frequency	N	Underweight Percentile < 5th (N)%	Healthy Weight 5th ≤ Percentile < 85th (N)%	Overweight 85th ≤ Percentile < 95th (N)%	Obesity Percentile ≥ 95e (N)%
Breakfast	Rarely	11	(1) 9.6	(8) 71.4	(2) 19.0	(0) 0.0
	1-2 times/week	6	(0) 0.0	(6) 100	(0) 0.0	(0) 0.0
	3-4 times/week	12	(0) 0.0	(11) 91.3	(1) 8.7	(0) 0.0
	5-6 times/week	18	(0) 0.0	(15) 82.6	(2) 11.6	(1) 5.8
	Every day	216	(9) 4.1	(172) 79.7	(22) 10.2	(13) 6.0
Main meal	1 meal/day	0	(0) 0.0	(0) 0.0	(0) 0.0	(0) 0.0
	2 meals/day	15	(1) 7.0	(13) 86.0	(1) 7.0	(0) 0.0
	3 r meals/day	241	(9) 3.7	(192) 79.7	(26) 10.8	(14) 5.8
	More than 3 meals/day	7	(0) 0.0	(7) 100	(0) 0.0	(0) 0.0

Table 3. Comparison of daily food consumption (mean in grams (standard deviation)) of foods on the food frequency questionnaire by different weight categories

	Underweight Percentile < 5e N = 10 Mean (SD)	%	Healthy Weight 5e ≤ Percentile < 85e N = 212 Mean (SD)	%	Overweight 85e ≤ Percentile < 95e N = 27 Mean (SD)	%	Obesity Percentile≥ 95e N = 14 Mean (ET)	%
Fries	17.9 (47.2)	14.3	16.4 (61.3)	11.5	45.0 (66.3)	40.0	5.7 (18.9)	**9.1**
Butter	5.0 (6.0)	80.0	1.5 (3.2)	31.3	1.1 (2.4)	24.0	2.2 (3.4)	**40.0**
Koolaid	0.0 (0.0)	0.0	15.9 (69.5)	6.8	19.2 (42.4)	19.2	68.2 (151.7)	**27.3**
Instant tea	**0.0 (0.0)**	**0.0**	**8.3 (56.1)**	**3.2**	**0.0 (0.0)**	**0.0**	**68.2 (161.7)**	**18.2**

Conclusions

The percentage of subjects with a healthy weight decreases, as the BMI of the parents increases. The daily amounts (average in grams) of food consumed do not differ by weight category with the exception of the consumption of butter and instant tea. Overweight subjects consume more fried potatoes than their counterpart. Paradoxically, subjects in the weight category consume more butter than their counterparts in any other weight category.

Caucasian subjects are approaching the combined percentages of obesity and overweight and obesity of Aboriginal Canadians living off reserve.