

Article details: 2013-0088	
Title	The influence of country of birth and ethnicity on BMI among Canadian youth: a national survey
Authors	Atif Kukaswadia, MSc; William Pickett, PhD; Ian Janssen, PhD
Reviewer 1	Laurie Twells
Institution	Memorial University , Pharmacy/Medicine
General comments	<p>This paper examines differences in BMI by country of birth and ethnicity individually and together using a cross-sectional study design. Time since immigration and other health behaviors are examined to determine the potential contribution to BMI differences. The authors use a national data set- the Canadian Health Behaviour in School-Aged Children Study and the Canada Census of Population to conduct the study. Participants were youth in grades 6-10 (weighted n = 19,272). Sociodemographic characteristics such as height, weight, and health behaviours were assessed by the questionnaire administered in the study and the WHO growth references were used to determine mean BMI percentiles by group. The BMI percentile differences in foreign versus Canadian born youth were examined as well as the differences by ethnic groupings. Small but significant differences were found in BMI percentile between foreign and Canadian born youth and the differences did not reduce overtime (the authors expected this to change given previous research on time since immigration). Significant differences in BMI percentiles by ethnic groups were also found.</p> <p>Given the ethnic diversity of Canada this is an interesting study in that what was proposed by the authors- acculturation did not appear to be in effect here. Further research to elucidate this relationship seems warranted and is proposed.</p> <p>I recommend this paper is published in the CMAJ with minor revisions/edits – see below.</p> <p>Abstract</p> <p>Results: The results section could be clarified. I see that the results are presented as differences in mean BMI percentiles but this is not clear in this section. Currently the statements seem to suggest lower BMI's and not percentiles.</p> <p>Interpretation. The last line regarding childhood obesity does not seem to fit here. There is no earlier reference to childhood obesity in the abstract. The results just tell us there are some small but statistically significant differences between some of the groups. The conclusion should be more around understanding differences between foreign and Canadian born youth and the differences that develop over time after immigration.</p> <p>Introduction</p> <p>The rationale for the study is presented- that is when people immigrate to a new country they often adapt the host country's norms, culture, behaviors, health status such as the development of obesity. The theory of acculturation is proposed – new immigrants adapt the host country's way of living (for good or bad) therefore time from immigration becomes an important determinant. In addition ethnicity may also be a determinant as different ethnicities are at increased risk of developing certain conditions. The authors hypothesize that foreign-born youth would have lower BMI than Canadian peers, that the difference would diminish overtime and that differences would exist by ethnicity.</p> <p>Methods</p> <p>The authors describe the methods used in the study in sufficient detail. In brief data is analyzed from a national survey on Canadian youth defined as those in grades 6-10 (a study conducted by the WHO). The sample is large n= 19,272 and appears to be representative of Canadian youth although there were some significant differences between those who participated in the survey and those who didn't (e.g., more 2nd generation than 1st). The response rate differed by ethnicity (64-76%) but would be similar to other population based surveys. Exposure data (birth country, number of years in Canada, ethnicity) was collected on the survey along with information on other covariates/explanatory variables such as those related to socio-demographics and lifestyle.</p> <p>One outcome I would like to see more information on is the <u>BMI percentile</u>. For example how are the percentiles described? Are there percentile ranges that describe normal, overweight or obesity in this population? More information is needed in order to interpret the findings of mean BMI percentile scores in the results section. I appreciate the paper is about</p>

	<p>examining differences but having made the link to obesity in the introduction, this information would be useful.</p> <p>The statistical analysis is appropriate – e.g.,descriptives and a number of multi-level linear regression models with a continuous outcome measure BMI percentile . The overall sample size appears large enough to accommodate for these types of analysis however the groups were dominated by Canadian born youth (92%) leaving much small percentage of different ethnic groups. [Significant differences were found in the analysis suggesting that the sample size was adequate]</p> <p>Results are well presented.</p> <p>Limitations</p> <p>The limitations of any cross sectional study design should be addressed under this section e.g., the survey is based on self- reported survey data with issues of over or under reporting which may affect the results, no temporal relationship can be inferred only associations due to the nature of the data. There appears to be a non-linear relationship between time since immigration and BMI differences but without longitudinal data on the same sample the current result is primarily hypothesis generating.</p> <p>Conclusions</p> <p>This section should include the key findings stated in the abstract and answer the objective of the study as stated “The authors hypothesize that foreign-born youth would have lower BMI than Canadian peers, that the difference would diminish overtime and that differences would exist by ethnicity”. <i>The predictive analysis is a secondary objective. Line 36 Given the myriad of health problems..... There is no link between this statement and either the study objectives or the results.</i> The authors have not shown the sample to be obese or overweight (or made any comment on their BMI classification or health risk) only to demonstrate small but significant differences between the groups under study. The link here with childhood obesity is tenuous and does not appear to make a lot of sense. This sentence should be rewritten to reflect the findings of the current study.</p> <p>Funding: I do not see any reference to funding of the study.</p>
Reviewer 2	Kuo-Chin Huang
Institution	National Taiwan University Hospital, Department of Family Medicine
General comments	The right 2 columns (mean difference and p value) of Table 3 can be deleted.
Author response	<p>Reviewer 1:</p> <p>Comments to the Author The influence of country of birth and ethnicity on BMI among Canadian Youth: A National Survey</p> <p>Review of paper</p> <p>This paper examines differences in BMI by country of birth and ethnicity individually and together using a cross-sectional study design. Time since immigration and other health behaviors are examined to determine the potential contribution to BMI differences. The authors use a national data set- the Canadian Health Behaviour in School-Aged Children Study and the Canada Census of Population to conduct the study. Participants were youth in grades 6-10 (weighted n = 19,272). Sociodemographic characteristics such as height, weight, and health behaviours were assessed by the questionnaire administered in the study and the WHO growth references were used to determine mean BMI percentiles by group. The BMI percentile differences in foreign versus Canadian born youth were examined as well as the differences by ethnic groupings. Small but significant differences were found in BMI percentile between foreign and Canadian born youth and the differences did not reduce overtime (the authors expected this to change given previous research on time since immigration). Significant differences in BMI percentiles by ethnic groups were also found.</p> <p>Given the ethnic diversity of Canada this is an interesting study in that what was proposed by the authors- acculturation did not appear to be in effect here. Further research to elucidate this relationship seems warranted and is proposed.</p> <p>We thank Dr. Twells for their summary of the study, and for taking the time to review it in such depth.</p>

Abstract

1. Results: The results section could be clarified. I see that the results are presented as differences in mean BMI percentiles but this is not clear in this section. Currently the statements seem to suggest lower BMI's and not percentiles.

This was reworded for clarity.

2. Interpretation. The last line regarding childhood obesity does not seem to fit here. There is no earlier reference to childhood obesity in the abstract. The results just tell us there are some small but statistically significant differences between some of the groups. The conclusion should be more around understanding differences between foreign and Canadian born youth and the differences that develop over time after immigration.

This line was removed from the abstract. The focus of the manuscript was on differences between ethnic groups, and in particular differences between Canadian born and foreign born peers of the same ethnicity. This was the focus of the results section of the manuscript.

3. One outcome I would like to see more information on is the BMI percentile. For example how are the percentiles described? Are there percentile ranges that describe normal, overweight or obesity in this population? More information is needed in order to interpret the findings of mean BMI percentile scores in the results section. I appreciate the paper is about examining differences but having made the link to obesity in the introduction, this information would be useful.

The use of BMI percentiles was expanded in the methods section, including references to overweight and obese (page 7, lines 17-18 and 21-22).

Reference

de Onis M, Onyango AW, Borghi E, Siyam A, Nishida C, Siekmann J. Development of a WHO growth reference for school-aged children and adolescents. *Bull World Health Organization* 2007; 85: 660-7. URL: http://www.who.int/growthref/growthref_who_bull/en/index.html (accessed 5 December 2013)

The statistical analysis is appropriate – e.g., descriptives and a number of multi-level linear regression models with a continuous outcome measure BMI percentile . The overall sample size appears large enough to accommodate for these types of analysis however the groups were dominated by Canadian born youth (92%) leaving much small percentage of different ethnic groups. [Significant differences were found in the analysis suggesting that the sample size was adequate]

Results are well presented.

We thank the reviewer for their comments.

Limitations

4. The limitations of any cross sectional study design should be addressed under this section e.g., the survey is based on self- reported survey data with issues of over or under reporting which may affect the results, no temporal relationship can be inferred only associations due to the nature of the data. There appears to be a non-linear relationship between time since immigration and BMI differences but without longitudinal data on the same sample the current result is primarily hypothesis generating.

Temporality is often described (quite rightly) as a limitation of cross-sectional studies. However, our key exposures are place of birth, ethnicity, and time since immigration, which are fixed characteristics. We would argue that in this circumstance it is more or less impossible for the temporality of its relationships to be distorted due to the cross-sectional design. Further, the key measures used in our study have been validated in youth populations, and thus can be interpreted with a high degree of confidence. In addition, these limitations do not form the primary limitations of our study as the time sequence is not the focus. Our limitations, as the reviewer pointed out, are around the measurement of acculturation, as it is with increased acculturation we would hypothesize to see a relationship (page 13, lines 15-18). We used a proxy measure of acculturation, and this forms the major limitations of our study.

Conclusions

5. This section should include the key findings stated in the abstract and answer the objective of the study as stated "The authors hypothesize that foreign-born youth would have lower

BMI than Canadian peers, that the difference would diminish overtime and that differences would exist by ethnicity". The predictive analysis is a secondary objective.

The conclusions reiterated the results from the study abstract (page 14, lines 3-5). The specific findings were not repeated however due to word count restrictions.

6. Line 36 Given the myriad of health problems..... There is no link between this statement and either the study objectives or the results. The authors have not shown the sample to be obese or overweight (or made any comment on their BMI classification or health risk) only to demonstrate small but significant differences between the groups under study. The link here with childhood obesity is tenuous and does not appear to make a lot of sense. This sentence should be rewritten to reflect the findings of the current study.

This sentence was removed.

Funding: I do not see any reference to funding of the study.

This was included in the original submission under the "Acknowledgements" section (Page 15, lines 1-15). Relevant sections are provided below:

"The Canadian HBSC study (PI: John Freeman, William Pickett) was funded by the Public Health Agency of Canada and Health Canada. This analysis was supported by operating grants from the Canadian Institutes of Health Research and the Heart and Stroke Foundation of Canada (MOP 97961; PCR 101415)."

"Atif Kukaswadia was supported by a Canadian Institutes of Health Research Frederick Banting and Charles Best Canada Graduate Scholarships Doctoral Award and Ian Janssen was supported by a Tier 2 Canada Research Chair in Physical Activity and Obesity. The funders did not have any role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; and preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication. "

Reviewer 2:

Comments to the Author

1. The right 2 columns (mean difference and p value) of Table 3 can be deleted.

These two columns were deleted from Table 3.