Author's response to reviews

Title: South Asian Populations in Canada: Migration and Mental Health

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Author's response to reviews: see over
Dear Editors and Reviewers,

Thank you very much for your comments.

Line numbers and page numbers have been added to the manuscript. Please find responses to reviewers’ comments below:

REVIEWER 1:

1. Response rates by immigration status. Can you please give some overall figure of response rates in Canadian born and in immigrants? The 69% seems to be an over-optimistic figure taking into account what has been reported by other studies of immigrants in Canada.

Unfortunately, the Canadian Community Health Survey does not report or calculate response rates for subpopulations. The response rate is only calculated for the overall population surveyed.

2. How are weights computed in CCHS? If participants are weighted by age, sex and region, how can these weights correct for selection bias due to the lower probability of vulnerable groups such as the poor, unemployed, those with little education, immigrants and particularly poor immigrants or isolated immigrants?

The following has been added to the manuscript (more specific information is not provided by the Canadian Community Health Survey):

CCHS weights are calculated based on how many people each person surveyed represents in the population [31]. Following a similar method to the one used to determine the CCHS sampling design, these weights are then post-stratified according to demographic data [31].

3. Validity of auto-rapport of diagnosis? Who are those who have consulted?

Who consults?

The limitations of self-reported diagnosis are discussed in the Discussion section (page 18). As outlined in the Methods section on page 7, Statistics Canada conducts the survey across the country, surveying individuals over the age of 12 in all provinces and territories.

4. Explain better each exposure: The verbatim of questions will help the reader understand the content of questions.

The Canadian Community Health Survey (CCHS) Questionnaire is available online for reference to specific questions. As there were 17 covariate variables, we felt it would be too wordy to include every single CCHS question. The reference for the CCHS questionnaire is provided [reference 27].

MINOR ESSENTIAL REVISION:

5. Please include table 3 in the main text. It is a very important table and I would recommend including it in the main text of the paper. The finding of higher prevalence of mental health problems in those immigrating before age 18 gives
some evidence of intergenerational vulnerability and it is particularly important
given that these adolescents are the new generation of Canadians.

Table 3 has been reformatted to fit a portrait page layout (as opposed to the original landscape layout). It can be found on page 33.

MAJOR COMPULSORY REVISIONS:

6. Discussion should comment results of table 3. Please comment on lower education of Canadian born South Asians. Is this a sign of vulnerability of the second generation of SA immigrants?

The following has been added to the Discussion: (page 16)
This study found important differences in the South Asian immigrant and South Asian Canadian-born population aged 25-64 years old, which may be related to mental health outcomes. South Asian Canadian-born populations had significantly higher proportions of those who were younger (25-44 years old), not married, had no children, less educated (high school education or less), experiencing income inadequacy, food insecurity, and not currently employed. On the other hand, South Asian Canadian-born populations had higher proportions of those who reported no chronic conditions and were more physically active. Many of these factors may be related to the younger age of South Asian Canadian-born populations. However, the SES indicators that emerged may have important implications. Food insecurity was the most significant factor associated with extremely stressful life stress for South Asian immigrants. Increased economic assistance from the government for immigrants may help to alleviate this. Moreover, the SES indicator of working status emerged as an important factors related to mental health for South Asian Canadian-born populations. Further research into the impact of SES on mental health for South Asian sub-populations is warranted.

7. Please comment on possible reasons for the higher prevalence of mood disorders among South Asian women. Is this due to gender associated power imbalance or to social isolation, or domestic violence or more exposure to extreme poverty? Is there any literature on this?

This is not peculiar to South Asian women. The sex difference for mood disorder risk has been established across cultures and nations. The following has been added to the manuscript:

For example, female immigrant South Asians were at almost a three-fold greater risk of mood disorders in comparison to their male counterparts (this sex difference where women are at a greater risk of mood disorders has been established in the literature cross-nationally [37]). (page 17)

8. Please, discuss selection bias due to inclusion of those less exposed and with better health

The following has been added to the manuscript: (page 19)

The prevalence rates of mental health are reported estimates and not true prevalence estimates, since not all households chose to participate in the CCHS survey (78% response rate) and certain populations were excluded from the CCHS (those residing on Indian Reserves, institutions, remote regions, and full-time members of the Canadian Forces). Members of South Asian populations with the four mental health outcomes analyzed in this study may have been more or less likely to choose to participate in the
survey. As a result, as with all epidemiological surveys, the prevalence rates calculated are only estimates. Caution needs to be exercised in interpreting them.

9. Please, discuss weightings and qualitatively, state to what extent these weights can correct for selection bias.

The information provided by the Canadian Community Health Survey has been added to the methods section.

10. Could there be under-diagnosis of mental health problems? Any additional information on potential under-diagnoses could help.

The following has been added to the manuscript: (page 18)

Those who did not have a regular medical doctor were more likely not to self-report anxiety disorder and high life stress risk amongst Canadian-born South Asian populations. It is estimated that about 15.3% of Canadians do not have access to a regular medical doctor (Statistics Canada, 2014). Not having a family doctor that can diagnose and identify mental health issues may lead to underreporting of these mental health outcomes.

11. Confounders: Clarify comments on discrimination and belonging to community (which community?)

Sense of belonging to the community was asked as a survey question the CCHS. Which community was not clarified in the question and it was up to the respondent to interpret it as he/she wished.

12. Conclusions are not well supported by the data since they do not seem to be direct consequences of results.

13. Results point to the increase vulnerability of some sub-groups. Vulnerability of first generation immigrants is related to age at immigration, gender and extreme poverty, represented by food insecurity and poor communication skills. Public policies should address the special needs of these subpopulation of first generation immigrants, mostly poor women who came to Canada before age 18 and have no small children at home. Vulnerability of second generation is more related to lack of work integration and physical inactivity. The authors could better discuss the different profiles of mental health risks of first and second generation immigrants addressing intergenerational vulnerability.

The following has been added to the Implication section on page 21:

Female gender, having no children under the age of 12 in the household, food insecurity, poor-fair self-rated health status, being a current smoker, immigrating to Canada before the age of 18, and taking the CCHS survey in either English or French was associated with greater risk of negative mental health outcomes for South Asian immigrant populations, while not being currently employed, having a regular medical doctor, and inactive physical activity level were associated with greater risk for South Asian Canadian-born populations. In terms of policy implications, the study findings suggest that South Asian immigrant populations require better economic support and assistance upon arrival in Canada in order to mitigate negative mental health outcomes. The effects of this lack of economic and workforce
integration were also seen in the second-generation Canadian-born South Asian population, where not being employed emerged as a significant risk factor of negative mental health outcomes.

REVIEWER 2

Major Compulsory Revisions:
The manuscript is hard to follow as it doesn’t not page numbers.

Page numbers have been added to the manuscript.

It is a bit odd to begin the paper by just mentioning the numbers of the South Asian populations in Canada.

The Abstract has been changed to include the following:
South Asian populations are the largest visible minority group in Canada; however, there is a dearth of information on the mental health of South Asian populations.

The introduction paragraph should have provided a few statements about the focus and research objectives of this study.

The Background section has been edited to begin with the objective of the study:
This study’s objective was to determine the prevalence rates and characteristics associated with mental health outcomes for South Asian populations in Canada.

A more specific definition of “South Asian,” particularly the one used in Census in Canada should be explained.

The following has been added to page 4:
The Census defines “South Asian” as those who self-identify as having “ancestry that originates in South Asia, including those reporting their origin as at least one of Bangladeshi, Bengali, East Indian, Goan, Gujarati, Kashmiri, Pakistani, Punjabi, Nepali, Sinhalese, Sri Lankan, Tamil, or South Asian.”

With the discussion of the numbers related to the South Asian populations at the beginning of the paper, please also mention the importance of studying their mental health.

This information was provided in the next paragraph under the heading: Mental health of South Asian populations in Canada.

Within the section on “Mental health of South Asian population”, the authors should explain the potential reasons for NPHS reporting lower depression rates for the South Asian populations in Canada. When compared with the Calgary study, which finding is considered to be more accurate?

We are not sure if the accuracy of the two reports can be compared and commented upon. The two studies were different – one was based on secondary data analysis of a national survey and the other was primary data analysis on a specific subset of South Asian populations (older adults) in a specific city (Calgary).
The authors mentioned that migration stress was a risk factor mental health in the immigrant groups. However, according to the beginning page of the paper, a significant proportion of the South Asian populations in Canada have been in Canada for within 20 years. It would be useful for the authors to clarify how long lasting the migration stress would last. What specifically does migration stress mean and what is it related to in terms of the mechanism that affects mental health?

The following has been added to the manuscript (page 5):
Both premigration (circumstances leading to migration, i.e. in the cases of war trauma for refugees) and postmigration factors (loss of social status, social support, separation from family, difficulty integrating into a new culture, and lack of employment) can be sources of stress for newcomers (Beiser & Edwards, 1994).

What does it mean by “open-ended survey” under the subtitle of Migration as a determinant of mental health”.

The following has been added for clarification: (page 5)
In an open-ended survey, where South Asian populations in Toronto were asked to write in their responses to a questionnaire, migration and the culture clash between the parental first generation of immigrants and second generation of South Asian youth were identified as risk factors for mental health and sources of stress, anxiety, depression, and identity loss [10].

The authors indicated that most research conducted on South Asian populations relied on self-reported life stress. The authors should then clarify to what extent the CCHS data were not collected via self-reporting.

It was stated that the outcome of self-reported life stress has been neglected in the literature (page 6).

In terms of data source, how big is the original sample in CCHS? The sample size of the South Asian cases should be mentioned in the data source section but not just in the result section.

The following has been added in the Methods section on page 8:
This study examined data on South Asian populations across five CCHS cycles from 2007-2011 (unweighted n = 3918; weighted n = 5,962,903).

More clarity is needed to explain how the subgroups in the mental health measures were regrouped. For example, is the “fair” group includes the excellent, very good, good, and fair groups when measuring self-perceived mental health? How about other measures? Please be specific about the groupings.

Thank you for the comment. It has been clarified on page 9.

It is difficult to argue that martial status, sense of belonging and number of children are measures of social support.
The “roles and attachments available subscale” of the Older Americans Resources and Services (OARS) Social Support Scale parameters is based on questionnaire items on marital status, number of living children, and number of living siblings (Blazer, 1982). Sense of belonging has been shown to be related to social and psychological functioning (Hagerty et al., 1996).


Using “health and behavioral factors” as covariates for health dependent variables could be problematic due to multicolinearity and conceptual overlapping. These health covariates are actually health outcome variables, particularly for self-rated health.

Self-perceived health status and the physical health component score (PCS) were used by Lai and Surood (2008) as potential determinants of depression for South Asian older adults in Calgary. These physical health variables emerged as the most significant factors associated with depression after controlling for socio-demographic and culture-related factors. We felt these were important variables to include.


When calculating influential statistics, standardized weight should be calculated and applied. The sole application of the sample weights provided in the data file may not be sufficient. Please clarify this issue. The use of bootstrapping should be further clarified and more explicitly discussed.

Analysts at Statistics Canada were consulted regarding the best method of weight application. Their recommendations and guidance was followed in calculating the bootstrapped weights and applying them in this study. The following has been added to the manuscript (page 10):
Sample weights are re-calculated for simple random samples taken repeatedly from the CCHS dataset repeatedly [31]. These weights are then post-stratified for each stratum [31]. This process is repeated 500 times and results in the calculation of 500 bootstrapped weights for each cycle of the CCHS [31]. Statistics Canada has developed programming to carry out these calculations. The application of bootstrapped weights to the inferential statistics was done in consultation with analysts at Statistics Canada.

It is also unclear how the focus of the study suddenly shifted to testing healthy immigrant effect. The authors did not really give a fair discussion to healthy immigrant effect in the literature review section of this paper. I am not sure that using healthy immigrant effect as the analytic framework for this study is appropriate.
Thank you for pointing this out. References to the healthy immigrant effect have been removed from the Discussion section.

**For the differences identified between the Canadian born South Asians and the immigrant South Asians, the authors have failed to provide further explanation for the reasons. This is a critical component missing in the discussion section.**

The following has been added to the Discussion: (page 16) Patterson et al. (2012) found the highest prevalence rates and risk of mood disorders, anxiety disorders and substance abuse amongst those who had immigrated to Canada before the age of 6 even after adjusting for age, sex, region of origin, marital status, urbanicity, household income, and household size. Mental health programming needs to concentrate on those who migrate to Canada in early childhood as they are at a greater risk for mental health issues. In Guzder, Yohannes, and Zelkowitz’s (2013) study comparing Canadian-born and immigrant parents of children with mental health issues in Montreal, immigrant parents were more likely to report barriers in accessing mental healthcare, including the dearth of family doctors and presence of language barriers. Kirmayer et al.’s (2007) concluded that cultural or language barriers may be related to the lower prevalence rates of mental health service utilization for immigrants compared to Canadian-born populations in Montreal. Targeted mental health promotion is needed to address these gaps. This study found important differences in the South Asian immigrant and South Asian Canadian-born population aged 25-64 years old, which may be related to mental health outcomes. South Asian Canadian-born populations had significantly higher proportions of those who were younger (25-44 years old), not married, had no children, less educated (high school education or less), experiencing income inadequacy, food insecurity, and not currently employed. On the other hand, South Asian Canadian-born populations had higher proportions of those who reported no chronic conditions and were more physically active. Many of these factors may be related to the younger age of South Asian Canadian-born populations. However, the SES indicators that emerged may have important implications. Food insecurity was the most significant factor associated with extremely stressful life stress for South Asian immigrants. Increased economic assistance from the government for immigrants may help to alleviate this. Moreover, the SES indicator of working status emerged as an important factors related to mental health for South Asian Canadian-born populations. Further research into the impact of SES on mental health for South Asian sub-populations is warranted.

The discussion of this paper did include some implications related to service delivery. However, if most of the significant predictors of mental health are socially related, what would be the role of psychiatry? For the purpose and mandate of this journal, it is important for the authors to connect the results to clinical psychiatric practice.

“BMC Psychiatry is an open access, peer-reviewed journal that considers articles on all aspects of the prevention, diagnosis and management of psychiatric disorders, as well as related molecular genetics, pathophysiology, and epidemiology.” This study offers the social epidemiological perspective to the mental health of South Asian populations in Canada. We feel that there are real implications for mental health service planning and delivery. The following has been added to clarify these implications for practitioners further: (page 17-18) Mental healthcare professionals and outreach programs for mood disorders can use this information to target female South Asian immigrant populations knowing that this is a particularly at-risk population. Mood disorder mental health programs tailored to South Asian immigrant populations could target women, those living in food insecurity, current smokers, and those who immigrated before the age of
18. On the other hand, mood disorder programs tailored for South Asian Canadian-born populations may potentially target those who are currently not working and not physically active.

In terms of the limitations of this study, issues related to sample size of South Asian participants should be discussed.

The following has been added to the Discussion (page 20):

As South Asian populations are a relatively new community in Canada, the sample size of Canadian-born South Asians was low. Data across five CCHS cycles was merged in order to increase sample size and power, however, the Canadian-born South Asian sample (unweighted n = 523) still remained relatively small. Findings related to this group also need to be interpreted with caution.

Thank you again for all the helpful suggestions and comments.

Sincerely,

Farah Islam