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ORIGINAL ARTICLE

# Alcohol consumption change of English, French and Chinese speaking immigrants in Ottawa and Gatineau, Canada

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**Abstract**
*Aim* The multicultural study aimed at examining alcohol consumption change or drinking change of English, French and Chinese speaking immigrants in Ottawa and Gatineau, Canada, and identifying demographic factors that impact the change.
*Subjects and methods* In all, 810 immigrants of three language sub-groups were recruited by purposive-sampling. Using self-reports, respondents answered questions regarding drinking change and demography in the Multicultural Lifestyle Change Questionnaire in either the English, French or Chinese versions. Data on drinking were analyzed statistically.
*Results* The immigrants of different gender, language and category sub-groups exhibited different drinking rates, drinking rates before immigration, drinking rates after immigration, drinking change rates and drinking belief change rates. Drinking change (drinking behavior change+drinking belief change) was correlated positively with mother tongue and negatively with gender. Drinking behavior change was negatively correlated with gender and category of immigration. Mother tongue and gender significantly impacted drinking change. Gender significantly impacted drinking behavior change.
*Conclusion* The immigrants of different sub-groups in Canada experienced different drinking change. Mother tongue and gender were main impacting factors. Culture and acculturation were important contributing factors. Data of immigrant drinking change may provide evidence for drinking policy-making and policy-revising in Canada.

**Keywords** Immigration · Culture · Acculturation · Alcohol consumption change · Difference · Impacting factors

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## Background

Canadian immigrants generally showed lower rates of alcohol consumption and binge drinking than Canadian-born residents (Ali 2002; McDonald 2005). In particular, English and French speaking immigrants from Africa had the lowest rates of alcohol dependence in Canada (Statistics Canada 2002). However, alcohol consumption of some of immigrant men increased with years spent in Canada, but no significant change was observed in immigrant women (McDonald 2006). The majority of Canadian immigrant youth aged 15 to 25 drank alcohol occasionally (Mulira 2010). A study exposes that immigrant youth who have been in Canada for less than 10 years are less likely to drink than Canadian-born youth (Kunz 1999). No study has compared alcohol consumption between different cultural immigrant sub-groups in literatures and reports.

English-speaking immigrants represent one of the largest ethnic or cultural immigrant sub-groups in Canada (Statistics Canada 2009), while French-speaking immigrants are one of principal ethnic immigrant groups in Ottawa (Ontario)–Gatineau (Québec) region (Roy et al. 2007; Statistics Canada 2009). Chinese-speaking immigrants have constituted the largest ethnic immigrant sub-group entering Canada and one of the fastest-growing sub-groups in Canada since 1987 (Man 2004; Lu 2008).

The main objectives of this study were to explore the differences in drinking change (drinking behavior change and drinking belief change) among different sub-groups of immigrants as well as to explore the covariates associated with the change. The explorations show far-reaching significance in multicultural health research, health care, health policy-making and health-promoting programs in Canada.

## Methods

### Survey method

English, French and Chinese speaking immigrants at adult educational centres/schools, Christian community churches and residential communities in Gatineau and Ottawa of Canada were identified as the target population of this multicultural cross-sectional study. Random sampling was deemed impracticable for the study and could bring greater bias because immigrant status of these three ethnic sub-groups could not be identified effectively according to the sampling criteria. Purposive-sampling method was therefore applied in the multicultural study to recruit qualified immigrant participants (RMKB 2006; Statistics Canada 2010). The participants must have been 18 years or more, have resided in Ottawa or Gatineau 1 year or more, and had been 16 years or more when they arrived in Canada. In total, 810 qualified English, French and Chinese volunteer immigrant participants were recruited for the study. Using self-reports, all participants answered questions regarding alcohol consumption change/drinking change and demography in the Multicultural Lifestyle Change Questionnaire in either the English, French or Chinese versions. The Multicultural Lifestyle Change Questionnaire was demonstrated by a pilot-test in the three immigrant sub-groups to have high validity (Pearson correlation coefficient $r$=0.435>satisfactory value 0.40) (Eshaghi et al. 2006; Ekeberg et al. 2008), and reliability (alpha coefficient $\alpha$=0.754> satisfactory value 0.70) before the multicultural study (Grau 2007; Hopkins et al. 2010).

Drinking subjects were regarded as the sum total of drinking subjects before immigration, drinking subjects after immigration and drinking subjects both before immigration and after immigration. Drinking behavior change (dependent variable) was identified based on response choice of the drinking question "Which of the following best describes you?". The answer options for the question were as follows: (A) You have never drunk alcohol (including any alcoholic beverage); (B) You drank alcohol before arrival in Canada, but quit after arrival, (C) You did not drink alcohol before arrival in Canada, but began to drink alcohol after arrival, (D) If you drank alcohol both before arrival and since arrival in Canada, go to the questions below the section on drinking quantity. The respondent was identified as experiencing drinking behavior change if option (B) or (C) was chosen.

Drinking quantities before and after immigration were identified according to the response choices for two questions of drinking quantity: "In the last year before arrival in Canada, on average, how much alcohol (beer, wine) did you drink each day?" (question one) and "In the past year in Canada, on average, how much alcohol (beer, wine) did you drink each day?" (question two). The response options for both of the two questions were as follows: (1) "1/2 bottle of beer or less, or a glass of wine or less", (2) "1–1.5 bottles of beer, or 2–3 glasses of wine", (3) "2–3 bottles of beer, or 4–6 glasses of wine", (4) "4 bottles of beer or more, or 7–8 glasses of wine or more", (5) "Do not know". The respondent was also identified experiencing drinking behavior change if there were different choices in the options for the two questions except option (5) (i.e. picking option (1) for question one and choosing option (2) for question two).

Drinking belief change (dependent variable) was identified based on the response choices for two drinking belief questions: "Before arrival in Canada, which of these statements best describes your belief with regards to drinking alcohol?" (question one) and "Since arrival in Canada, which of these statements best describes your belief with regards to drinking alcohol?" (question two). The response options for both questions were as follows: (1) "Excessive drinking of alcohol is extremely bad for health", (2) "Excessive drinking of alcohol is very bad for health", (3) "Excessive drinking of alcohol is bad for health", (4) "Excessive drinking of alcohol is somewhat bad for health", (5) "Excessive drinking of alcohol is less than somewhat bad for health", (6) "Excessive drinking of alcohol is not bad for health", (7) "Do not know". The respondent was identified as experiencing drinking belief change if there were different choices in the options for the two questions except option (7) (i.e. picking option (1) for question one and choosing option (2) for question two).

Immigrant status of English or French or Chinese speaking subjects was identified by the response for the "original country" question – "What is your country of origin?". Demographic characteristics (independent variable) of the study population were identified according to the response choices for the demographic questions relating to "mother tongue", "spoken language", "age", "gender", "marital status", "category of immigration", "duration of residence", "education", "employed status", "employed status", "occupation", "religion" and "income". Data in drinking were analyzed statistically for the different immigrant sub-groups.

### Data analysis method

Rate of drinking was calculated including, respectively, drinking rate, drinking rate before immigration, drinking rate after immigration, drinking change rate, drinking belief change rate

in the sampled immigrant subjects, the gender (male and female) sub-groups, the language (English, French and Chinese) sub-groups and the category (principal applicant immigrant, spouse and dependant immigrant, family class immigrant, other/refugee immigrant) sub-groups. Chi-square tests were performed to test if there were significant differences between the rates for different sub-groups in drinking. Following the descriptive analysis, correlation analysis was performed to test if there was correlation between demographic (independent) variables—mother tongue, age, gender, category of immigration, duration of residence in Canada and drinking (dependent) variables —drinking change (drinking behavior change+drinking belief change) and drinking behavior change. The objectives were to measure a relationship between the independent variables and the dependent variables. Finally, multiple/multivariable linear regression analysis was used to determine if the independent variables had significantly impacted the dependent variables.

## Results

### Percentages in drinking

Table 1 presents the drinking change by population sub-groups.

### Significance level

Table 2 presents the significance level of drinking change rates.

### Multivariate analysis (correlation and regression analysis)

Table 3 presents multivariate (correlation and regression) analysis results in drinking change.

## Discussion

### Total sampled subjects

The results regarding drinking show that the immigrants in Ottawa and Gatineau, Canada had a higher drinking rate (50.25 %), drinking rate before immigration (39.14 %) and drinking rate after immigration (43.21 %). Most of immigrants increased consumption of alcohol because their drinking rate after immigration was higher than drinking rate before immigration. A total of 29.75 % of immigrants experienced drinking behavior change; however, 37.41 % of immigrants changed their drinking belief after immigration. It is worth noting that the drinking belief change rate of the immigrants was higher than their drinking behavior change rate, which discloses that drinking behavior change was not compatible with drinking belief change. It seems that drinking behavior and drinking belief have a different level of acculturation (Pedersen et al. 2011). Acculturation has been broadly described as "the process by which immigrants adopt the attitudes, values, customs, beliefs, and behaviors of a new culture" (LaFromboise et al. 1993; Pérez-Escamilla and Putnik 2007). Acculturation is an indication of the cultural change of minority individuals to the majority culture (Mainous et al. 2008). Drinking belief could have a higher acculturation level than drinking behavior. Because of the difference in cultures of origin, some of immigrants could have a higher acculturation level of drinking behavior, while others could have higher acculturation level of drinking belief. Some of immigrants who changed drinking belief did not change their drinking behavior.

In the multicultural study data, drinking rate (50.25 %) and drinking rate after immigration (43.21 %) of the immigrants were greatly lower than the alcohol "lifetime use" sate (91.0 %) and alcohol "past 12 month use" rate (78.4 %) of Canadian citizens (aged 15 or more) in the 2012 Canadian Alcohol and Drug Use Monitoring Survey (HC-Alcohol 2013). Therefore, drinking rate after immigration of the immigrants was lower than "current alcohol use" rate of the Canadian citizen.

It is known that drinking change was associated with drinking acculturation (Caetano and Mora 1988, Pedersen et al. 2011). Acculturation was negatively associated with alcohol use (Parikh et al. 2009). Some of studies reveal that acculturation might drive drinking change, and higher acculturation was associated with a greater likelihood of high alcohol intake (Su et al. 2002; Abraido-Lanza et al. 2005). Some of researchers indicate that the association between acculturation and alcohol use disorders did not appear to be linear and the effect of acculturation was not uniform on individuals' drinking behavior (Caetano et al. 2008).

### Gender sub-groups

The data reveal that different immigrant gender sub-groups had different rates in drinking or alcohol consumption. All of rates (drinking rate, drinking rate before immigration, drinking rate after immigration, drinking change rate, drinking belief change rate) of male immigrants were higher than those of female immigrants. It appears that male immigrants faced or encountered more challenges and had more psychological pressure after immigration, and they had greater drinking change.

Drinking rate (65.94 %) and drinking rate (59.61 %) after immigration of male immigrants in the multicultural survey were greatly lower than alcohol "lifetime use" rate (92.0 %) and alcohol "past 12 month use" rate (82.7 %) of male Canadian citizens (aged 15 or more), and drinking rate

**Table 1** Immigrant drinking change rate

| Item | | Alcohol consumption/drinking | | | | |
|---|---|---|---|---|---|---|
| | | Drinking rate %[a] | Drinking rate before immigration %[b] | Drinking rate after immigration %[c] | Drinking behavior change Drinking change rate %[d] | Drinking belief change Drinking belief change rate %[e] |
| Total sampled immigrant subjects (810) | | 50.25 | 39.14 | 43.21 | 29.75 | 37.41 |
| Gender sub-groups | Male immigrants (411) | 65.94 | 51.09 | 59.61 | 39.42 | 43.07 |
| | Female immigrants (399) | 34.34 | 26.82 | 26.07 | 19.05 | 31.58 |
| Language sub-groups | English immigrants (278) | 47.12 | 30.94 | 41.01 | 28.78 | 27.34 |
| | French immigrants (268) | 61.19 | 47.76 | 51.87 | 35.45 | 45.52 |
| | Chinese immigrants (264) | 42.80 | 38.43 | 35.99 | 23.49 | 39.77 |
| Category sub-groups | Principal applicant immigrants (193) | 63.21 | 55.96 | 55.96 | 32.12 | 41.97 |
| | Spouse and dependent immigrants (193) | 39.38 | 26.94 | 34.20 | 22.80 | 34.20 |
| | Family class immigrants (354) | 47.18 | 35.88 | 40.11 | 29.94 | 36.16 |
| | Refugee immigrants (70) | 61.43 | 42.86 | 47.14 | 37.14 | 40.00 |

[a] Drinking rate=drinking subjects before immigration+drinking subjects after immigration+drinking subjects both before immigration and after immigration/sampled subjects (810)×100 %

[b] Drinking rate before immigration=drinking subjects before immigration/sampled subjects×100 %

[c] Drinking rate after immigration=drinking subjects after immigration/sampled subjects×100 %

[d] Drinking change rate=drinking subjects before immigration+drinking subjects of increasing or decreasing cigarette consumption after immigration/sampled subjects×100 %

[e] Drinking belief change rate=subjects of drinking smoking belief change after immigration/sampled subjects×100 %

**Table 2** Significance level of rates in drinking change

| Item | Chi-square | *p*-value | Significant difference |
|---|---|---|---|
| Rates for male and female immigrant sub-groups in drinking | 11.000 | 0.358 | No |
| Rates for English, French and Chinese immigrant sub-groups in drinking | 30.000 | 0.363 | No |
| Rates for principal applicant, spouse and dependent, family class, other/refugee immigrant sub-groups in drinking | 60.000 | 0.182 | No |

Significance level: $p<0.05$

(34.34 %) and drinking rate (26.94 %) after immigration of female immigrants were greatly lower than alcohol "lifetime use" rate (89.3 %) and alcohol "past 12 month use" rate (74.4 %) of female Canadian citizens (aged 15 or more) in the 2012 Canadian Alcohol and Drug Use Monitoring Survey (HC-Alcohol 2013). Thus, drinking rates after immigration of male and female immigrants could be respectively lower than "current alcohol use" rates of male and female Canadian citizens.

Some of studies show that acculturation has different effects on drinking for men and women (Caetano et al. 2008; Vaeth et al. 2012). A research finding discloses that acculturation effects on drinking outcomes were stronger for female immigrants than male immigrants (Mills and Caetano 2012). Similarly, acculturation has a direct effect on drinking status for women but not for men (Alaniz et al. 1999). Further, acculturation had a more consistent association with increased drinking and binge drinking among women than among men (Vaeth et al. 2012) . The effect of acculturation was gender-specific in drinking (Vaeth et al. 2012). However, the results of the multicultural drinking study reveal that drinking change rate of immigrant males was higher than that of immigrant females, which did not support that immigrant females have higher levels of drinking acculturation.

## Language sub-groups

The data exhibit that different immigrant language sub-groups had different rates in drinking. Amongst the three immigrant language sub-groups, French immigrants had the highest rates in drinking, while English Immigrants had the lowermost drinking rates before immigration (30.94 %) and drinking belief change rate (27.34 %). However, Chinese immigrants had the lowermost drinking rate (42.80 %), drinking rate after immigration (35.99 %) and drinking change rate (23.49 %). It is obvious that French immigrants had the greatest drinking behavior change, English immigrants followed French immigrants, and Chinese immigrants exhibited the least drinking behavior change. The drinking rate of Chinese immigrants decreased after immigration, but drinking rates of English and French immigrants increased.

Meanwhile, the results reveal that French immigrants had the highest drinking belief change rate (45.52 %) or the greatest drinking belief change, while Chinese immigrants had lower drinking belief change rates (39.77 %) or less drinking belief change. However, English immigrants had the lowermost drinking belief change rates (27.34 %) or the least drinking belief change. Evidently, because of environmental change, immigrants experienced drinking belief change, while different ethnic and cultural sub-groups exhibited different changes.

It appears that culture is an important factor impacting drinking behavior and drinking change as pertains to the ethnic or language sub-groups. Research shows that alcohol use patterns and prevalence of alcohol–related problems varied among ethnic groups or sub-groups (Galvan and Caetano 2003). For example, Asian immigrants had high rates of alcohol abstention and low rates of heavy alcohol use and culture-impacted drinking patterns of different ethnic groups in the US (Caetano and Mora 1998), and ethnic drinking cultures may significantly influence alcohol use by Asian Americans (Cook et al. 2012). Similarly, Chinese immigrant adolescents from mainland China living in the United States were less likely to be drinkers than adolescents from the other two sub-cultures (Chinese adolescents from Hong Kong and American-burn Chinese adolescents) (Lo and Globetti 2001). Additionally, in another instance, the number of days of drinking of Latino immigrants in the US declined significantly post-immigration (De La Rosa et al. 2013).

It seems that immigrants of different language sub-groups had different levels of drinking acculturation, which resulted in their different drinking rates after immigration and different drinking change rate. Chinese immigrants had the least drinking rate after immigration and greater drinking change, which appears that they have lower level of drinking acculturation than English and French immigrants. A study revealed that greater levels of past drinking were associated with more acculturation into the mainstream US society for Hispanic veterans (Verney 2007), while another study showed that first generation South Asians and linguistically acculturated Vietnamese were at an increased risk of binge drinking (Becerra et al. 2013).

## Category sub-groups

The study results expose that different immigrant category sub-groups had different rates in drinking. Among the four

**Table 3** Multivariate analysis results in drinking change

| Correlation analysis | | | | Multiple linear regression analysis | | | |
|---|---|---|---|---|---|---|---|
| Dependent variable | Independent variable | Pearson's $r$ | $p$-value | Correlation between independent variable and dependent variable | Dependent variable | Independent variable | $p$-value | Impact of independent variable on dependent variable |
| Drinking change (drinking behavior change+drinking belief change) | Mother tongue | 0.127 | 0.000 | Positive correlation | Drinking change (drinking behavior change+drinking belief change) | Mother tongue | 0.000 | Significant impact |
| | Gender | –0.238 | 0.000 | Negative correlation | | Gender | 0.000 | Significant impact |
| Drinking behavior change | Gender | 0.121 | 0.001 | Negative correlation | Drinking behavior change | Gender | 0.000 | Significant impact |
| | Category of immigration | –0.086 | 0.014 | Negative correlation | | | | |

Significance level:$p<0.05$

immigrant category sub-groups, principal applicant immigrants had the highest drinking rate (63.21 %), drinking rate before immigration (55.96 %) and drinking rate after immigration (55.96 %), while the category of spouse and dependent immigrants had the lowermost rates in drinking. It is known that drinking rate (61.43 %), drinking rate before immigration (42.86 %) and drinking rate after immigration (47.14 %) of other (refugee) immigrants were lower than those of principal applicant immigrants, but higher than those of family class immigrants and spouse and dependent immigrants. Drinking rate (47.18 %), drinking rate before immigration (35.88 %) and drinking rate after immigration (40.11 %) of family class immigrants were higher than those of spouse and dependent immigrants.

However, the result reveals that other (refugee) immigrants had the highest drinking change rate (37.14 %) and the greatest drinking change, while principal applicant immigrants had the second highest drinking change rate (32.12 %) and the second greatest drinking change. The drinking change rate (29.94 %) of family class immigrants was lower than that of other (refugee) immigrants and principal applicant immigrants, but higher than those in the category of spouse and dependent immigrants. It is apparent that spouse and dependent immigrants had the lowermost drinking change rate (22.80 %) and the least drinking change. However, except for drinking rate of principal applicant immigrants, drinking rates of immigrants of other three sub-groups increased after immigration.

Meanwhile, the results of this drinking study expose that principal applicant immigrants had the highest drinking belief change rate (41.97 %), while other (refugee) immigrants had a slightly lower drinking belief change rate (40.00 %). The drinking belief change rate (36.16 %) of family class immigrants was lower than that of principal applicant immigrants and other (refugee) immigrants, but higher than that (24.20 %) of spouse and dependent immigrants. Obviously, the immigrant category sub-group of the largest drinking belief change was principal applicant immigrants, the second one was other (refugee) immigrants, and the third and least ones were respectively family class immigrants and spouse and dependent immigrants. It seems that principal applicant immigrants more easily accepted Canadian culture and foreign culture and had higher drinking acculturation and higher drinking belief change. On the other hand, more family class immigrants and spouse and dependent immigrants kept their original drinking belief; however, it is unclear whether other (refugee) immigrants had higher drinking belief change rates and greater drinking belief change. It is inferred that immigrants of different sub-group categories could have different levels of drinking acculturation, contributing to a difference in drinking change.

### Significance level

Though significance analysis results show that there was no statistical significance difference between rates in drinking change in different immigrant sub-groups, there were greater or very great percentage differences between some of rates in drinking change.

### Multivariate analysis

The analysis results of correlation show that drinking change (drinking behavior change+drinking belief change was positively correlated with mother tongue and negatively correlated with gender. The analysis results of regression disclose that mother tongue and gender significantly impacted drinking change. They were determinants of drinking change; however, the analysis results of correlation reveal that drinking behavior change was negatively correlated with gender and category of immigration. Gender and category of immigration influenced drinking behavior change, but the analysis results of multiple linear regression expose that gender significantly impacted drinking behavior change. They were determinants of drinking behavior change such as gender, which was the main determinant factor of both immigrant drinking change and drinking behavior change. The drinking belief of immigrants did not change accordingly with drinking behavior and duration of residence in Canada; however, immigrants of different ethnic or linguistic groups did experience different belief changes because of a difference in the acceptability of a new drinking belief. Mother tongue was correlated with drinking change instead of drinking behavior change. Therefore, mother tongue was correlated with drinking belief change. The immigrants with different linguistic, cultural or social backgrounds indicated different data regarding drinking belief change. Original culture and/or acculturation of immigrants were important impacting factors in their drinking belief change.

Believably, the results of this drinking change study provide evidence for making and/or revising policies related to immigrant health in Canada, which may regulate or adjust health care and service for immigrants, and make more effective drinking health promotion programs to lessen immigrant risk of diseases relating to excessive drinking, and to reduce health inequality and inequity for immigrants. The data may help Health Canada policy makers in the decision-making and policy-revising process to source and consider evidence of drinking change for the vulnerable and/or marginalized population, and to appropriately adapt evidence, prior to and during the formulation of new health policies or revising previous health policies. Thus, Canadian immigrants would be able to improve their health to better contribute to Canadian economic and social development.

## Conclusion

The immigrants of different gender, language and category sub-groups in Canada showed a difference in their experience regarding alcohol consumption change or drinking change. Mother tongue and gender were main factors impacting drinking change, while gender was a principal factor influencing drinking behavior change. Drinking behavior change was not in accord with drinking belief change, and drinking behavior change and drinking belief change did not contribute identically to drinking change. Culture and acculturation were important factors contributing to drinking behavior change and drinking belief change. Data of immigrant drinking change may provide evidence for drinking health policy-making and policy-revising in Canada.

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**Ethical approval** The Immigrant Drinking Change study was part of a multicultural lifestyle change research project that was approved by the Flinders University Social and Behavioural Research Ethics Committee in Australia in 2010 and by the Office of Research Ethics and Integrity, University of Ottawa in Canada in 2014.

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