

Religion, Alcohol Use and Risk Drinking Among Canadian Adults Living in Ontario

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Abstract This research examines (1) the association between risk drinking and religious affiliation and (2) differences between religions for risk drinking among adults living in Ontario, Canada, for Christians, Buddhists, Sikhs, Muslims, Hindus, Jews, other religious groups and the non-religious. Data are based on telephone interviews with 16,596 respondents and are derived from multiple cycles (2005–2011) of the Centre for Addiction and Mental Health's (CAMH) Monitor survey, an ongoing cross-sectional survey of adults in Ontario, Canada, aged 18 years and older. Data were analysed using bivariate cross-tabulations, Mann–Whitney *U* nonparametric test and logistic regression. Alcohol use and risk drinking occur among members of all religious groups; however, the rate of drinking ranges widely. Risk drinking is significantly associated with religion. When compared to the No religion/Atheist group, several religious groups (Baptist, Christian, Hindu, Jehovah's Witness, Jewish, Muslim/Islam, Non-denominational, Pentecostal, Sikh and Other religion) in our sample have significantly lower odds of risk drinking. Risk drinkers also attended significantly fewer services among several religions. Results suggest that there are differences in the risk drinking rates among Canadian adults, living in Ontario, by religion. It appears that religious traditions of prohibition and abstinence do hold sway among Canadian adults for some religious groups.

Keywords Alcohol · Religion · Adults · Population survey · Canada

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Introduction

Religion has been identified as a key sociocultural indicator in patterns of alcohol use and rates of risky alcohol consumption (Chitwood et al. 2008). Various religions have differing perspectives on alcohol use; some religions teach against alcohol use, some advocate a moderation of use, and most condemn heavy drinking and intoxication. Within Christianity some denominations prohibit alcohol use (e.g. Southern Baptists and Seventh-Day Adventists), some groups advocate abstinence suggesting that the use of alcohol is not the wisest choice in life, while most endorse moderation (e.g. Catholics) (Michalak et al. 2007). Judaism tolerates, and even advocates for moderate and controlled consumption of alcohol, at least in religious contexts (Neumark et al. 2001). Buddhism teaches that drinking can cause carelessness and excessive drinking should be avoided; however, alcohol is widely used and is an important part of many ceremonies (Assanangkornchai et al. 2002; Newman et al. 2006). Alcohol use is prohibited in Islam and generally condemned in Hindu and Sikh religions (AlMarri and Oei 2009; Hurcombe et al. 2010); Michalak and Trocki 2006).

Despite religious restrictions or prohibitions, there is evidence of alcohol use around the world, even in countries where the predominant religion prohibits the use or where alcohol is illegal (Michalak and Trocki 2006; World Health Organization [WHO] 2014). A study of Lebanese university students noted that Christian students were twice as likely to be diagnosed with lifetime alcohol abuse and lifetime alcohol dependence compared to Muslim students (Ghandour et al. 2009). Similarly, Luczak et al. (2014) found that Muslims and Hindus had significantly lower levels of alcohol use disorders (AUDs) from Catholics in a Mauritian sample, and the level of AUDs was lower among Muslims compared to Hindus. A recent review of alcohol literature in the UK found that Muslims consistently reported the highest percentage of abstinence and Christians generally had the lowest percentage, while Sikhs and Hindus fall between the two (Hurcombe et al. 2010). Christians and those with no religion report heavier consumption rates than Muslims, Hindus and Sikhs but among drinkers Muslims report higher rates (Hurcombe et al. 2010). Once alcohol has been tried, being a Muslim may not shield against developing an alcohol use disorder (Ghandour et al. 2009; Hurcombe et al. 2010).

The USA has been studying relationships between religion and alcohol for some time, although the literature focuses heavily on Christian denominations (Chitwood et al. 2008). Overall, denominations proscribing alcohol consumption (e.g. Baptists and Protestants) generally display the lowest probability of use while those permitting alcohol show the highest probability (e.g. Presbyterians, Jews and Catholics) (Cochran et al. 1988). Michalak et al. (2007) offer the most comprehensive look at the use of alcohol across religions in the USA. They explored differences in abstinence, moderate and heavy drinking across 21 religions, plus in those reporting no religion. Their findings show that regardless of the affiliation (e.g. Muslim, Catholic or Baptist) occasional heavy drinking occurs. When compared to those with no religious affiliation, they found that the odds of being a heavy drinker compared to a moderate drinker (those who never drank 5 or more drinks on any occasion in the past year) were significantly lower for European Free Church and Jewish participants, and significantly greater for Christians with no denomination, Baptists and Catholics (Michalak et al. 2007). These results provide significant insights despite their small sample sizes, as this is the first and only study using a national adult sample exploring so many different religious denominations.

Canada is one of the most culturally and ethnically diverse countries in the world, with over 200 ethnic origins reflected in the national population and over 20% of the population being foreign-born (Statistics Canada 2013a), and it is therefore not surprising that Canadians report belonging to numerous religions. The majority of Canadians identify with Christianity (67.3%), with smaller populations identifying as Buddhist (1.1%), Hindu (1.5%), Jewish (1.0%), Muslim (3.2%) and Sikh (1.4%). Nearly one-quarter of Canadians report no religious affiliation (Statistics Canada 2013b). When specific religious denominations are examined, as in the National Household Survey (NHS), as many as 100 affiliations have been reported (Statistics Canada 2013c).

There is a pattern in the worldwide literature that religion is a factor in alcohol consumption and potentially risky drinking patterns. However, the link between religion and alcohol use has not been studied extensively among Canadian adults, with very limited knowledge for only a few religions. The small body of Canadian work looks at alcohol use in relation to (1) the idea of belonging to a religion without specifying the religion (Bernards et al. 2009); (2) one specific religion (McKenzie et al. 2015) which may be compared to an “other” group (Kim 2012; Kunz and Giesbrecht 1999); or (3) the importance of religion, including religious attendance (Graham and Braun 1999; Kim 2012; Kunz and Giesbrecht 1999; Single et al. 1995a, b; Torchalla et al. 2014). Only one study (Engs et al. 1990) has compared across multiple religions (Roman Catholic, Protestants allowed to drink, Protestants not allowed to drink and Jewish). Engs et al. (1990) found regardless of the country (Canada or the USA) that Roman Catholics and Protestants who are allowed to drink experience more alcohol problems than either of the other two groups, but all groups report fewer problems in Canada than in the USA. In their multi-country study Bernards et al. (2009) report that Canadian males (39.9%) more than females (22.3%) suggest that they abstain from alcohol because it is against their religion. The literature shows that religiosity in its various measures reduces the use of alcohol and problem drinking in Canada (Single et al. 1995a, b; Torchalla et al. 2014) but rates of current alcohol use vary greatly for the few religions on which we have information, from 95% in a sample of Protestant, Catholic and Jewish University students (Engs et al. 1990), to 41.6% among Sikhs (Kunz and Giesbrecht 1999), and 2.4% among Seventh-Day Adventists (McKenzie et al. 2015).

Religiosity is a complex phenomenon and is difficult to measure. Research tends to focus on three aspects of religious involvement: (1) belief in God, an afterlife or a transcendent order; (2) behaviour such as prayer or religious service attendance; and (3) affiliation (McAndrews and Voas 2011). Frequency of attending religious services is often used as a measure of religiosity; however, this is not an expectation of all religions. Buddhists, for example, are not obliged to visit a temple or participate in formal religious functions, but may do so due to tradition or social obligation (Assanangkornchai et al. 2002). At the other end of the spectrum, Jehovah’s Witness are expected to attend religious services two times a week (Watch Tower Bible and Tract Society of Pennsylvania 2015).

Our study explored the prevalence of Canadians’ alcohol consumption by religion. In this research we were interested in finding out whether Canadians who identify with different religions report different levels of alcohol use and risky alcohol consumption. This research examined (1) the association between risk drinking and religious affiliation and (2) differences between religions for risk drinking among adults living in Ontario, Canada, for various Christian denominations (e.g. Baptists, Roman Catholics and United Church of Canada members), Buddhists, Sikhs, Muslims, Hindus, Jews, other religious groups and the non-religious.

Methods

This study is based on data derived from seven cycles (2005–2011) of the Centre for Addiction and Mental Health's (CAMH) Monitor survey. The CAMH Monitor is a cross-sectional monthly telephone survey asked of non-institutionalized adults (aged 18+) in Ontario, Canada, that has been conducted by CAMH and administered by the Institute for Social Research (ISR) at York University since 1996 (for full details of the CAMH Monitor methodology see Ialomiteanu and Adlaf 2012). Each year approximately 2000 to 3000 adult Ontarians are surveyed about their drinking, smoking and drug use through the CAMH Monitor survey. The survey employs random-digit-dialing (RDD) methods via computer-assisted telephone interviewing. Because the sampling frame used a list-assisted RDD (instead of landline numbers only), cellular telephones, newly listed and unlisted numbers are also included. Each annual cycle consists of four independent quarterly samples with approximately 750 completions each. The annual response rate of identified eligible participants who agreed to participate varied from 51 to 61%.¹ The data were weighted to adjust for varying selection probabilities, and regional representation, with a final post-stratification adjustment to restore the age by gender distribution based on the most recently available census figures. All analyses for this research were conducted using the weighted sample in SPSS 21.0 (see Ialomiteanu and Adlaf 2012 for more explanation of the weighting strategy). The institutional research ethics committee at CAMH has approved the survey annually.

Independent Variable

Religion was the independent variable of interest. Each survey respondent was asked, "What is your religion?" The original question provides 25 options; however, due to small sample size 5 groups were excluded from analysis (Born again Christian, Mormon/Latter Day Saints, Salvation Army, Methodist and Unitarian). This left 20 categories, each with a weighted sample of more than 50 respondents (Anglican, Baptist, Buddhist, Roman Catholic, Christian, Eastern/Greek Orthodox, Hindu, Jehovah's Witness, Jewish, Lutheran, Mennonite, Muslim/Islam, Non-denominational, Pentecostal, Presbyterian, Protestant, Sikh, United Church of Canada, No religion/Atheist and Other religion).

Dependent Variable

Risk Drinking: For each respondent we calculated a binary measure of drinking risk (0 non-risk drinker (includes non-drinkers over past year); 1 risk drinker). An individual was considered to be a risk drinker if they met one or more of the following criteria²:

1. Indicated that they were a monthly binge drinker, defined as consuming five or more drinks on one occasion at least once a month during the year prior to completing the survey. This was determined based on the question "About how often during the past twelve months would you say you had five or more drinks at the same sitting or occasion: would you say every day, about every day, 3 or 4 times a week, once or twice a week, 2 or 3 times a month, about once a month, 6–11 times a year, 1–5 times

¹ The CAMH Monitor employs American Association of Public Opinion Research (AAPOR) eligibility-adjusted response rate calculation (see Ialomiteanu and Adlaf 2012 for more information).

² Note: The low-risk drinking guidelines measure was not asked in 2010.

- a year, or never in the past year?” Binge drinking (consuming ≥ 5 alcoholic drinks on 1 occasion) was used as a measure of “risk drinking” because it generally results in acute impairment and has numerous adverse health consequences (Naimi et al. 2003); or
2. Consumed enough alcohol to exceed the recommended number of drinks in Canada’s low-risk drinking guidelines (LRDG) (Butt et al. 2011): for men 15 or more drinks and for women 10 or more drinks per week or 3 or more drinks per day for men or women. This variable was derived from a series of questions asked of each respondent on the number of drinks they had on each of the seven days prior to the day the survey was conducted; or
 3. Scored 8 or more out of 40 on the Alcohol Use Disorders Identification Test (AUDIT) screener in the past 12 months which is considered an indicator of hazardous drinking. The AUDIT is a screening instrument developed by the World Health Organization designed to detect problem drinkers at the less severe end of the spectrum of alcohol problems (Saunders et al. 1993; Babor et al. 2001). The 10 AUDIT items focus on drinking frequency, volume, heavy consumption and frequency of various disruptive experiences due to alcohol to assess hazardous and harmful drinking. A score of 8 or more is generally accepted as an indication of problem drinking (Reinert and Allen 2002).

Other Variables

Religious Service Attendance: Respondents were asked “How often have you attended religious services in the last twelve months?” This question was left open for respondents to provide the number of attendances, outside of weddings and funerals.

Data Analysis

A cross-tabulation was conducted to show the association between risk drinking and religion. Due to the skewed nature of the number of services attended, we used Mann–Whitney U nonparametric tests to see whether the distributions were significantly different between risk and non-risk drinkers for each religion. Logistic regression analyses were used to examine the relationship between religion (reference category No religion/Atheist) and risk drinking adjusted for age, gender (male or female), place of birth (born in Canada or born outside of Canada) and marital status (married/partner, never married or previously married). These variables are included to adjust the relationship between religion and drinking because previous research has identified them as important in understanding the relationship with drinking and risk drinking patterns (Agic et al. 2015, 2016; Amundsen 2012; Bloomfield et al. 2006; Cramer 1993; Hartford et al. 1994; Hjern and Allebeck 2003; Szaflarski et al. 2011).

Results

There were a total of 16,596 respondents to the survey over the 7 years. A demographic profile for each religion (see Table 1) shows that the groups were nearly equally split between male and female with slightly more male representation in the Hindu, Muslim/ Islam, Sikh, the No religion/Atheist and Other religion groups. The Sikh and Muslim

Table 1 Descriptive profile of respondents by self-reported religious affiliation, Ontario adults 18+ (CAMH Monitor 2005–2011)

| Religion | Unweighted sample size | Male (%) | Average Age (SD) | Born outside of Canada (%) | Median [IQR] # religious services attended in past 12 months | Married/partner (%) | Previously married (%) | Never married (%) |
|-------------------------|------------------------|----------|------------------|----------------------------|--|---------------------|------------------------|-------------------|
| Total sample | 16,596 | 48.4 | 45.97 (±17.18) | 26.9 | 2.00 [0.00–20.00] | 66.5 | 12.1 | 21.4 |
| Anglican | 1179 | 42.4 | 55.73 (±16.56) | 17.1 | 2.00 [0.00–6.77] | 71.1 | 20.3 | 8.6 |
| Baptist | 272 | 45.5 | 50.29 (±17.30) | 15.7 | 5.00 [0.00–52.00] | 69.9 | 16.3 | 13.8 |
| Buddhist | 78 | 44.0 | 41.29 (±12.76) | 80.9 | 0.00 [0.00–5.56] | 68.0 | 8.6 | 23.4 |
| Roman Catholic | 4815 | 45.5 | 45.31 (±16.44) | 25.8 | 5.00 [1.00–30.00] | 65.8 | 11.8 | 22.4 |
| Christian | 1351 | 47.9 | 39.84 (±15.06) | 30.4 | 10.00 [1.00–52.00] | 63.5 | 8.1 | 28.4 |
| Eastern/Greek Orthodox | 188 | 42.3 | 41.89 (±16.13) | 57.7 | 3.00 [1.00–12.00] | 62.3 | 11.2 | 26.5 |
| Hindu | 196 | 62.0 | 40.50 (±13.93) | 91.7 | 6.00 [3.00–20.00] | 77.2 | 3.1 | 19.8 |
| Jehovah's Witness | 86 | 37.9 | 51.10 (±17.83) | 28.8 | 145.43 [70.88–173.79] | 75.0 | 13.2 | 11.8 |
| Jewish | 229 | 43.2 | 49.32 (±18.02) | 26.7 | 3.67 [0.00–12.00] | 71.1 | 9.7 | 19.2 |
| Lutheran | 297 | 44.7 | 56.00 (±17.58) | 26.5 | 2.00 [0.00–25.00] | 71.4 | 18.2 | 10.4 |
| Mennonite | 61 | 46.8 | 50.55 (±17.76) | 29.6 | 42.29 [16.12–52.00] | 86.4 | 6.1 | 7.6 |
| Muslim/Islam | 289 | 51.7 | 36.67 (±12.77) | 92.3 | 7.00 [0.00–52.00] | 61.8 | 5.3 | 32.9 |
| Non-denominational | 116 | 42.2 | 47.61 (±16.05) | 18.8 | 2.00 [0.00–20.00] | 75.2 | 11.9 | 12.9 |
| Pentecostal | 141 | 41.4 | 50.30 (±15.40) | 31.3 | 33.86 [3.00–60.00] | 72.9 | 19.4 | 7.7 |
| Presbyterian | 395 | 44.5 | 54.14 (±16.77) | 13.4 | 2.29 [0.00–12.00] | 74.7 | 17.9 | 7.4 |
| Protestant | 1732 | 45.7 | 57.55 (±15.71) | 11.4 | 1.00 [0.00–15.00] | 73.5 | 17.7 | 8.7 |
| Sikh | 66 | 60.3 | 36.27 (±11.69) | 69.0 | 30.00 [12.00–52.00] | 74.0 | 0.4 | 25.6 |
| United Church of Canada | 1100 | 43.3 | 54.96 (±15.93) | 4.9 | 2.00 [0.00–12.00] | 73.7 | 18.2 | 8.1 |

Table 1 continued

| Religion | Unweighted sample size | Male (%) | Average Age (SD) | Born outside of Canada (%) | Median [IQR] # religious services attended in past 12 months | Married/partner (%) | Previously married (%) | Never married (%) |
|-------------------------|------------------------|----------|------------------|----------------------------|--|---------------------|------------------------|-------------------|
| Other religion | 306 | 50.1 | 43.17 (±17.22) | 43.3 | 3.23 [0.00–52.00] | 61.9 | 12.2 | 25.9 |
| No religion/ Atheist | 3066 | 56.9 | 39.76 (±15.44) | 21.6 | 0.00 [0.00–0.00] | 59.2 | 9.4 | 31.3 |

Proportions are based on weighted sample

groups were on average the youngest (36.27 and 36.67 years old, respectively), and the Lutheran group was on average the oldest (56.00 years old). Less than 20% of the Buddhist, Hindu and Muslim/Islam groups were born in Canada, while more than 85% of Presbyterians, Protestants and United Church of Canada members were born in Canada. The majority of respondents for each religious group were married. The Muslim/Islam group had the highest percentage of never married individuals (32.9%), while only 7.4% of Presbyterians have never been married. The rate of previously married ranges from 4 in 1000 among Sikhs to as high as 200 in 1000 Anglicans.

Alcohol Use

More than 95% of Lutheran, Anglican, Presbyterian, No religion/Atheist, United Church of Canada, Roman Catholic, Jewish and Protestant respondents reported consuming alcohol in their lifetime, while only 42.6% of Muslim/Islam respondents did so. The other groups ranged from 63.5% lifetime drinkers in the Sikh group to 94.8% of lifetime drinkers in the Eastern/Greek Orthodox group. Current drinking patterns were similar; the highest reported rate of drinking in the past 12 months was among Lutherans (88.4%), and the lowest rate was in the Muslim/Islam group (27.4% of respondents). All of the other groups had a rate of current drinking higher than 50% (see Table 2).

Table 2 shows that the relationship between risk drinking status and religion was statistically significant with a moderately strong association ($\chi^2 = 374.39$, $p < 0.001$). The highest proportion of noted risk drinking is observed within the No religion/Atheist group (43.5%), while the lowest proportion of risk drinking is observed within the Muslim/Islam group (11.8%). The rate of risk drinking was 1 in 4 people or greater for eleven other religious groups (Roman Catholic 36%, Eastern/Greek Orthodox 34.9%, Lutheran 32.5%, Anglican 32%, Christian 31.8%, Presbyterian 31.1%, Protestant 30.4%, United Church of Canada 29.7%, Baptist 25.1%, Other Religion 25.1% and Buddhist 25%).

Examining the median number of services attended by risk drinkers compared to non-risk drinkers, we found that the differences were statistically significant for all but five religions (Lutheran, Mennonite, Non-denominational, Presbyterian and Sikh) and the non-religious group. For all significant differences found, the non-risk drinkers attended significantly more religious services than the risk drinkers groups (see Table 3). Among Roman Catholics, for example, those who were considered non-risk drinkers had a median attendance of 7.29 services in the past year [IQR 1–40] compared to 3.00 services in the past year [IQR 0–12] for those Roman Catholics considered risk drinkers.

Logistic Regression

After adjusting for the other sociodemographic variables, the odds of risk drinking when compared to the No religion/Atheist group (see Table 4) was significantly lower for respondents who identify their religion as Baptist (0.60 OR, 95% CI 0.43–0.84), Christian (0.68 OR, 95% CI 0.59–0.79), Hindu (0.34 OR, 95% CI 0.24–0.49), Jehovah's Witness (0.48 OR, 95% CI 0.24–0.98), Jewish (0.58 OR, 95% CI 0.41–0.80), Muslim/Islam (0.23 OR, 95% CI 0.16–0.32), Non-denominational (0.30 OR, 95% CI 0.16–0.55), Pentecostal (0.45 OR, 95% CI 0.27–0.76), Sikh (0.33 OR, 95% CI 0.21–0.51) and Other religion (0.52 OR, 95% CI 0.39–0.69).

Religious groups that prohibit alcohol use or that recommend abstinence (Baptist, Hindu, Muslim/Islam, Pentecostal and Sikh) have significantly lower odds of risk drinking,

Table 2 Prevalence of lifetime, 12 months and risk drinking by religion, Ontario adults 18+ (CAMH Monitor 2005–2011)

| Religion | Lifetime drinkers (<i>n</i> = 15,975) (%) | Current drinkers (past 12 months) (<i>n</i> = 15,978) (%) | Risk drinkers (<i>n</i> = 14,235) (%) |
|----------------------------|---|---|---|
| All religions | 92.8 | 80.0 | 33.5 |
| Anglican | 97.5 | 84.4 | 32.0 |
| Baptist | 87.6 | 65.9 | 25.1 |
| Buddhist | 87.5 | 69.5 | 25.0 |
| Roman Catholic | 96.0 | 84.5 | 36.0 |
| Christian | 91.0 | 76.1 | 31.8 |
| Eastern/Greek Orthodox | 94.8 | 80.5 | 34.9 |
| Hindu | 69.0 | 55.2 | 15.1 |
| Jehovah's Witness | 94.1 | 75.8 | 14.9 |
| Jewish | 95.6 | 81.8 | 23.0 |
| Lutheran | 98.5 | 88.4 | 32.5 |
| Mennonite | 89.7 | 67.7 | 21.1 |
| Muslim/Islam | 42.6 | 27.4 | 11.8 |
| Non- denominational | 93.5 | 80.6 | 15.1 |
| Pentecostal | 87.8 | 58.3 | 17.0 |
| Presbyterian | 97.5 | 83.1 | 31.1 |
| Protestant | 95.4 | 81.1 | 30.4 |
| Sikh | 63.5 | 52.4 | 19.7 |
| United Church of Canada | 96.1 | 82.5 | 29.7 |
| Other religion | 81.6 | 65.0 | 25.1 |
| No religion/ Atheist | 96.9 | 87.2 | 43.5 |

Proportions are based on weighted sample

while religious groups that recommend moderation (primarily Christian denominations) do not differ significantly from the No religion/Atheist group.

Discussion

We found that all of the religions have individuals that report current alcohol use and risk drinking. The rates of risk drinking range from about 1 in 10 respondents among the Muslim/Islam group to as high as 4 in 10 respondents in the non-religious/Atheist group. Christian denominations for the most part drink at similar non-significantly different rates from the non-religious/Atheist, while minority religions and those who prohibit or generally suggest abstinence are less likely to report risk drinking.

Our religion variable measures which religious affiliations the respondents reported, but it does not measure a person's religiosity, their religious commitment or the strength of

Table 3 Difference in the distribution of number of services attended in past 12 months for risk drinkers and non-risk drinkers by religious affiliation, Ontario adults 18+ (CAMH Monitor 2005–2011)

| Religion (<i>n</i> = 9569) | Median [IQR] # of services attended by non-risk drinkers | Median [IQR] # of services attended by risk drinkers | Mann–Whitney <i>U</i> significance |
|--------------------------------|---|---|---------------------------------------|
| Anglican | 2.00 [0.00–12.00] | 1.00 [0.00–5.00] | 34,800** |
| Baptist | 24.93 [1.00–52.00] | 0.00 [0.00–4.00] | 1108.5*** |
| Buddhist | 1.00 [0.00–7.00] | 0.00 [0.00–0.54] | 233.5* |
| Roman Catholic | 7.29 [1.00–40.00] | 3.00 [0.00–12.00] | 723,400*** |
| Christian | 20.04 [2.00–52.00] | 3.00 [1.00–25.75] | 55,742*** |
| Eastern/Greek Orthodox | 5.28 [2.00–14.14] | 2.00 [1.00–5.00] | 2046.5* |
| Hindu | 10.00 [3.00–35.00] | 5.00 [1.00–10.00] | 1672.5* |
| Jehovah's Witness | 150.00 [79.53–209.97] | 107.56 [4.00–150.00] | 59* |
| Jewish | 4.00 [1.00–12.00] | 2.00 [0.00–6.00] | 2420* |
| Lutheran | 2.00 [0.00–30.00] | 4.00 [0.00–22.51] | 2490.5 |
| Mennonite | 49.21 [20.00–52.00] | 12.46 [5.46–30.00] | 46.5 |
| Muslim/Islam | 12.00 [1.00–52.00] | 0.00 [0.00–1.00] | 1785.5*** |
| Non- denominational | 2.00 [0.00–20.00] | 0.97 [0.00–96.00] | 213.5 |
| Pentecostal | 48.00 [7.47–64.42] | 3.00 [0.00–16.64] | 158** |
| Presbyterian | 3.00 [0.00–20.26] | 2.00 [0.00–8.00] | 4218.5 |
| Protestant | 2.23 [0.00–35.72] | 0.00 [0.00–3.00] | 62,010.5*** |
| Sikh | 30.00 [12.00–52.00] | 15.00 [5.00–42.43] | 281 |
| United Church of Canada | 3.00 [0.00–24.00] | 1.00 [0.00–4.00] | 25,240.5*** |
| Other religion | 10.00 [0.00–52.00] | 0.36 [0.00–7.00] | 3604.5** |
| No religion/ Atheist | 0.00 [0.00–1.00] | 0.00 [0.00–0.00] | 478,381.5 |

All analyses are based on the weighted sample size

Significance: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

their beliefs. As a proxy to religious commitment, we examined the number of religious services attended. This is a crude measure for how religious a person is; expectations for service attendance vary across religious groups, and even within a group, attendance expectations may differ [e.g. Islam is a non-congregational religion, with the exception that Muslim men are expected to attend Friday prayer but women are exempt from attending (Bulut and Ebaugh 2014)]. Nevertheless, similar to previous studies (Michalak et al. 2007), our results suggest that one's religious affiliation, and the "degree" of its importance, is a protective measure for each of the groups. While the number of services attended was not significantly different for all of the groups, there was a pattern that non-risk drinkers attended more religious services. While not all religions expect their members to attend services, it is interesting to note that in some of those groups non-risk drinkers still reported a significantly greater median attendance than risk drinkers. This might indicate that using the number of religious services attended as a proxy for religious adherence may be problematic in Canada as it may hide patterns for some religious groups, or lead

Table 4 Logistic regression model for risk drinking

| | Risk drinking (95% CI) | |
|-------------------------|------------------------|--------------------------|
| | Unadjusted OR | Adjusted OR ^a |
| <i>Religion</i> | *** | *** |
| No religion/Atheist | 1.00 | 1.00 |
| Anglican | 0.62 (0.53–0.73)*** | 1.16 (0.97–1.38) |
| Baptist | 0.44 (0.32–0.60)*** | 0.60 (0.43–0.84)** |
| Buddhist | 0.45 (0.26–0.75)** | 0.78 (0.44–1.36) |
| Roman Catholic | 0.74 (0.67–0.81)*** | 0.98 (0.88–1.09) |
| Christian | 0.62 (0.54–0.71)*** | 0.68 (0.59–0.79)*** |
| Eastern/Greek Orthodox | 0.70 (0.72–0.93)* | 1.07 (0.78–1.46) |
| Hindu | 0.25 (0.17–0.34)*** | 0.34 (0.24–0.49)*** |
| Jehovah’s Witness | 0.26 (0.13–0.52)*** | 0.48 (0.24–0.97)* |
| Jewish | 0.38 (0.28–0.52)*** | 0.58 (0.41–0.80)** |
| Lutheran | 0.62 (0.46–0.84)** | 1.20 (0.87–1.67) |
| Mennonite | 0.36 (0.18–0.71)** | 0.59 (0.29–1.20) |
| Muslim/Islam | 0.17 (0.13–0.24)*** | 0.23 (0.16–0.32)*** |
| Non-denominational | 0.22 (0.12–0.39)*** | 0.30 (0.16–0.55)*** |
| Pentecostal | 0.28 (0.17–0.46)*** | 0.45 (0.27–0.76)** |
| Presbyterian | 0.59 (0.46–0.76)*** | 1.00 (0.76–1.32) |
| Protestant | 0.57 (0.49–0.65)*** | 1.06 (0.90–1.24) |
| Sikh | 0.33 (0.22–0.51)*** | 0.33 (0.21–0.51)*** |
| United Church of Canada | 0.55 (0.47–0.65)*** | 0.94 (0.78–1.13) |
| Other religion | 0.44 (0.33–0.58)*** | 0.52 (0.39–0.69)*** |
| Constant | 0.78*** | 1.60*** |
| χ^2 | 382.04*** | 2214.28*** |
| <i>df</i> | 19 | 24 |

Total sample size adjusted model ($n = 13,791$)

^a Odds ratios adjusted by gender, age, place of birth and marital status

Significance: Chi-square or Wald test * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

researchers to misinterpret results. Future studies need to consider what it means to be religious, and how to measure it if attendance does not adequately capture degree of religiosity for the diverse population of Canada. Taken together, however, these data suggest that the more involved someone is in communal religious life, the less likely they are to be a risk drinker.

Religion is a complex variable and religious beliefs influence attitudes towards alcohol consumption and risk for excessive drinking and related problems (Assanangkornchai et al. 2002; Michalak and Trocki 2006; Newman et al. 2006). However, belonging to or believing in a religion does not guarantee adherence to all the tenets of that religion (AlMarri and Oei 2009), and religion is only one important factor in a person’s identity (Michalak and Trocki 2006). If we were to consider religion without adjusting for any other variables, our results (see Table 4 unadjusted model) would indicate that every religion has lower odds of risk drinking than the non-religious/Atheist group. However, drinking patterns are shaped by various sociodemographic and cultural factors including

income and social status, sociocultural norms, beliefs and expectancies about alcohol use, migration and acculturation. The large body of alcohol research shows that, in general females, older individuals, married and previously married, and immigrants report lower rates of risky drinking (Amundsen 2012; Bloomfield et al. 2006; Cramer 1993; Hartford et al. 1994; Hjerm and Allebeck 2003; Szaflarski et al. 2011). However, given the small sample size of some groups, we could not conduct further analyses to consider the interactions between some of these variables and their relationship to religion and alcohol use.

Over time it will be interesting to see whether the rates in groups change. A recent study looking at immigration and ethnicity has shown that in groups that are traditionally low risk drinkers the longer they have resided in Canada the more their rates of risk drinking begin to converge with heavier drinking immigrant groups (Agic et al. 2016). Results from the UK have pointed to the fact that Sikhs may drink at higher rates than other groups because they use it as a coping mechanism to deal with acculturative stress and among some Sikhs it is considered a helpful mechanism for work production (Hurcombe et al. 2010). Anecdotally, post-migration stress and acculturation have been noted as factors for drinking among Sikhs and Muslims in Ontario, especially among young women (Agic et al. 2011). While both Islam and Sikhism prohibit alcohol use, we found 63.5% of Sikh and 42.6% of Muslim/Islam respondents to be lifetime drinkers. These levels of drinking may be partially explained by the acculturative model that health behaviours change over time as a result of interaction with the host culture (Caetano et al. 1998). Combining the view of drinking as normal and encouraged in Canada (Agic et al. 2011) with members of religious groups that do not hold culturally homogenous stances around drinking allowance (Hurcombe et al. 2010) may help to provide some explanation for why a portion of members of various minority religions report drinking and risk drinking despite a religion's prohibition stance.

We observe that Christian denominations with the highest proportion of risk drinking emerge from European traditions with a history of monastic beer and wine-making (Poelmans and Swinnen 2011; Varriano 2011). Such alcohol production served both economic and anti-bacterial purposes, as water was believed to be (and often was) unsafe to drink (Poelmans and Swinnen 2011; Varriano 2011). Among the riskier drinkers the Anglican, Catholic, Lutheran and Orthodox groups tend to be “high churches”, that is they have a formal ecclesiology, liturgy and theology that values continuity of tradition over change (Grentz 2000). The noted levels of risk drinking among people with low service attendance in such denominations may be related to conflicts between religious and cultural values. For example, people who find their religious life to be increasingly compartmentalized and disintegrated from their daily lives may find their religious identity (and perhaps its view on the moderation of alcohol) to conflict with their secular identities and values, and they may attend services less frequently as a result. Additionally, a number of religions with high rates of risk drinkers have a sacrament of confession or reconciliation (e.g. Anglican, Catholic, Eastern/Greek Orthodox) (Keene 2000; Zernov 1940). Participation in a ceremony of absolution may impact how members perceive their culpability and guilt related to drinking, and may impact future decisions about drinking.

Drinking levels could also be related to how involved and empowered individual religious group members feel. Many of the lower-drinking Christian church groups (Pentecostal, Mennonite, Baptist, United and Presbyterian) have a relatively involved laity compared with higher-consumption groups (Klaus and Triplett 1991; Mademan 2006; Rowthorn 2000).

For some groups, risk drinking may have a religious significance beyond their tradition's views on alcohol *per se*. Among the Christian groups on the lower end of risk

drinking (e.g. Non-denominational and Protestant) values emerging from their history in the Temperance Movement may be a factor influencing drinking patterns (Heron 2003). Cann (2016) has noted how maintaining abstinence from alcohol within the home and church allowed Baptist women to assert moral leadership, becoming a source of identity for Baptist mothers and of branding for Baptists congregations. It would be interesting to know whether low drinking rates among Pentecostal and Baptist denominations are influenced by their views on free will and salvation (Basinger and Basinger 2009). Both low-drinking Protestant denominations favour the theology of Jacobus Arminius, in which the human being's response to God's offer of grace is a significant component of salvation (versus the theology of John Calvin, in which salvation is accomplished by God alone, with the human being unable to choose goodness of their own will) (Steel and Thomas 1963). Are the members of low-drinking protestant denominations striving to demonstrate their acceptance of grace by demonstrating personal virtue?

Finally, we note that the higher-drinking groups are “mainstream” churches with large numbers of Canadian adherents, while the lower-drinking groups are not particularly numerous within the Canadian-born population (Statistics Canada 2013c). However, consistent with changing immigration patterns, the proportion of people belonging to religions other than Christianity is growing. Future studies should consider a longitudinal approach to better examine the connection between lower rates of risk drinking over time and religious groups and combine this with qualitative research to explore why certain patterns may exist.

Limitations

While the CAMH Monitor is an established, valid and reliable survey tool, basing our research on secondary data limits the scope and aims of the study. Religion is not one of the focuses of the Monitor, and so therefore the variable options available to us limit the research directions. We cannot be certain of the strength of religious association, commitment or beliefs of the respondents in the survey; we only know that they identified with a religion. The study findings are based on cross-sectional data that cannot identify causal relationship, and we are not able to measure change over time that may occur with the development of a stronger religious commitment or a change in religious identification. In our study we are able to examine a number of Christian groups; however, due to the limited sizes of the other religious groups we are not able to examine subgroups within them. This limits our ability to speak about culture and historical differences that may explain some of the rates of alcohol use and risk drinking we note. In the 2010 CAMH Monitor, questions constituting the measure for exceeding the low-risk alcohol drinking guidelines were not asked. Therefore, our estimates for risk drinking in the 2010 data may be reduced as a result of this omission.

Conclusion

Despite the limitations, this study is the first to clearly show differences in risky alcohol drinking patterns among Canadian adults by so many different religions. This research clearly demonstrates that there are differences in the risk drinking rates among Canadian adults, living in Ontario, by religion. It appears that for some religious groups, traditions on prohibition and abstention are reflected in the drinking patterns of Canadian adults. The

odds of risk drinking are lower among respondents who identify as Baptist, Christian, Hindu, Jehovah's Witness, Jewish, Muslim, Non-denominational, Pentecostal, Sikh and Other religions compared to respondents without a religion or those who identify as Atheist. Respondents who identify with religious groups that promote alcohol moderation (e.g. Buddhist, Roman Catholic and United Church of Canada) are as likely as Atheists or as those without a religion to be risk drinkers.

The proportion of the Canadian population that reported No religion/Atheist increased between the 1980s and early 2000s (Lindsay 2008). Also, Canadians are attending services less often (Lindsay 2008). This could indicate that risk drinking will increase over time, foreshadowing a growing health concern and possibly the need for a national campaign to draw attention to the issue.

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