Original Research

Epidemiology of Youth Gambling Problems in Canada: A National Prevalence Study

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Objectives: To describe the epidemiology of gambling problems among youth aged 15 to 24 years in Canada and to examine whether these gambling prevalence patterns differ by sex and (or) by geographic region.

Method: We used data from The Canadian Community Health Survey: Mental Health and Well-Being. Gambling problems were determined according to the Canadian Problem Gambling Index. All prevalence estimates used appropriate sampling weights and bootstrap variance estimation procedures developed by Statistics Canada. Multivariate logistic regression modelling was also employed to supplement the above prevalence comparisons by age, sex, and region.

Results: Among Canadian youth aged 15 to 24 years (n = 5666), 61.35% gambled in the past 12 months and the national prevalence of moderate-risk or problem gambling was 2.22% (3.30% in male respondents and 1.10% in female respondents). Male respondents had significantly higher prevalence of gambling problems than female respondents. Regional prevalence estimates of youth moderate-risk or problem gambling were 1.37% in British Columbia, 2.17% in the Prairie provinces, 2.75% in Ontario, 2.12% in Quebec, and 1.71% in the Atlantic provinces.

Conclusions: Youth, particularly young men, are at greater risk for gambling problems than adults. More prevention and research efforts are also needed to address the observed sex differences and interregional variability in the prevalence of gambling problems among youth. The national prevalence estimates from this study provide important baseline data against which future cohorts of Canadians can be monitored and measured.

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Clinical Implications

- Canadian youth aged 15 to 24 years are at greater risk for gambling problems than adults aged 25 years or older.
- Young men consistently have higher prevalence of gambling problems than young women in Canada.
- There is interregional variability in the prevalence of youth gambling problems in Canada.

Limitations

- The cross-sectional design of the survey cannot determine causality of the associations observed.
- Without including other gambling measures, our CPGI-based prevalence estimates cannot be compared directly with those from other studies.
- Relatively smaller sample sizes of youth in the heavier gambling category constrain our statistical power, accounting for some nonsignificant results.

Key Words: youth, problem gambling, prevalence, epidemiology

Youth gambling problems have increasingly become a significant public health issue, especially in the wake of the widespread expansion of legalized gambling in the United States and Canada. Studies suggest that an estimated 15.3 million adolescents in North America have engaged in gambling activities, and 2.2 million of these are problem or pathological gamblers.[1,2] An analysis of long-term trends between 1984 and 1999 also reveals that the median past-year prevalence of youth gambling in North America increased from 45% to 66%, as did the proportion of youth reporting serious gambling-related problems (from 10% to about 15%).[2] This was also the period in which gambling's availability and accessibility increased progressively in the United States and Canada.

However, despite considerable consensus in the current literature that adolescents and young adults represent the highest-risk group for gambling problems, most research efforts have targeted adult gamblers, and relatively fewer studies have focused on or included young gamblers.[1–6] Concerns that youth gambling behaviour has been understudied are echoed among researchers, as are recommendations to increase efforts to respond to this growing problem.[7,8]

Using prevalence studies from the past 25 years in the United States and Canada, Shaffer and Hall[6] employed a metaanalytic strategy to synthesize the prevalence estimates of disordered gambling in different population segments. They reported that youth is significantly associated with gambling-related problems. For example, the lifetime prevalence estimates of Level 2 (subclinical or problem) gambling and Level 3 (pathological) gambling among adolescents are 8.4% and 3.4%, respectively—nearly double those found in adults (4.2% and 1.9%, respectively). College students yield even higher estimates (10.9% and 5.6%, respectively) than those found among adolescents. In terms of past-year prevalence, the Level 2 and Level 3 gambling estimates among adolescents are 14.6% and 4.8%, respectively, compared with 2.5% and 1.5%, respectively, in adults. Comparative past-year

Abbreviations used in this article

CCHS 1.2	Canadian Community Health Survey: Mental Health and Well-Being
CI	confidence interval
CPGI	Canadian Problem Gambling Index
OR	odds ratio
RR	relative risk
SOGS	South Oaks Gambling Screen

prevalence estimates for college students cannot be calculated because there are insufficient data. Shaffer and Hall also noted that, although the past-year estimates are higher than the lifetime estimates for adolescents, there is considerable overlap between the CIs of these measures. They concluded that adolescents' past-year gambling experiences are likely to be comparable to their lifetime gambling experiences and that differences between instruments most likely account for the discrepancies in these estimates.

In addition to youth, the other aspect of gambling prevalence research that has interested many is sex difference. Men, especially young men, have been identified as problem gamblers more often than women, even across different cultures.[9] Several surveys in student and youth populations (for example, in the United States, Canada, Taiwan, and Norway) have reported similar findings that young men gamble more than young women and that problem gambling is also more prevalent in young men than in young women.[10–15] Although male sex is recognized as a risk factor for adolescent gambling disorders,[16] the magnitude of the sex differences in youth problem gambling has been difficult to assess, owing to differences in the instruments, screening tools, and nomenclature used across different study samples. Therefore, to bridge this gap in the current literature, we need more accurate population prevalence estimates based on the same measures and classifications of problem gambling.

Largely owing to the aforementioned methodological constraint, there is still a paucity of information on potential cross-regional differences in youth problem gambling on a national level, even though prevalence studies have been conducted over the past 2 decades in various regions in Canada and the United States. Among the few studies that have compared youth gambling prevalence across different geographical regions, inconsistent findings have been reported. For example, a random survey of Ontario students in Grades 7 to 13 found that gambling disorders did not differ significantly by region,[10] whereas a university survey in 5 US states found that students in the Northeast and Nevada gambled more than those in the South, with pathological gambling prevalence ranging from 8% in New York to 4% in Nevada.[17] In comparison, albeit not youth-focused, a few US national surveys have evidenced varying patterns of adult problem gambling by region, with some suggesting that living in the West and Midwest is associated with higher lifetime prevalence of pathological gambling[18] and others suggesting that New Englanders gamble more heavily than their US peers.[19]

What makes youth problem gambling even more problematic is its cooccurrence with alcohol–substance use behaviour and delinquency.[20–23] For example, a study of 16 948 Vermont students in Grades 8 to 12 reported that problem gambling was significantly associated with a host of alcohol–drug use and

violence-related risk behaviours.[24] A survey of 11 736 Louisiana students in Grades 6 to 12 also found that 15.9% were problem or pathological gamblers and that, among them, 59% drank alcohol or used illicit drugs weekly or more frequently.[15] In addition, the survey found that gambling behaviour occurred before drinking, smoking, and marijuana use. A study of Canadian adolescents revealed that 35.1% gambled at least once a week and reported participation in gambling more often than cigarette smoking, alcohol consumption, and illicit drug use.[13] Correlations between gambling and alcohol–tobacco use have also been documented in the college student population.[25] A review of youth gambling studies in North America summarized that youth with gambling problems reported frequent tobacco use and twice the rate of weekly or more frequent use of alcohol, compared with their nonproblem classmates.[2]

Recent youth gambling research suggests that more attention should be paid to adolescent gamblers and adolescent-onset young adult gamblers because they are more likely to exhibit more severe psychiatric problems, particularly substance use disorders.[26] The first national survey of problem gambling completed in Sweden also raised the same concern that people under age 25 years are at an increased risk for problem gambling.[27] Clearly, youth as a group warrant more thorough investigation and monitoring. In an extensive review of the current status of gambling epidemiology studies, Shaffer and colleagues[28] lent support to this view and suggested focusing new prevalence studies on the apparently more vulnerable groups, such as the younger population with elevated prevalence of gambling problems.

To respond to these concerns, the present study sought to establish national prevalence estimates of gambling among Canadian youth. Until the recent CCHS 1.2 data[29] became available, few studies, if any, were able to provide nationally representative data for nationwide prevalence estimates and cross-regional comparisons because of their different sampling schemes and instruments. However, some researchers have taken advantage of this national dataset and reported that the 12-month prevalence of gambling problems in Canada was 2.0%.[30] Although their research was not youth-focused, they found variability of problem gambling across different provinces. For example, 2 provinces in the Prairies had the highest prevalence of gambling problems, whereas Quebec and the other province in the Atlantic region had the lowest prevalence estimates. Building on these findings, and also using the CCHS 1.2 data and the CPGI, our study aimed to estimate the Canadian population prevalence of various levels of gambling among youth (defined as those aged 15 to 24 years), compared with adults (defined as those aged 25 years or older). Further, focusing on youth, our study examined whether these prevalence patterns differ by sex and (or) by

geographic region—namely, British Columbia, the Prairies (Alberta, Saskatchewan, and Manitoba), Ontario, Quebec, and the Atlantic provinces (New Brunswick, Nova Scotia, Prince Edward Island, and Newfoundland and Labrador).

Method

Sample and Sampling Design

Data for this study were drawn from the CCHS 1.2, a cross-sectional, national survey on the mental health and well-being of Canadians aged 15 years or older and living in private dwellings in the 10 provinces. The sampling plan of the CCHS 1.2 was a multistage, stratified cluster design in which the dwelling (or household) was the final sampling unit from which one individual aged 15 years or older was randomly selected. Conducted by Statistics Canada between May 2002 and December 2002 and using computer-assisted interviewing, the CCHS 1.2 had an overall response rate of 77.0%, yielding a representative national sample of 36 984 respondents. Details regarding the methodology of CCHS 1.2 have been reported elsewhere.[31]

Instrument and Variables

The Canadian Problem Gambling Index. The CPGI is a 9-item instrument that taps into domains of problem gambling behaviour and adverse consequences in the past 12 months, including guilt, loss of control, chasing the losses, negative health effects, and financial problems.[32] The response categories are the same for each item: "never," "sometimes," "most of the time," and "almost always," scoring 0, 1, 2, and 3, respectively. Scores for the 9 items are summed to create a CPGI score ranging from 0 to 27 to denote increasing levels of gambling problems, where 0 indicates nonproblem gambling, 1 to 2 indicates low-risk gambling, 3 to 7 indicates moderate-risk gambling, and 8 to 27 indicates problem gambling.

Importantly, nongamblers (that is, those who indicated no participation in any gambling activity in the past 12 months) were separated from nonproblem gamblers (who reported gambling participation in the past 12 months but who had a CPGI score of 0). Notably, respondents who indicated participation in gambling but who subsequently volunteered that "I am not a gambler" and were thereby coded 95 for the CPGI score in the CCHS 1.2 were also categorized as nonproblem gamblers in our study.

Outcome Variables. The CPGI-based classification was used to estimate the 12-month prevalence of various levels of gambling problems. While those scoring 8 to 27 (problem gamblers) represent the most extreme group of problem gambling, those scoring 3 to 7 (moderate-risk gamblers) are believed to be at a significant risk for gambling problems as well.[32] In view of that, some researchers have combined these 2 highest

CPGI levels to indicate moderate and severe problem gambling.[30] In addition, given the small number of the highest-level problem gamblers in the study, it is statistically and theoretically sensible to collapse the top 2 levels of gamblers. Consequently, we created a 4-category outcome variable of gambling (that is, nongambling, nonproblem gambling, low-risk gambling, and moderate-risk or problem gambling) to describe and estimate the population prevalence of gambling. For gamblers, we also created a dichotomous outcome variable for the logistic regression analysis to indicate moderate-risk or problem gambling vis-à-vis nonproblem and low-risk gambling.

Independent Variables. Age, sex, and region were the main study variables. We dichotomized age into those aged 15 to 24 years and those aged 25 years or older when comparing youth and adults; we also used this as a continuous variable in a regression model that included youth only. Canada was dummy-coded into the 5 regions described above (British Columbia, the Prairie provinces, Ontario, Quebec, and the Atlantic provinces).

Statistical Analysis

Population Prevalence of Gambling. First, we calculated the national 12-month prevalence estimates of the 4 levels of gambling in youth and adults by cross-tabulating the dichotomous age variable with the 4-category outcome variable of gambling. These age comparisons were further broken down by region. For youth, on both the national and regional levels, prevalence estimates in male and female respondents were also computed separately for sex comparisons. We estimated all the prevalence figures with weighted data, using SPSS 13 (SPSS Inc, Chicago, IL, 2004). In addition, to account for the effect of the complex, multistage sampling design of the CCHS 1.2, we employed bootstrapping to calculate all the 95%CIs, using the bootstrap weights and BOOTVAR (SPSS macro) program provided by Statistics Canada.

Multivariate Logistic Regression. As an exploratory, ancillary analysis to supplement the above prevalence comparisons, we employed multivariate logistic regression modelling to examine the effects of age, sex, and region. Among those who gambled in the past 12 months, we estimated 2 regression models to assess whether the risk of being moderate-risk or problem gamblers varied by age, sex, and (or) region while simultaneously controlling for the effects of these 3 variables. The first model included youth only, with the age variable being continuous, whereas the second model included both youth and adults, with the age variable being dichotomous. Both models used Quebec as the reference for region. As with the above-mentioned prevalence analyses, we used weighted data to estimate the ORs, and we also employed bootstrapping to calculate the 95%CIs.

Results

Table 1 presents the prevalence estimates of gambling across various levels as measured by the CPGI, broken down by region, age (youth and adults), and sex (for youth only). Compared with adults, Canadian youth had a significantly higher percentage of nongamblers (38.65%, compared with 21.35%) but a significantly lower percentage of nonproblem gamblers (55.58%, compared with 74.09%). Further, youth appeared to have higher prevalence of low-risk gambling (3.55%, compared with 2.65%), which was marginally nonsignificant, and somewhat higher prevalence of moderate-risk or problem gambling (2.22%, compared with 1.92%), which was not statistically significant.

The above pattern of prevalence differences between youth and adults remained almost the same across the 5 regions of Canada investigated, with youth having proportionately and significantly more nongamblers but fewer nonproblem gamblers than adults. As well, although the prevalence comparisons with adults were not always significant, youth tended to have higher prevalence of low-risk gambling; for example, in the Atlantic region, 4.7% of youth were low-risk gamblers, compared with 2.08% of adults (at a significance level of 0.05). As for moderate-risk or problem gambling, although the prevalence differences between youth and adults were not statistically significant in individual regions, Quebec and Ontario both showed higher prevalence in youth, whereas British Columbia, the Prairies, and the Atlantic region had somewhat higher prevalence estimates in adults.

With variability in prevalence figures, the overall population pattern of youth gambling was similar across all regions in Canada, each having more than 53% defined as nonproblem gamblers, more than 35% defined as nongamblers, less than 5% defined as low-risk gamblers, and less than 3% defined as moderate-risk or problem gamblers. The percentage of nongamblers ranged from 35.69% in Quebec to 41.77% in British Columbia. The percentage of nonproblem gamblers ranged from 53.26% in the Prairies to 58.80% in Quebec. The prevalence of low-risk gambling ranged from 3.12% in British Columbia to 4.70% in the Atlantic region. As to moderate-risk or problem gambling, the prevalence ranged from 1.37% in British Columbia to 2.75% in Ontario.

In Canadian youth, sex differences were found in the national prevalence across all 4 levels of gambling. Young women had a significantly higher proportion of nongamblers than young men (42.98%, compared with 34.50%). Among young women, the percentage of nonproblem gamblers was lower than among young men (53.34%, compared with 57.72%), although the difference was nonsignificant. Women also had significantly lower prevalence of low-risk gambling (2.57%, compared with 4.48%) and significantly lower prevalence of

Table 1 Population prevalence of gambling across various levels by region, age, and sex

Variable	Sample size n	Nongambler %	Nongambler 95%CI	Nonproblem gambler %	Nonproblem gambler 95%CI	Low-risk gambler %	Low-risk gambler 95%CI	Moderate-risk or problem gambler %	Moderate-risk or problem gambler 95%CI
Canada									
Age 15–24	5 666	38.65	36.84–40.47	55.58	53.75–57.39	3.55	2.90–4.20	2.22	1.69–2.76
M	2 736	34.50	31.93–37.07	57.72	55.25–60.19	4.48	3.48–5.51	3.30	2.37–4.20
F	2 930	42.98	40.46–45.51	53.34	50.78–55.87	2.57	1.80–3.34	1.10	0.56–1.66
Age 25+	31 219	21.35	20.65–22.04	74.09	73.37–74.80	2.65	2.39–2.91	1.92	1.69–2.14
Quebec									
Age 15–24	820	35.69	31.03–40.38	58.80	54.29–63.31	3.39	1.63–5.17	2.12	0.54–3.66
M	385	34.99	28.39–41.63	58.92	52.61–65.24	3.73	1.15–6.19	2.35	0.01–4.78
F	435	36.47	30.07–42.79	58.61	52.22–65.11	3.18	0.80–5.45	1.74	0.00–3.84
Age 25+	4 493	17.61	15.85–19.36	79.12	77.27–80.98	1.78	1.17–2.38	1.50	1.03–1.97
Ontario									
Age 15–24	1 986	39.18	36.37–41.99	54.94	52.05–57.89	3.14	2.15–4.10	2.75	1.85–3.61
M	948	33.00	29.28–36.68	58.50	54.56–62.45	4.12	2.50–5.84	4.38	2.78–5.91
F	1 038	45.61	41.68–49.58	51.32	47.35–55.22	2.02	1.03–3.04	1.05	0.40–1.70
Age 25+	11 174	22.36	21.25–23.47	72.99	71.88–74.10	2.79	2.38–3.20	1.86	1.45–2.27
Atlantic									
Age 15–24	1 015	36.11	32.17–39.94	57.48	53.50–61.38	4.70	3.01–6.55	1.71	0.83–2.62
M	468	32.77	27.50–37.78	57.98	52.61–63.34	6.72	4.04–9.71	2.52	0.99–4.03
F	547	39.57	34.13–45.05	56.96	51.41–62.38	2.61	0.72–4.50	0.87	0.11–1.70
Age 25+	6 024	20.85	19.47–22.19	75.25	73.76–76.72	2.08	1.61–2.57	1.82	1.43–2.25
Prairies									
Age 15–24	1 300	40.13	36.58–43.63	53.26	49.50–57.01	4.44	3.05–5.91	2.17	1.31–2.99
M	648	35.34	30.39–40.28	54.77	49.52–60.06	6.18	3.92–8.41	3.71	2.15–5.27
F	652	45.07	40.64–49.64	51.58	46.84–56.44	2.79	1.28–4.13	0.56	0.04–0.99
Age 25+	6 188	24.06	22.67–25.45	69.91	68.41–71.40	3.45	2.85–4.05	2.58	2.09–3.08
British Columbia									
Age 15–24	545	41.77	36.76–46.90	53.74	48.72–58.72	3.12	1.39–4.78	1.37	0.52–2.20
M	287	37.99	31.30–44.51	57.11	50.85–63.59	3.19	0.82–5.62	1.72	0.32–2.98
F	258	45.94	38.24–53.55	50.00	42.44–57.77	3.05	0.26–5.61	1.02	0.10–2.03
Age 25+	3 340	22.31	20.69–23.93	72.39	70.66–74.13	3.21	2.44–3.97	2.09	1.43–2.75

Levels of gambling were determined according to the CPGI. Sample sizes shown here were unweighted, but prevalence (%) was calculated using weighted data and 95%CIs were produced using bootstrapping technique. See the Method section for more details.

M = Male youth; F = Female youth

Table 2 Multivariate logistic regression models: estimating the RR of being a moderate-risk or problem gambler among those who gambled in the past 12 months

Variable	Model 1 Youth only (aged 15 to 24 years)		Model 2 All ages (youth and adults)	
	OR	95%CI	OR	95%CI
Male sex	2.64	1.47–4.74	1.79	1.43–2.25
Age, years	1.01	0.92–1.11	—	—
Age (15–24 vs 25+)	—	—	1.46	1.13–1.89
Region				
Quebec	reference	reference	reference	reference
Ontario	1.35	0.56–3.25	1.33	0.92–1.95
British Columbia	0.69	0.24–2.04	1.33	0.84–2.10
Prairies	1.07	0.44–2.63	1.70	1.18–2.45
Atlantic	0.81	0.31–2.13	1.19	0.81–1.74

moderate-risk or problem gambling (1.10%, compared with 3.30%) than men.

The same pattern of sex differences in youth gambling was found across the 5 regions. However, the magnitudes of these sex differences varied across regions. For example, the gap between male and female youth in the percentage of nongamblers ranged from 1.48% in Quebec to around 7% in the Atlantic region and British Columbia, 9.73% in the Prairies, and 12.61% in Ontario, with the sex differences being significant in the Prairies and Ontario. The sex gap in the proportion of nonproblem gamblers was relatively smaller, ranging from 0.31% in Quebec to 7.18% in Ontario; none of these were significant. Sex differences in prevalence of low-risk gambling and moderate-risk or problem gambling were also relatively smaller (under 1%) and not statistically significant in both Quebec and British Columbia. By contrast, in Ontario, the Atlantic provinces, and the Prairie provinces, although the sex differences were not significant, the prevalence estimates of low-risk gambling in male youth were all more than twice as high as those in female youth. Further, male youth also had consistently higher prevalence of moderate-risk or problem gambling, compared with female youth—ranging from almost 3 times higher in the Atlantic provinces (nonsignificant) to more than 4 times higher in Ontario (significant) and almost 7 times higher (significant) in the Prairies.

Table 2 presents 2 multivariate logistic regression models estimating the relative risk of being a moderate-risk or problem gambler as opposed to a nonproblem or low-risk gambler. Because the objective of the modelling was to explore the above-noted epidemiologic patterns of gambling further

rather than to analyze the etiologic effects of an exhaustive set of risk factors, both models focused on age, sex, and region variables only to elucidate their effects on the gambling prevalence patterns observed in this study.

Controlling for the effects of age and region, the first model indicated that, among Canadian youth who gambled in the past 12 months, young men were 2.64 times as likely as young women to be moderate-risk or problem gamblers (OR 2.64; 95%CI, 1.47 to 4.74). Although the regional variables were not statistically significant, they suggested regional variation in regard to risk for problem gambling.

Controlling for the regional effect, the second model revealed that, among Canadians who gambled in the past 12 months, men were 79% more likely than women (OR 1.79; 95%CI, 1.43 to 2.25), and youth were almost 1.5 times as likely as adults (OR 1.46; 95%CI, 1.13 to 1.89), to be moderate-risk or problem gamblers. In addition, one regional dummy variable (the Prairies) was significant, indicating that, after controlling for sex and age variables, gamblers in the Prairies were 70% more likely than those in Quebec to be moderate-risk or problem gamblers (OR 1.70; 95%CI, 1.18 to 2.45).

Discussion

Using nationally representative data from the CCHS 1.2 and the CPGI, this study found that more than 3 in 5 (61.35%) young Canadians aged 15 to 24 years gambled in the past 12 months. Further, consistent with the conclusions of metaanalyses across gambling studies over the past 25 years,[6] our results add to evidence that, compared with adults, youth have higher past-year prevalence of low-risk gambling and moderate-risk or problem gambling. This, combined with our

findings that youth also had a higher percentage of nongamblers but a lower percentage of nonproblem gamblers than adults, suggests a polarized pattern of youth gambling, because they seem either to abstain from gambling or to engage in more problematic gambling. This also corroborates the results from the first Swedish national gambling survey, which found that individuals under age 25 years are at an increased risk for problem gambling.[27] Indeed, more attention should be given to the apparently more vulnerable younger population, as suggested by Shaffer and colleagues.[28]

Also of interest are sex differences in gambling prevalence and the magnitudes of these differences. As in the youth gambling literature reviewed in this study, we found significantly higher prevalence of gambling among men, compared with women (65.5% and 57.02%, respectively). Further, the past-year prevalence of low-risk and moderate-risk or problem gambling in men was, respectively, almost twice as high, and precisely 3 times as high, as that in women. These sex differences were statistically significant at the 0.05 level.

The phenomenon of sex differences in gambling prevalence is not new. However, prior to the CCHS 1.2, no Canadian survey could provide population prevalence estimates based on nationally representative data and uniform measures and classifications of problem gambling that would allow direct comparisons. Therefore, it is reasonable to suggest that, in the existing literature, the sex differences found in this study may represent the best currently available estimate of the magnitude of the sex gap in problem gambling among Canadian youth. We also found interregional variability in the size of the sex gap, with Quebec and British Columbia having relatively smaller prevalence gaps and Ontario, the Atlantic provinces, and the Prairie provinces having much wider gaps. Our findings not only highlight a recurring theme but also suggest the need for further research into the interregional differences in the magnitude of the sex gap in youth problem gambling.

Although the overall population prevalence of youth gambling had similar patterns across Canada, we found some cross-regional variations in prevalence across various gambling levels. For example, British Columbia and Ontario had the lowest (1.37%) and highest (2.75%) prevalence of youth gambling problems, respectively, although the prevalence difference was not statistically significant. Our results differ from those of Cox and colleagues,[30] described earlier, because these researchers examined the national prevalence among youth and adults combined rather than focusing on youth. This highlights the important differences in gambling prevalence patterns within different population segments.

Logistic regression analyses supplemented the prevalence comparisons in this study, and ORs were used to assess the relative risk of gambling problems in relation to age, sex, and region. For example our study found that youth (compared with adults) and men (compared with women) both had higher prevalence as well as a higher relative risk of gambling problems. Accordingly, young men should be the primary target group for gambling interventions. More research is also needed to investigate, in problem gambling, the etiologic differences between youth and adults and between men and women. Lastly, according to the OR from the logistic regression model, the Prairies had the highest RR of problem gambling, after controlling for sex and age, which suggests that this region may have some other individual-level and (or) environmental-level factors that contribute to such higher risk. This warrants further research into causes of interregional differences in the risk of problem gambling.

One of the limitations of this study is that the CCHS 1.2 used only the newly developed CPGI to assess gambling problems and did not include other commonly used measures, such as the DSM-IV[33] criteria and the SOGS.[34] Consequently, it is difficult to compare our findings directly with the results from other studies, although the CPGI has been found to correlate well at 0.83 with both DSM-IV criteria and the SOGS.[32] Although the CPGI demonstrated good psychometric properties in its original validation study, it was not developed specifically for youth. More studies are needed to evaluate use of the CPGI in adolescents and young adults. Regardless, the population prevalence estimates from this study can serve as important reference figures for future monitoring and direct comparisons of gambling problems in the population when the CPGI is also used.

Although this prevalence study is mainly a descriptive epidemiology study, to explore beyond the prevalence comparisons, we conducted logistic regression analyses and found that youth, male sex, and living in the Prairie region were associated with increased risk of problem gambling. However, the cross-sectional design of the CCHS 1.2 constrains the ability to make causal inferences about potential risk factors and the development of problem gambling, although some variables remain constant over time (for example, sex). Longitudinal research is thus needed in the future to elucidate the temporal–causal relations between risk–protective factors and problem gambling. Other limitations of the CCHS 1.2 include its sole reliance on self-report and its generalizability only to community dwellers in private households in the 10 provinces but not to residents of the Yukon, the Northwest Territories, or Nunavut or to the homeless or those living on First Nations reserves and government-owned land.

Finally, as a result of the relatively smaller sample sizes of youth in the heavier gambling category, their prevalence figures tended to have wider CIs and to overlap with each other, leading to statistically nonsignificant results. To improve the precision of prevalence estimates in the future, youth need to

be strategically oversampled to ensure enough statistical power for comparisons of problem gambling in youth.

Conclusions

The CCHS 1.2 is the first Canadian survey with nationally representative data on problem gambling as measured by the CPGI. Using the CCHS 1.2 data, this study has been able to estimate national prevalence figures in both youth and adults, to make comparisons, to assess interregional variability, and to examine sex differences in the prevalence of gambling problems. These findings not only provide critical information for policy-makers and public health planners at both national and regional levels but also contribute to the growing international knowledge on problem gambling in youth. Future studies will need to further explore these sex and regional differences in gambling involvement, particularly among youth. More empirical research that builds on the results and recommendations of this study is warranted to enhance our understanding of the development and maintenance of problem gambling and to inform future evidence-based prevention programs tailored to youth.

References

1. Shaffer HJ, Hall MN, Vander Bilt J. Estimating the prevalence of disordered gambling behavior in the United States and Canada: a research synthesis. Am J Public Health. 1999;89(9):1369–1376.

2. Jacobs DF. Juvenile gambling in North America: an analysis of long term trends and future prospects. J Gambl Stud. 2000;16(2–3):119–152.

3. Derevensky JL, Gupta R. Prevalence estimates of adolescent gambling: a comparison of the SOGS-RA, DSM-IV-J, and the GA 20 questions. J Gambl Stud. 2000;16(2–3):227–251.

4. Derevensky JL, Gupta R, Winters K. Prevalence rates of youth gambling problems: are the current rates inflated? J Gambl Stud. 2003;19(4):405–425.

5. Shaffer HJ, Hall MN. Estimating the prevalence of adolescent gambling disorders: a quantitative synthesis and guide toward standard gambling nomenclature. J Gambl Stud. 1996;12(2):193–214.

6. Shaffer HJ, Hall MN. Updating and refining prevalence estimates of disordered gambling behaviour in the United States and Canada. Can J Public Health. 2001;92(3):168–172.

7. Messerlian C, Derevensky J, Gupta R. Youth gambling problems: a public health perspective. Health Promot Int. 2005;20(1):69–79.

8. Kaminer V, Petry NM. Gambling behavior in youths: why we should be concerned. Psychiatr Serv. 1999;50(2):167–168.

9. Gray PB. Evolutionary and cross-cultural perspectives on gambling. J Gambl Stud. 2004;20(4):347–371.

10. Adlaf EM, Ialomiteanu A. Prevalence of problem gambling in adolescents: findings from the 1999 Ontario Student Drug Use Survey. Can J Psychiatry. 2000;45(8):752–755.

11. Ko CH, Yen JY, Chen CC, et al. Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. J Nerv Ment Dis. 2005;193(4):273–277.

12. Johansson A, Gotestam KG. Gambling and problematic gambling with money among Norwegian youth (12–18 years). Nord J Psychiatry. 2003;57(4):317–321.

13. Gupta R, Derevensky JL. adolescent gambling behavior: a prevalence study and examination of the correlates associated with problem gambling. J Gambl Stud. 1998;14(4):319–345.

14. Stinchfield R, Cassuto N, Winters K, et al. Prevalence of gambling among Minnesota public school students in 1992 and 1995. J Gambl Stud. 1997;13(1):25–48.

15. Westphal JR, Rush JA, Stevens L, et al. Gambling behavior of Louisiana students in grades 6 through 12. Psychiatr Serv. 2000;51(1):96–99.

16. Pietrzak RH, Ladd GT, Petry NM. Disordered gambling in adolescents: epidemiology, diagnosis, and treatment. Paediatr Drugs. 2003;5(9):583–595.

17. Lesieur HR, Cross J, Frank M, et al. Gambling and pathological gambling among university students. Addict Behav. 1991;16(6):517–527.

18. Petry NM, Stinson FS, Grant BF. Comorbidity of DSM-IV pathological gambling and other psychiatric disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. J Clin Psychiatry. 2005;66(5):564–574.

19. Welte JW, Barnes GM, Wieczorek WF, et al. Gambling participation in the US—results from a national survey. J Gambl Stud. 2002;18(4):313–337.

20. Barnes GM, Welte JW, Hoffman JH, et al. Gambling and alcohol use among youth: influences of demographic, socialization, and individual factors. Addict Behav. 1999;24(6):749–767.

21. Winters KC, Anderson N. Gambling involvement and drug use among adolescents. J Gambl Stud. 2000;16(2–3):175–198.

22. Vitaro F, Brendgen M, Ladouceur R, et al. Gambling, delinquency, and drug use during adolescence: mutual influences and common risk factors. J Gambl Stud. 2001;17(3):171–190.

23. Barnes GM, Welte JW, Hoffman JH, et al. Shared predictors of youthful gambling, substance use, and delinquency. Psychol Addict Behav. 2005;19(2):165–174.

24. Proimos J, DuRant RH, Pierce JD, et al. Gambling and other risk behaviors among 8th- to 12th-grade students. Pediatrics. 1998;102(2):e23.

25. Greenberg JL, Lewis SE, Dodd DK. Overlapping addictions and self-esteem among college men and women. Addict Behav. 1999;24(4):565–571.

26. Lynch WJ, Maciejewski PK, Potenza MN. Psychiatric correlates of gambling in adolescents and young adults grouped by age at gambling onset. Arch Gen Psychiatry. 2004;61(11):1116–1122.

27. Volberg RA, Abbott MW, Ronnberg S, et al. Prevalence and risks of pathological gambling in Sweden. Acta Psychiatr Scand. 2001;104(4):250–256.

28. Shaffer HJ, LaBrie RA, LaPlante DA, et al. The road less travelled: moving from distribution to determinants in the study of gambling epidemiology. Can J Psychiatry. 2004;49(8):504–516.

29. Statistics Canada. Canadian Community Health Survey: Mental Health and Well-Being [Internet]. Ottawa (ON): Statistics Canada; 2003 Sep 3 [updated 2004 Sep 9; cited 2007 Jul 11]. Available from: http://www.statcan.ca/english/freepub/82-617-XIE/index.htm.

30. Cox BJ, Yu N, Afifi TO, et al. A national survey of gambling problems in Canada. Can J Psychiatry. 2005;50(4):213–217.

31. Gravel R, Beland Y. The Canadian Community Health Survey: mental health and well-being. Can J Psychiatry. 2005;50(10):573–579.

32. Ferris J, Wynne H. The Canadian Problem Gambling Index: final report. Ottawa (ON): Canadian Centre on Substance Abuse; 2001.

33. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed. Washington (DC): American Psychiatric Association; 1994.

34. Lesieur HR, Blume SB. The South Oaks Gambling Screen (SOGS): a new instrument for the identification of pathological gamblers. Am J Psychiatry. 1987;144(9):1184–1188.

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Résumé : L'épidémiologie des problèmes de jeu chez les jeunes au Canada : une étude de la prévalence nationale

Objectifs : Décrire l'épidémiologie des problèmes de jeu chez les jeunes de 15 à 24 ans au Canada, et examiner si ces modèles de prévalence du jeu pathologique diffèrent selon le sexe et (ou) la région géographique.

Méthode : Nous avons utilisé les données de l'Enquête sur la santé dans les collectivités canadiennes : santé mentale et bien-être. Les problèmes de jeu étaient déterminés d'après l'Indice canadien du jeu problématique. Toutes les estimations de la prévalence utilisaient les poids d'échantillonnage appropriés et les méthodes bootstrap d'estimation de la variance mises au point par Statistique Canada. Le modèle de régression logistique multivariée a aussi été utilisé pour fournir les comparaisons de prévalence mentionnées ci-dessus, selon l'âge, le sexe et la région.

Résultats : Chez les jeunes Canadiens de 15 à 24 ans (*n* = 5 666), 61,35 % ont joué au cours des 12 derniers moins et la prévalence nationale de jeu à risque modéré ou problématique était de 2,22 % (3,30 % chez les répondants masculins et 1,10 % chez les répondants féminins). Les répondants masculins avaient une prévalence significativement plus élevée de problèmes de jeu que les répondants féminins. Les estimations de la prévalence régionale du jeu à risque modéré ou problématique chez les jeunes étaient de 1,37 % en Colombie-Britannique, 2,17 % dans les Prairies, 2,75 % en Ontario, 2,12 % au Québec, et 1,71 % dans les provinces de l'Atlantique.

Conclusions : Les jeunes, surtout les jeunes hommes, sont à plus grand risque de problèmes de jeu que les adultes. Il faut plus de prévention et de projets de recherche pour aborder les différences entre les sexes observées et la variabilité interrégionale dans la prévalence des problèmes de jeu chez les jeunes. Les estimations de la prévalence nationale de cette étude offrent d'importantes données de départ auxquelles pourront être mesurées et surveillées de futures cohortes canadiennes.