

The Relation Between Types and Frequency of Gambling Activities and Problem Gambling Among Women in Canada

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Objective: Canada experienced large-scale growth of the gambling industry during the 1990s. Clinical data have indicated that substantial proportions of people seeking help for gambling problems in Canada are women. A population health model was used to understand the relation between types and frequency of gambling activities and problem gambling among women in Canada.

Method: Data used for the analysis were from the nationally representative Canadian Community Health Survey: Mental Health and Well-Being (CCHS 1.2; $n = 10\,056$, women aged 15 years and older; data collected in 2002).

Results: The types of gambling associated with the highest odds of problem gambling among women in Canada were video lottery terminals (VLTs) outside the casino (OR 2.37 to 53.73; $P < 0.01$), VLTs inside the casino (OR 2.84 to 36.19; $P < 0.001$), and other casino games (OR 4.01 to 24.15; $P < 0.001$).

Conclusions: These observations further our understanding of problem gambling among women in Canada and confirm that problem gambling among women is an important public health concern. Frequent VLT gambling, both outside and inside casinos, and other casino games are associated with the largest odds of problem gambling, which highlights an area of gambling in Canada that needs to be reassessed if problem gambling is to be prevented or reduced. Evidence-based research is necessary to inform healthy public policies on gambling in Canada. Findings from the current research have important research and policy implications.

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Clinical Implications

- VLTs outside casinos are associated with the largest odds of problem gambling.
- VLTs inside casinos are associated with the second largest odds of problem gambling.
- Casino gambling other than VLTs are associated with the third largest odds of problem gambling.

Limitations

- The data are cross-sectional in nature.
- Data on the physical gambling environment were limited.
- Genetic variables could not be controlled owing to unavailable measures in the data.

Key Words: *problem gambling, women, video lottery terminals, electronic gaming machines, casinos*

In the past, many forms of gambling in Canada were considered illegal under the Canadian Criminal Code. In 1892, the Criminal Code banned gambling, with the exception of horse racing, and later the exemption of gambling at fair midways.¹ In 1969, legalized gambling expanded due to an amendment to the Criminal Code authorizing provincial and federal run lotteries and licensed charitable gambling.¹ However, the most notable growth of the gambling industry in Canada has been in the past 2 decades. In 1985, another amendment to the Criminal Code gave each province exclusive control over gambling and the authority to distribute electronic gaming machine gambling within provinces.^{1,2} The amendments to the Canadian Criminal Code have changed the gambling landscape in Canada through decriminalization of gambling, greater provincial authority over gambling, the expansion of gambling products and technology, and vested interest groups driving gambling growth.³

In 1989, Manitoba was the first province to open a government casino.⁴ In 1990, New Brunswick became the first province to introduce VLTs into the community.⁴ VLT is a commonly used term for electronic gambling machines available in the community. Electronic gambling machines in casinos are either called slot machines or VLTs. For simplicity, the term VLT is used in our research and includes slots machines.

By 2005, all provinces had permanent casinos, with the exception of Newfoundland and Labrador, Prince Edward Island, and New Brunswick, and all provinces had VLTs within the community, with the exception of Ontario and British Columbia.⁵ To date, gambling continues to be controlled and regulated at the provincial level. The availability of gambling varies by province, with some provinces being quite similar. This rapid expansion of gambling in Canada has been identified as an important public health concern.^{2,6,7} Problem gambling refers to gambling behaviour that has a negative impact on the gambler, other people in his or her social network, or the community.⁸

Historically, gambling was thought of as a predominately male activity occurring in underground illegal venues. However, recent research indicates that women are now just as likely to gamble as men.⁹ The expansion of gambling will have an impact on gambling behaviour among men and women, but it may be especially important among women. Evidence indicates that women tend to participate in legal rather than illegal forms of gambling, suggesting that the greater availability of legal gambling increases the likelihood of women to gamble.¹⁰ Although slot machines are not a new technology, VLTs are a newly available form of gambling and

is often reported as a preferred type of gambling among women.¹¹⁻¹⁴

Women with gambling problems have also been increasingly found among help-seeking samples,¹⁵⁻¹⁷ a population that had been almost exclusively male. At an Ontario Addictions Centre, almost 50% of gambling clients from 1999 to 2001 were women.¹⁶ Data from the Addictions Foundation of Manitoba indicated that the percent of women being seen for gambling problems was 37.1% from 1996 to 2001 and 49.2% from 2004 to 2005.¹⁷ These changes in women's gambling activity and the presence of women gamblers in help-seeking populations indicate that, relative to the past, gambling and gambling problems among women have increased. Consequently, there has been a recognized and encouraged need in the literature to study women and problem gambling.^{6,10,18,19} However, to date, research has not been conducted on the association between gambling activities and problem gambling among women at a national level in Canada.

Evidence-based research is necessary to inform healthy gambling policy. Our study is the first to use a population health framework to identify what types of gambling activities are associated with increased odds of problem gambling among Canadian women. Evans and Stoddart's²⁰ population health framework indicates genetic endowment, social environment, and physical environment function together have an impact on individual behaviour or biological response. This framework was used to identify important social and psychosocial factors from the social environment to be adjusted in the current research. Unfortunately, it was not possible to include genetic and physical environment variables because of inadequate or unavailable measures in the data. It was hypothesized that frequent play of the 13 types of gambling assessed would be associated with significantly increased odds of problem gambling relative to nonproblem gambling among women after adjusting for important demographic and social covariates.

Method

Sample

Data from the CCHS 1.2 master file were used in the current research. Data were collected in 2002, using a random, multi-stage stratified cluster design to select private-dwelling Canadian residents aged 15 years and older from 10 provinces.²¹ CCHS 1.2 data were representative of the general population of Canada at the provincial level.²² The total sample size of the CCHS 1.2 was 36 984, with a response rate of 77%.²² Women participants aged 15 years and older who had endorsed gambling in the past 12 months ($n = 10\ 056$) were selected for the current analysis. Ethical approval for the current research was obtained from the Health Research Ethics Board at the University of Manitoba.

Abbreviations used in this article:

CCHS 1.2	Canadian Community Health Survey: Mental Health and Well-Being
CPI	Canadian Problem Gambling Index
VLT	video lottery terminal

Measures

Gambling Activities

The frequencies of the following 13 gambling activities in the past 12 months were assessed, including: instant win, scratch tickets, or daily lotteries; lottery tickets; bingo; cards or board games for money; VLTs outside a casino; coin slots or VLTs inside a casino; casino games other than VLTs; internet gambling; horse racing; sport lotteries; stock market; games of skill (for example, golf and pool); and, other gambling (for example, dog racing). Frequency of playing instant win tickets, lottery tickets, and bingo were analyzed using 6 categories: never; 1 to 5 times per year; 6 to 11 times per year; 1 to 3 times per month; once a week; and several times per week to daily. Cards or board games, VLTs outside of a casino, and VLTs inside a casino were collapsed into 5 categories including: never; 1 to 5 times per year; 6 to 11 times per year; 1 to 3 times per month; and weekly or more. Casino games other than VLTs were collapsed into 3 categories: never; 1 to 11 times per year; and once a month or more. Finally, owing to low frequency of play among women, Internet gambling, horse racing, sport lotteries, stock market betting, games of skill, and other gambling were all dichotomized (yes or no). The provinces of British Columbia and Ontario do not permit VLTs outside of casinos. Accordingly, these respondents reported the lowest levels of playing VLTs outside of casinos, compared with the remaining provinces that allow VLTs outside of casinos. As respondents from British Columbia and Ontario did report gambling on VLTs outside of casinos in the past 12 months, they were not excluded from any models. Likewise, respondents from all 10 Canadian provinces were included in all analyses.

Problem Gambling

The valid and reliable CPGI was used to assess past 12-month problem gambling. The CPGI is a well-developed tool that was created specifically for assessing problem gambling in the general population and has been subject to extensive psychometric testing.^{8,23}

The CPGI uses the following 9 items to assess level of gambling problems: wagered larger amounts to get the same feeling of excitement, tried to win back losses, borrowed money or sold something to get money for gambling, felt you might have a problem with gambling, gambling caused health problems including stress and anxiety, been criticized for your betting or told that you have a problem, gambling has caused financial problems, felt guilty about gambling, and bet more than you could afford to lose. The 9 items were used to compute CPGI scores that measures problem gambling. The conventional method of comparing nonproblem and low-risk gamblers (scores of 0 to 2) to problem gamblers (defined as moderate- or severe-risk gamblers with scores of 3 or more) was used in the current research.^{5,24-28} Women who did not participate in gambling activities in the past 12 months were excluded from the analyses.

Covariates

Using a population health framework, demographic and social variables that were significantly associated with problem gambling among women in Canada (results available upon request) were used as control variables.

Age was measured in 7 categories including: 15 to 19 years, 20 to 29 years, 30 to 39 years, 40 to 49 years, 50 to 59 years, 60 to 69 years, and 70 years or older. Annual household income was measured in Canadian dollars: \$14 999 or less, \$15 000 to \$29 999, \$30 000 to \$49 999, \$50 000 to \$79 999, and \$80 000 or more. Highest educational attainment was measured in 5 categories: less than high school; high school graduate; some post secondary; trade, college, university diploma or certificate; and university degree. Marital status was measured in 6 categories: married, common law, widowed, separated, divorced, and never married.

The Medical Outcome Study measured social support, including emotional or informational support, tangible support, positive social interaction, and affection.^{29,30} The respondent reported the amount of life stress in their lives from the following categories: not at all stressful, not very stressful, a bit stressful, quite a bit stressful, and extremely stressful.

A factor analysis using principal components analysis with varimax rotation determined that the 8 negative coping items loaded on one factor and could be used to compute a negative coping index variable. The negative coping items included the following coping strategies: avoiding being with other people; sleeping more than usual; eating more or less than usual; smoking more cigarettes than usual; drinking alcohol; using drugs or medications; blaming oneself; and, wishing the problem would go away. These 8 items were added together to compute a negative coping index variable with higher scores indicating greater negative coping strategies.

Statistical Analysis

Logistic regression models were used to analyze the relation between 13 types of gambling activities and problem gambling. Each type of gambling was assessed in separate logistic regression models after adjusting for covariates as identified using a population health approach. All assumptions of logistic regression were verified. Statistical weights were applied in all analyses. In addition, to adjust for the complex sampling design of the CCHS 1.2, bootstrapping was used to produce standard errors and 95% confidence intervals.³¹

Results

The prevalence of problem gambling among women in the sample was 1.4% ($n = 320$). The odds ratios for the relation between gambling activity and problem gambling among women in Canada are presented in Table 1. With the exception of internet gambling and games of skill, all types of gambling were associated with increased odds of problem gambling relative to nonproblem gambling among women

after adjusting for covariates. The highest odds of problem gambling were associated with gambling on VLTs outside a casino (OR 2.37 to 53.73; $P < 0.01$), VLTs inside a casino (OR 2.84 to 36.19; $P < 0.001$), and other casino games (OR 4.01 to 24.15; $P < 0.001$). More specifically, compared with women never gambling on VLTs outside a casino, gambling on VLTs outside a casino weekly or more was associated with extremely increased odds of problem gambling (AOR 53.73, 95% CI 24.85 to 116.16, $P < 0.001$). Similarly, compared with women never playing VLTs inside a casino, the probability of problem gambling was also very high for women playing VLTs inside a casino weekly or more (AOR 36.19, 95% CI 15.55 to 84.22, $P < 0.001$). Additionally, compared with women never playing other casino games, the probability of problem gambling was high for women playing other casino games monthly or more (AOR 24.15, 95% CI 8.95 to 65.18, $P < 0.001$). The general trend noted in the results was that the probability of problem gambling increased with greater frequency of gambling measured using an ordinal scale.

Discussion

The current research does contribute to our understanding of problem gambling among women from a population health perspective. All 13 types of gambling assessed were associated with increased odds of problem gambling, with the exception of Internet gambling and gambling on games of skill, which largely supports the research hypothesis. The size of the odds ratios highlighted which types of gambling were more likely to be associated with problem gambling among women. More specifically, gambling on VLTs outside of casinos was associated with the largest odds of problem gambling, followed by gambling on VLTs inside casinos and other casino games. Interestingly, gambling on VLTs outside and inside casinos as little as 1 to 5 times per year was associated with increased odds of problem gambling among women. However, greater frequency of gambling on VLTs outside and inside casinos generally corresponded with a higher probability of problem gambling.

These findings are consistent with past research that found that VLTs had the strongest association with gambling problems.³² VLTs are considered to have high addictive potential³³ and have been referred to as the crack cocaine of gambling.³⁴ Possible reasons for the unique addictive nature of VLTs include: quick continuous play, believing in strategies for winning, the mistaken belief that VLTs can be manipulated, the inability to understand that longer play means larger losses, the misunderstanding of the odds of winning, and the ability to dissociate during play.³⁵

Internet gambling was not associated with increased odds of problem gambling among women. Internet gambling is considered a new form of gambling that is difficult to regulate³⁶ and still appears to be rare.³⁷⁻³⁹ Likewise, only 1.2% of nonproblem gamblers and 1.4% of problem gamblers in the current research reported gambling on the Internet in the past

12 months. Even though Internet gambling may be accessed from home, it may still be less available for women who do not have a computer, Internet, or a credit card. Also, Internet gambling may be more difficult to hide, which can be a concern for some gamblers. However, it is important to note that Internet use continues to rise, which indicates that Internet gambling should be monitored for changing trends over time. It is possible that the frequency of Internet gambling and the relation between Internet gambling and problem gambling among women may have changed since the collection of these data in 2002. Gambling on games of skill was also not associated with problem gambling among women. This may be because gambling on games of skill may not be a preferred type of gambling among women.⁹

Research and Policy Implications

A summary of the recommendations based on the current results that could inform healthy gambling policy and potentially reduce problem gambling are presented in Table 2. First, the high odds of problem gambling associated with VLT gambling suggests that reducing the availability and accessibility of VLT gambling would be the most appropriate area of scrutiny for regulators aiming to reduce problem gambling. The following recommendations to potentially reach this goal could be considered: removal of VLTs outside of casinos (for example, community bars, restaurants, lounges, and legions) in all provinces, reducing the number of VLTs available in casinos and implementing lower provincial caps on the number of VLTs allowed in casinos and provinces, and limiting the hours of operation of VLTs (for example, midday or evening until midnight) regardless of the hours of operation of the establishment.

From a public health perspective, VLTs have been likened to an environmental toxin that is associated with disease.⁴⁰ Reluctance to remove or reduce the concentration of VLTs in the community or in casinos is likely due to the large revenue generated from VLTs. In fact, the largest amount of profit generated from gambling comes from VLTs.^{41,42} However, a public health perspective recognizes the health, social, and economic costs and benefits of gambling for people, families, and communities, and strives to find the optimal balance that maximizes the benefits while minimizing the costs.^{6,43} This is difficult because within Canadian provinces, government-owned Crown corporations manage legal gambling operations, which means provincial governments are responsible both for contrasting roles of maximizing profits and for protecting and promoting public health.^{44,45}

Second, owing to the large odds of problem gambling associated with casino games other than VLTs, the following changes to casino operations could be considered: hours of casino operation be reduced to decrease availability of gambling, casinos be relocated away from highly populated urban and rural areas or in low socioeconomic status neighborhoods and further construction of new casinos in these

Table 1 Logistic regression analysis for type and frequency of gambling among women

Gambling type and frequency	Problem gambling, compared with nonproblem gambling			
	Nonproblem gambler, % (SE)	Problem gambler, % (SE)	AOR (95%CI), P	Differences in AOR
Instant win tickets				
a Never	48.69 (0.78)	23.97 (3.17)	1.00	a = b < c = d = e < f
b 1 to 5 times per year	26.37 (0.63)	8.42 (2.07)	0.62 (0.31–1.24), ns	b < c
c 6 to 11 times per year	4.48 (0.26)	9.27 (2.19)	3.45 (1.76–6.75), <0.001	c = d
d 1 to 3 times per month	11.09 (0.46)	19.34 (3.09)	2.62 (1.55–4.44), <0.001	d = e
e Once a week	5.80 (0.32)	14.62 (2.86)	4.52 (2.51–8.14), <0.001	e < f
f Several times per week to daily	3.57 (0.31)	24.38 (3.45)	12.02 (6.78–21.31), <0.001	a < f
Lottery tickets				
a Never	18.28 (0.58)	11.82 (2.30)	1.00	a = b < c = d < e < f
b 1 to 5 times per year	40.23 (0.78)	15.08 (2.88)	0.66 (0.33–1.31), ns	b < c
c 6 to 11 times per year	6.42 (0.35)	9.69 (2.25)	2.31 (1.07–4.96), <0.05	c = d
d 1 to 3 times per month	15.04 (0.56)	15.80 (2.62)	1.45 (0.72–2.89), ns	d < e
e Once a week	12.54 (0.44)	21.69 (3.77)	2.79 (1.31–5.97), <0.01	e < f
f Several times per week to daily	7.50 (0.42)	25.92 (3.49)	5.21 (2.55–10.65), <0.001	a < f
Bingo				
a Never	84.21 (0.58)	47.80 (3.96)	1.00	a < b < c = d = e = f
b 1 to 5 times per year	9.32 (0.48)	15.67 (2.98)	2.38 (1.38–4.10), <0.01	b < c
c 6 to 11 times per year	0.69 (0.10)	5.11 (1.65)	8.58 (2.99–24.57), <0.001	c = d
d 1 to 3 times per month	2.27 (0.19)	10.46 (2.11)	4.90 (2.70–8.89), <0.001	d = e
e Once a week	2.20 (0.22)	10.75 (2.20)	7.90 (3.99–15.64), <0.001	e = f
f Several times per week to daily	1.32 (0.14)	10.22 (2.08)	16.24 (8.18–32.26), <0.001	a < f
Cards and (or) board games				
a Never	86.65 (0.50)	70.65 (3.78)	1.00	a < b = c = d = e
b 1 to 5 times per year	8.78 (0.43)	12.31 (2.70)	1.78 (1.03–3.06), <0.05	b = c
c 6 to 11 times per year	1.10 (0.15)	4.25 (2.52)	4.80 (0.84–27.38), ns	c = d
d 1 to 3 times per month	2.00 (0.19)	7.80 (2.31)	4.29 (1.99–9.29), <0.001	d = e
e Weekly or more	1.47 (0.15)	5.00 (1.65)	4.76 (1.74–13.00), <0.01	a < e
VLTs outside casino				
a Never	93.19 (0.38)	60.34 (3.91)	1.00	a < b = c = d < e
b 1 to 5 times per year	4.94 (0.33)	9.25 (2.12)	2.37 (1.35–4.16), <0.01	b = c, b < d, b < e
c 6 to 11 times per year	0.52 (0.08)	2.34 (1.18)	6.14 (1.84–20.53), <0.01	c = d, c < e
d 1 to 3 times per month	0.90 (0.12)	14.16 (3.02)	17.67 (8.71–35.86), <0.001	d < e
e Weekly or more	0.45 (0.10)	13.91 (2.62)	53.73 (24.85–116.16), <0.001	a < e
VLTs inside casino				
a Never	70.29 (0.68)	32.29 (3.43)	1.00	a < b < c = d = e
b 1 to 5 times per year	25.18 (0.63)	28.08 (3.49)	2.84 (1.85–4.36), <0.001	b < c, b < d, b < e
c 6 to 11 times per year	1.83 (0.25)	13.80 (3.26)	22.98 (10.57–49.93), <0.001	c = d, c = e
d 1 to 3 times per month	1.99 (0.18)	18.26 (3.10)	25.80 (14.25–46.73), <0.001	d = e
e Weekly or more	0.71 (0.12)	7.58 (1.83)	36.19 (15.55–84.22), <0.001	a < e

continued

Table 1 continued				
Gambling type and frequency	Problem gambling, compared with nonproblem gambling			
	Nonproblem gambler, % (SE)	Problem gambler, % (SE)	AOR (95%CI), <i>P</i>	Differences in AOR
Other casino games				
a Never	94.36 (0.37)	76.58 (3.63)	1.00	a < b < c
b 1 to 11 times per year	5.16 (0.36)	14.90 (3.23)	4.01 (2.25–7.17), <0.001	b < c
c Monthly or more	0.48 (0.11)	8.52 (2.23)	24.15 (8.95–65.18), <0.001	a < c
Internet				
a No	98.79 (0.19)	98.59 (0.65)	1.00	a = b
b Yes	1.21 (0.19)	1.41 (0.65)	1.38 (0.38–5.05), ns	
Horse racing				
a No	95.02 (0.30)	88.57 (2.77)	1.00	a < b
b Yes	4.98 (0.30)	11.43 (2.77)	2.54 (1.31–4.93), <0.01	
Sports lotteries				
a No	97.62 (0.21)	93.95 (2.74)	1.00	a < b
b Yes	2.38 (0.21)	6.05 (2.74)	3.29 (1.04–10.46), <0.05	
Stock market				
a No	96.42 (0.27)	92.12 (2.46)	1.00	a < b
b Yes	3.58 (0.27)	7.88 (2.46)	3.22 (1.53–6.76), <0.01	
Games of skill				
a No	96.41 (0.27)	95.50 (1.35)	1.00	a = b
b Yes	3.59 (0.27)	4.50 (1.35)	0.99 (0.46–2.16), ns	
Other gambling				
a No	96.05 (0.26)	90.01 (3.02)	1.00	a < b
b Yes	3.95 (0.26)	9.99 (3.02)	2.83 (1.27–6.32), <0.05	
Separate regression models were run for each dependent variable.				
AORs = models adjusted for age, income, education, marital status, life stress, social support, and negative coping.				
ns = not significant				
Percentages based on weighted <i>n</i>				

areas be prohibited, and all casino advertising or promotions be eliminated to reduce the audiovisual stimulus to gamble.

Reducing the hours of casino operation and restricting locations of casinos will make gambling less available and accessible. In addition, prohibiting casino promotions and advertising would eliminate a prominent environmental factor that increases visibility of gambling, can trigger gambling behaviour, and manipulates the perception of gambling as harmless and exciting and a way to improve a person's lifestyle. Prior research has indicated that women find casino advertising and promotions influential.^{16,46} As well, 60% of women from a convenience sample from Ontario who were concerned with their gambling behaviour strongly supported less commercial promotion of casinos as a harm reduction strategy.⁴⁷

Third, based on the findings from our research, the following recommendations for primary and secondary interventions

can be suggested: creating awareness and educational campaigns specifically addressing problem gambling among women, creating and evaluating gambling prevention programs to help women self-manage their gambling behaviours and reduce gambling problems, and conducting research on the effectiveness of altering VLT features.

Awareness and educational campaigns could provide information on the relation between types of gambling activities and problem gambling among women. Increased awareness of problem gambling among women may lead to earlier detection of problem gambling behaviour. Creating prevention programs specifically tailored to women who are problem gamblers, reducing frequency of VLT gambling, and building VLTs that decrease play time and wagers may help to control gambling behaviours and, in turn, reduce prevalence of problem gambling. However, it is important that all prevention efforts are evaluated for proven effectiveness.

Table 2 Research and policy recommendations based on a whole population approach

Level of intervention	Potential approach
Healthy public policy	<ol style="list-style-type: none"> 1. Develop a plan to remove all VLTs from bars, restaurants, lounges, and legions, and permanently prohibit VLTs from these types of locations. 2. Reduce the number of VLTs currently available in casinos and (or) provinces, and implement a lower provincial cap of machines in casinos. 3. Reduce the hours of operation of VLTs to midday or evening to midnight daily regardless of the hours of operation of the establishment. 4. Reduce casino hours of operation. 5. Remove casinos from heavily populated urban and rural areas and lower socioeconomic status neighbourhoods, and prohibit the construction of new casinos in these areas. 6. Prohibit all casino advertising or promotion.
Primary and secondary prevention	<ol style="list-style-type: none"> 1. Create awareness and educational campaigns specifically addressing problem gambling among women. Such campaigns can include the odds of problem gambling associated with each type of gambling activity. 2. Develop and evaluate prevention programs addressing the specific needs of women with gambling problems, and help women self-manage their gambling behaviour. 3. Conduct research on effectiveness of altered VLT features, such as removal of stop buttons, decreased play speed, and mandatory cash outs, and gambling myths and responsible gambling screens are on reducing time and money spent on gambling.

Limitations of the current research should be considered when interpreting the findings. First, the data are cross-sectional in nature, which indicates that inferences about causation cannot be made. Second, it was not possible to control for genetic and physical environment variables, such as gambling problems of biological family members, concentration of VLTs or presence of a casino within a 10 mile radius of home, and awareness of gambling marketing campaigns because of inadequate or unavailable measures in the data. Third, it should be noted that the data were collected in 2002. However, these data are the most contemporary gambling data currently available at the national level in Canada. Finally, our study identified problem gamblers using the CPGI. These findings may not be directly comparable with studies using other gambling screens.

Conclusions

Our research is the first comprehensive, nationally representative investigation of the association between gambling activities and problem gambling among women. The key findings indicate that VLT and casino gambling have the highest odds associated with problem gambling. Problem gambling among women is an important public health concern. It is hoped that these results will be used as evidence-based research to inform healthy public policies on gambling.

Disclaimer

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References

1. Stevens R. Legalized gambling in Canada. Lethbridge (AB): Alberta Gaming Research Institute; 2005.
2. Korn DA. Expansion of gambling in Canada: implications for health and social policy. *CMAJ*. 2000;163:61–64.
3. Campbell C, Smith G. Canadian gambling: trends and public policy issues. *Ann Am Acad Pol Soc Sci*. 1998;556:22–35.
4. Marshall K. The gambling industry: raising the stakes. Ottawa (ON): Statistics Canada, Service Industries Division; 1998.
5. Cox BJ, Yu N, Afifi TO, et al. A national survey of gambling problems in Canada. *Can J Psychiatry*. 2005;50:213–217.
6. Korn DA, Shaffer HJ. Gambling and the health of the public: adopting a public health perspective. *J Gambl Stud*. 1999;15:289–365.
7. Canadian Public Health Association. Gambling expansion in Canada: an emerging public health issue. Ottawa (ON): Canadian Public Health Association; 2000.
8. Ferris J, Wynne H. The Canadian Problem Gambling Index: final report. Ottawa (ON): Canadian Centre on Substance Abuse; 2001.
9. Welte JW, Barnes GM, Wieczorek WF, et al. Gambling participation in the US: results from a national survey. *J Gambl Stud*. 2002;18:313–337.
10. Mark ME, Lesieur HR. A feminist critique of problem gambling research. *Br J Addiction*. 1992;87:549–565.
11. Clarke D, Tse S, Abbott MW, et al. Reasons for starting and continuing gambling in a mixed ethnic community sample of pathological and non-problem gamblers. *Int Gambl Stud*. 2007;7:299–313.
12. Crisp BR, Thomas SA, Jackson AC, et al. Not the same: a comparison of female and male clients seeking treatment from problem gambling counseling services. *J Gambl Stud*. 2004;20:283–299.
13. Grant JE, Kim SW. Gender differences in pathological gamblers seeking medication treatment. *Comp Psychiatry*. 2002;43:56–62.
14. Potenza MN, Maciejewski PK, Mazure CM. A gender-based examination of past-year recreational gamblers. *J Gambl Stud*. 2006;22:41–64.

15. Wiebe JM, Cox BJ. A profile of Canadian adults seeking treatment for gambling problems and comparisons with adults entering an alcohol treatment program. *Can J Psychiatry*. 2001;46:418–421.
16. Berry RE, Fraehlich C, Toderian S. Northwestern Ontario women's experiences of gambling and problem gambling. Winnipeg (MB): University of Manitoba; 2002.
17. The Addictions Foundation of Manitoba. Gambling client services: 2004–2005. Winnipeg (MB): The Addictions Foundation of Manitoba; 2006.
18. Govoni R, Frisch GR, Rupcich N, et al. First year impacts of casino gambling in a community. *J Gamb Stud*. 1998;14:347–358.
19. Petry NM. A comparison of young, middle-aged, and older adult treatment-seeking pathological gamblers. *Gerontologist*. 2002;42:92–99.
20. Evans RG, Stoddart GL. Producing health, consuming health care. *Soc Sci Med*. 1990;31:1347–1363.
21. Beland Y, Dufour J, Hamel M. Sample design of the Canadian Mental Health and Well-being Survey. Proceedings of the Survey Methods Section 2001. Alexandria (VA): American Statistical Association; 2001.
22. Gravel R, Beland Y. The Canadian Community Health Survey: Mental Health and Well-Being. *Can J Psychiatry*. 2005;50:573–579.
23. Ferris J, Wynne H. The Canadian Problem Gambling Index: user manual. Ottawa (ON): Canadian Centre of Substance Abuse; 2001.
24. Wiebe JM, Single E, Falkowski-Ham A. Measuring gambling and problem gambling in Ontario. Ottawa (ON): Canadian Centre on Substance Abuse and Responsible Gambling Council; 2001.
25. Kairouz S, Nadeau L, Lo Siou G. Area variations in the prevalence of substance use disorders and gambling behaviour and problems in Quebec: a multilevel analysis. *Can J Psychiatry*. 2005;50:591–598.
26. Currie SR, Hodgins DC, Wang J, et al. Risk of harm among gamblers in the general population as a function of level of participation in gambling activities. *Addiction*. 2006;101:570–580.
27. McIntyre RS, McElroy SL, Konarski JZ, et al. Problem gambling in bipolar disorder: results from the Canadian Community Health Survey. *J Affect Disorders*. 2007;102:27–34.
28. Huang J-H, Boyer R. Epidemiology of youth gambling problems in Canada: a national prevalence study. *Can J Psychiatry*. 2007;52:657–665.
29. Sherbourne CD, Stewart AL. The MOS support survey. *Soc Sci Med*. 1991;32:705–714.
30. Statistics Canada. Canadian Community Health Survey: Mental Health and Well-Being (CCHS) Cycle 1.2: derived variable (DV) specifications public use microdata file. Ottawa (ON): Statistics Canada; 2002.
31. Shah BV, Barnswell BG, Bieler GS. SUDAAN user's manual: software for analysis of correlated data. Release 6.40 ed. Research Triangle Park (NC): Research Triangle Institute; 1995.
32. Doiron JP, Nicki RM. Epidemiology of problem gambling in Prince Edward Island: a Canadian microcosm? *Can J Psychiatry*. 2001;46:413–417.
33. Dowling N, Smith D, Thomas T. Electronic gaming machines: are they the 'crack-cocaine' of gambling? *Addiction*. 2005;100:33–45.
34. Breen RB, Zimmerman M. Rapid onset of pathological gambling in machine gamblers. *J Gamb Stud*. 2002;18:31–43.
35. Azmier J, Smith G. The state of gambling in Canada: an interprovincial roadmap of gambling and its impact. Calgary (AB): Canada West Foundation; 1998.
36. Sevigny S, Cloutier M, Pelletier M-F, et al. Internet gambling: misleading payout rates during the "demo" period. *Comput Human Behav*. 2005;21:153–158.
37. Petry NM. Internet gambling: an emerging concern in family practice medicine? *Fam Pract*. 2006; 23:421–426.
38. The Addictions Foundation of Manitoba. Gambling services: female clients. 2004–05. Winnipeg (MB): The Addictions Foundation of Manitoba; 2006.
39. Kessler RC, Hwang I, LaBrie R, et al. DSM-IV pathological gambling in the National Comorbidity Survey Replication. *Psychol Med*. 2008;38:1351–1360.
40. Shaffer HJ, LaBrie RA, LaPlante DA. Laying the foundation for quantifying regional exposure to social phenomena: considering the case of legalized gambling as a public health toxin. *Psychol Addict Behav*. 2004;18:40–48.
41. Azmier J. Gambling in Canada 2005: statistics and context. Calgary (AB): Canada West Foundation; 2005.
42. Collier R. Do slot machines play mind games with gamblers? *CMAJ*. 2008;179:23–24.
43. Shaffer HJ, Korn DA. Gambling and related mental disorders: a public health analysis. *Annu Rev Public Health*. 2002;23:171–212.
44. Smith GJ, Campbell CS. Tensions and contentions: an examination of electronic gaming issues in Canada. *Am Behav Sci*. 2007;51:86–101.
45. Collier R. The gambling take: balancing revenues and responsibilities. *CMAJ*. 2008;179:21–22.
46. Brown S, Conventry L. Queen of hearts: the needs of women with gambling problems. Victoria (AU): Financial and Consumers Rights Council; 1997.
47. Boughton R, Brewster JM. Voices of women who gamble in Ontario: a survey of women's gambling, barriers to treatment and treatment service needs. Toronto (ON): Ministry of Health and Long-Term Care; 2002.

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Résumé : La relation entre les types et la fréquence des activités de jeu et le jeu pathologique chez les femmes au Canada

Objectif : Le Canada a connu une croissance à grande échelle de l'industrie du jeu dans les années 1990. Les données cliniques indiquent que des proportions substantielles des personnes qui cherchent de l'aide pour des problèmes de jeu sont des femmes. Un modèle de santé de la population a été utilisé pour comprendre la relation entre les types et la fréquence des activités de jeu et le jeu pathologique chez les femmes au Canada.

Méthode : Les données utilisées pour l'analyse étaient tirées de l'Enquête sur la santé dans les collectivités canadiennes : Santé mentale et bien-être, nationalement représentative (ESCC 1.2; $n = 10\ 056$, femmes de 15 ans et plus, données recueillies en 2002).

Résultats : Les types de jeu associés aux probabilités les plus élevées de jeu pathologique chez les femmes au Canada étaient les terminaux de loterie vidéo (TLV) hors casino (RC 2,37 à 53,73; $P < 0.01$), les TLV dans un casino (RC 2,84 à 36,19; $P < 0.001$), et d'autres jeux de casino (RC 4,01 à 24,15; $P < 0.001$).

Conclusions : Ces observations approfondissent notre compréhension du jeu pathologique chez les femmes au Canada et confirment que le jeu pathologique chez les femmes est un problème important de santé publique. Le jeu fréquent sur les TLV en dehors et à l'intérieur des casinos ainsi que d'autres jeux de casino sont associés aux probabilités les plus élevées de jeu pathologique, ce qui met en relief un domaine du jeu au Canada qui doit être réévalué, si l'on veut prévenir ou réduire le jeu pathologique. La recherche fondée sur des données probantes est nécessaire pour éclairer les politiques de santé publique sur le jeu au pays. Les résultats de la recherche actuelle ont d'importantes implications pour la recherche et les politiques.