Comparing problem gamblers with moderate-risk gamblers in a sample of university students

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Background and aims: In an effort to provide further empirical evidence of meaningful differences, this study explores, in a student population, the distinctions in gambling behavioral patterns and specific associated problems of two levels of gambling severity by comparing problem gamblers (PG) and moderate-risk gamblers (MR) as defined by the score on the Problem Gambling Severity Index (PGSI; MR: 3-7; PG: 8 and more). *Methods:* The study sample included 2,139 undergraduate students (male = 800, mean age = 22.6) who completed the PGSI and questionnaires on associated problems. *Results:* Results show that problem gamblers engage massively and more diversely in gambling activities, more often and in a greater variety of locations, than moderate-risk gamblers. In addition, important differences have been observed between moderate-risk and problem gamblers in terms of expenditures and accumulated debt. In regards to the associated problems, compared to moderate-risk gamblers, problem gamblers had an increased reported psychological distress, daily smoking, and possible alcohol dependence. *Discussion and Conclusions:* The severity of gambling and associated problems found in problem gamblers is significantly different from moderate-risk gamblers, when examined in a student population, to reiterate caution against the amalgamation of these groups in future research.

Keywords: problem gambling, at-risk gambling, social context, university students, gambling habits, addictive behaviours

INTRODUCTION

Pathological gambling is a relatively rare disorder. It is estimated that between 0.5–1.8% of the general population suffer from probable pathological gambling and that 1.0–4.0% are at-risk (Bonke & Borregaard, 2009; Canadian Partnership for Responsible Gambling, 2007; Kairouz, Nadeau & Paradis, 2011; Stucki & Rihs-Middel, 2007; Wardle et al., 2007). In part due to the small numbers, problem or pathological and at-risk gamblers have been amalgamated in survey analyses of gambling behaviors (Desai & Potenza, 2008; Kennedy et al., 2010; Lorains, Cowlishaw & Thomas, 2011; Phillips & Ogeil, 2011; Rush, Bassani, Urbanoski & Castel, 2008; Wohl, Matheson, Young & Anisman, 2008). For example, to proceed beyond descriptive analyses and increase statistical power, studies using the Problem Gambling Severity Index (PGSI) may group problem gamblers and moderate-risk gamblers together. However, increasing the sample of the 'most severe' category of gambling by including less severe cases has the disadvantage of combining in a single entity two groups that are distinct on multiple dimensions (Currie, Hodgins & Casey, 2013).

Pathological gambling within itself represents a heterogeneous category, with varying levels of gambling severity and co-occurring mental disorders (Nower, Martins, Lin & Blanco, 2013). As a result of the ambiguity surrounding the clinical threshold between moderate and problem/pathological severity, and the diversity within each category, recent studies have only begun to highlight and understand differences between gambling categories with regard to gambling

patterns and preferences, clinical profile, and sociodemographic characteristics. Furthermore, there exists a dearth of information concerning these differences within university populations despite their increased vulnerability to, and prevalence of, risky behaviours, including gambling (Welte, Barnes, Wieczorek, Tidwell & Hoffman, 2007).

According to Currie et al. (2013), gambling expenditures constitute the most discriminating factor between moderate-risk and problem gambling categories. Problem gamblers spend a median of at least $250 per month compared to $41.6 for moderate-risk gamblers, which represented 7.05% of their annual income compared to 1.51% of annual income in moderate-risk gamblers ($p < .01$; Currie et al., 2013). Problem gambling is also associated with weekly frequency of play of specific games such as electronic gaming machines (EGM), casino table games, and private games, but not with instant lotteries, lotto, Keno, racetrack, or sports betting (Young & Stevens, 2009). More precisely, problem gamblers are significantly more likely to play EGM or casino table games (47%) than other gambling categories (low-risk: 13%, moderate-risk: 21%; $p < .01$; Currie et al., 2013). However, minimal differences are observed between

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low-risk, moderate-risk and problem gambling groups on high frequency playing (at least >2–3 times per month) at games of skill, instant win or lottery tickets, and bingo.

Associated problems of gambling categories

The more a person gambles, the greater the likelihood of having at least two symptoms of depression or of having been arrested (Momper, Delva, Grogan-Kaylor, Sanchez & Volberg, 2010). Currie et al. (2013) found that compared to other gambling categories, problem gamblers reported significantly lower psychological wellbeing and higher self-perceived stress than moderate-risk gamblers.

In the general population, problem gamblers are more likely than players in other gambling categories to report being 'drunk or high' (aOR: 8.92; 95% CI: 5.46, 14.55; $p < .001$), or to admit having an alcohol or drug problem (aOR: 3.80; 95% CI: 2.21, 6.52; $p < .001$; Martins, Ghandour, Lee & Storr, 2010). Momper and colleagues (2010) identified that even after adjusting for sociodemographic characteristics, compared to non-gamblers or not at-risk gamblers, at-risk gamblers are more likely to report daily consumption of alcohol (aOR = 4.42, $p < .001$) and tobacco (aOR = 1.89, $p < .01$). Problem gamblers are also the only group to be significantly associated (aOR = 14.04, $p < .01$) with daily consumption of marijuana (Momper et al., 2010). Furthermore, those at risk for problem gambling were more likely to consume alcohol at each of the drinking levels, from relatively infrequent drinking to daily drinking, when compared with individuals who do not gamble or who were not classified as being at risk. Further research is needed to better understand the relationship between gambling severity and associated risk behaviours such as consumption of marijuana or of other substances (Currie et al., 2013; Momper et al., 2010; Rush et al., 2008).

Sociodemographic characteristics of gambling categories

Giroux, Jacques, Ladouceur, Leclerc & Brochu (2012) reported that problem gamblers have lower annual incomes and are less likely to own a house. Other differences include problem gamblers reporting less involvement in religious activities (39.3%) when compared to at-risk gamblers (96.1%) or non-problem gamblers (91.3%).

Gambling in college and university students

Previous studies estimate rates of gambling problems – at-risk and probable pathological – among college students up to three times higher than the general population (Barnes, Welte, Hoffman & Tidwell, 2010; Nowak & Aloe, 2013; Welte et al., 2007). A meta-analysis, including Canadian and US studies, revealed that between 22% and 25% of students report gambling at least once a week (Blinn-Pike, Worthy & Jonkman, 2007; Oster & Knapp, 2001). Findings from a Canadian campus survey conducted with a representative sample drawn from 49 Canadian university campuses revealed that 62% of students report gambling over the year preceding the survey, with 13.2% being low-risk gamblers and 6.2% considered to have either a moderate or severe gambling problem (Kairouz, 2005). Estimates of gambling participation among student populations have not always

been consistent (e.g., Gainsbury, Russell & Blaszczynski, 2014) although the majority of studies today have drawn the conclusion that the rate of amalgamated at-risk and probable pathological gamblers is higher in university students than in the general population (e.g., Blinn-Pike et al., 2007). Contradictory findings such as those reported by Gainsbury et al. (2014) may be the result of online recruitment. It is unclear whether recruiting online gives a representative sample of the general gambling population (Marmurek, Switzer & D'Alvise, 2014). The specificity of pathological and at-risk gamblers among college and university students remains unknown. In fact, to our knowledge, there are no studies using a large representative sample of university students that examine differences in gambling behavioral patterns, and specific associated problems, found between PGSI moderate-risk and problem gambler types.

Study objectives

This paper aims to examine and contrast two gambling categories, moderate-risk and problem gamblers, in terms of their gambling patterns and associated problems in a university student population. More precisely, it will provide a comparison of the gambling patterns among the two groups relative to 1) gambling activities and locations, level of involvement in gambling activities, and 2) other associated problems such as hazardous drinking, illicit drug use and psychological distress.

Due to the descriptive nature of this study there were no explicit hypotheses, although it is expected that there will be differences between the two groups similar to, if not more pronounced than those found within general population surveys, due to the increased risk-taking behaviour seen within this population.

METHODS

Participants

Data are provided from the *Enquête sur les Habitudes de Jeu des* Étudiants *Universitaires* (ENHJEU) project, a large scale survey of gambling practices among college students. The sample for this survey included students from three universities and two university affiliated professional schools in the Montreal metropolitan area, Canada. In total 6,000 students were invited to participate. A random sample of students was generated for each participating institution based on registrar enrolment lists. The final sample consisted of 2,139 undergraduate students, with response rates ranging from 31% to 52% across institutions and an overall average response rate of 41%. Sampling weights were applied for the estimation of proportions. They adjusted for non-response rates within universities and schools, and post-stratification according to gender based on administrative data of the Association of Universities and Colleges of Canada (Association of Universities and Colleges Canada, 2014).

Measures

Demographics. Information was gathered on respondents' gender, age, marital status, level of education, place of birth

and residential status. Participants also provided information regarding field of study, average university grades and employment status.

Gambling patterns. Current gamblers reported on past-year gambling frequency, as well as time or money spent, and debt accumulated on each reported gambling activity: lottery, table poker, video lottery terminals/coin slot machines, games of skill, betting on sports or sporting events, table games, speculative investments, card games/board games, bingo, and horse/dog racing. For each gambling activity, frequency of play was reported separately in each of the following locations: private residence, public locations – including casinos and bars, restaurants and taverns, and the Internet.

The overall score on the Problem Gambling Severity Index (PGSI) – a quantitative sub-section of the Canadian Problem Gambling Index – was used to assess the severity of gambling problems. The PGSI consists of 9 items measuring gambling behaviours and negative consequences. Items include questions such as "How often have you bet more than you could really afford to lose?" and "How often has your gambling caused you any health problems, including stress or anxiety?" Answers are reported on a 4-point Likert scale ('Never'; 'Sometimes'; 'Most of the time'; 'Almost always') and items scores are summed to give a total score ranging from 0–27. The PGSI demonstrates strong internal validity and reliability, as well as satisfactory temporal reliability (Currie et al., 2013). Respondents were categorized as 1) non-problem gamblers (score of 0); 2) low-risk gamblers (1 or 2); 3) moderate-risk gamblers (3 to 7); and 4) problem gamblers (8+).

Other addictive behaviors. Respondents were asked about past-year frequency of alcohol consumption and problematic drinking using the Alcohol Use Disorders Identification Test (AUDIT). The AUDIT shows strong validity and satisfactory internal consistency (Allen, Litten, Fertig & Babor, 1997). The cut-off score of 8 (maximum potential total score of 40) was used to identify respondents exhibiting patterns of hazardous and harmful drinking. An additional cut-off score of 11 was used to identify possible alcohol dependence.

Frequency of cannabis use in the past 12 months was measured ('How often have you used marijuana or hashish during the past 12 months?', the choices being 'almost every day', '4 to 5 times a week', '2 to 3 times a week', 'once a week', '2 to 3 times a month', 'once a month', 'less than once a month', 'never'). Based on the scale, a binary variable assessing weekly cannabis use was derived. Current smoking status was also assessed. Daily smokers were those who reported having smoked at least 100 cigarettes in their life and who smoke on a daily basis at the present time.

Psychological distress. Each respondent's psychological well-being was evaluated using the General Health Questionnaire (GHQ-12), a 12-item measure of general nonpsychotic mental health difficulties (Goldberg, 1978; Montazeri et al., 2003). Each item is rated on a 4-point Likert scale ranging from 0 (not at all) to 3 (much more than usual), with total sum scores ranging from 0 to 36. Greater scores on the GHQ-12 indicate more mental health difficulties. A cut-off point of 4 and more was used to identify psychological distress. The GHQ-12 shows good psychometric properties (Goldberg et al., 1997).

Procedure

All participants were mailed a package that included a paper copy of the questionnaire and a cover letter. Respondents were also provided a paid, business reply envelope to return completed questionnaires. The cover letter described the study goals and informed participants that they could either complete and return the paper copy of the questionnaire by mail or complete it online via a secured website. In total, 718 students (33.5%) chose to complete the survey by mail, and 1,425 (66.5%) completed the survey online. Respondents were also assured that participation was voluntary and that their answers would remain completely confidential. Participants could either complete the questionnaire in English or in French. Data collection took place between October 17, 2008 and January 15, 2009.

Statistical analyses

All statistical analyses were carried out using Stata 12 (StataCorp, 2011). A series of logistic regressions were conducted to assess the likelihood of problem gamblers engaging in specific gambling activities and locations as well as for addictive behaviours, and level of psychological distress, compared to moderate risk gamblers. All regression models controlled for gender and place of birth. Given the small sample size, a posteriori power analyses were conducted and revealed that the study sample allowed the detection of significance when differences are large ($p \le .05$) and moderate ($p \le .10$) with a power of 80%. The tables will report results for p values of up to .10 with an effect size equal to 2.9 (OR) and a power of 80%. Furthermore, Fisher's exact test and Mann–Whitney tests assessed associations between gambling status (problem gamblers/moderate-risk gamblers) and gambling expenditures as well as the number of gambling activities.

Ethics

The Research Ethics Board of Concordia University approved the study and each participant's written informed consent was obtained.

RESULTS

Overall, the majority of students had gambled in the past 12 months (60.5%). Of the whole student population, 58 (2.8%) were classified as moderate-risk gamblers and 21 (0.9%) as problem gamblers. Among those who gambled in the past 12 months, most (93.9%) did not experience significant gambling problems whereas 4.7% faced moderate-risk gambling problems and 1.5% were problem gamblers.

Gambling patterns

The five most popular gambling activities among moderate-risk gamblers and problem gamblers included: lottery, VLT, poker, table games and sports betting. Table 1 presents the prevalence for each activity for both groups. Additional analyses excluded other gambling activities whose prevalence were insubstantial or distribution atypical (e.g. speculative investment). Logistic regressions showed that com-

pared to moderate-risk gamblers, problem gamblers were five times more likely to gamble on poker (OR = 5.01, 95% CI [1.5–17.1]) and six times more likely to engage in sports betting (OR = 6.32, 95% CI [1.8–22.5]).

Problem gamblers also had a greater likelihood to frequent all locations where gambling was offered (see Table 1) but the greatest difference was observed in gambling on the Internet, where, compared to their counterparts, problem gamblers had a tenfold likelihood to gamble (OR = 10.08, 95% CI [2.9–35.2]). In addition, a higher probability of problem gamblers to engage in betting in private residences (OR = 5.74, 95% CI [1.7–19.5]) or public locations (OR = 3.80, 95% CI [1.1–13.2]) was also noted.

The analyses of monthly spending and annual debt, which are shown in Table 2, revealed that problem gamblers spent significantly more money ($Mdn_p = 850$ vs. $Mdn_m = 57.5$; $p = 0.0003$) and accumulated significantly more annual debt ($Mdn_p = 850$ vs. $Mdn_m = 50$; $p = 0.0004$) than moderate-risk gamblers.

Problem gamblers typically engaged in more gambling activities than moderate-risk gamblers ($p = 0.0012$, Fish-er's exact test; see Table 2). The difference was more pronounced when comparing gambling on three or more types of activities. Problem gamblers also endorsed gambling versatility in higher proportions than moderate-risk gamblers ($p = 0.006$, Fisher's exact test).

Other addictive behaviours and psychological well-being

Problem gambling co-occurs with other addictive behaviours (see Table 3), such as daily smoking (40%), weekly use of marijuana (35%), harmful and hazardous drinking (44.4%), possible alcohol dependence (38.9%), as well with psychological distress (50%). Problem gamblers reported drug use and symptoms of psychological distress in larger numbers than their moderate-risk counterparts, although significant differences were only noted in their increased likelihood to report psychological distress (OR = 4.67, 95% CI [1.4–15.4]), smoking on a daily basis (OR = 4.44, 95% CI [1.2–15.9]), and possible alcohol dependence (OR = 4.20, 95% CI [1.1–15.7]).

Table 1. Prevalence of most popular gambling activities[a] and gambling locations among undergraduates who are moderate-risk or problem gamblers (*N* = 79)

	Moderate-risk gamblers[a] (*n* = 58)	Problem gamblers (*n* = 21)	Comparison	
	%	%	OR[b] (95% CI)	*p*
Gambling activities				
Lottery	62.1	71.4	1.04 (0.3–3.4)	0.947
Poker	41.4	71.4	5.01 (1.5–17.1)	0.010
VLTs	37.9	61.9	2.37 (0.8–6.9)	0.114
Table games	27.6	47.6	1.69 (0.6–5.2)	0.353
Sports betting	12.1	42.9	6.32 (1.8–22.5)	0.004
Gambling locations				
Private residence	36.2	66.7	5.74 (1.7–19.5)	0.005
Public locations[c]	53.4	80.9	3.80 (1.1–13.2)	0.036
Internet	19.0	66.7	10.08 (2.9–35.2)	<0.001

Note: OR = odds ratio; CI = confidence interval; Controlled for gender and place of birth in all regression analyses.
[a] Reference group: moderate-risk gamblers; [b] Includes only the five most popular gambling types; [c] Casino, and Bar/Pub/Tavern/Resto-Bar.

Table 2. Level of involvement in gambling activities among undergraduates who are moderate-risk or problem gamblers (*N* = 79)

	Moderate-risk gamblers (*n* = 58)			Problem gamblers (*n* = 21)			Comparison	
	Median	Mean (SD)	Min–Max	Median	Mean (SD)	Min–Max	z[§]	*p*
Monthly spending	57.5	1367.2 (8146.5)	2–60,030	850	2002.9 (4298.4)	1–20,000	3.593	0.0003
Annual debt	50	454.8 (1145.6)	0–6,000	850	2738.9 (4273.1)	0–15,050	3.552	0.0004
Total number of activities	2	2.4 (1.3)	1–6	4	3.7 (1.8)	1–10	3.249	0.0012
	%	95% CI			%	95% CI	X^2[§]	*p*
Number of activities								
One or two	58.6	45.6–71.6			23.8	4.8–42.8	7.48	0.006
Three or more	41.4	28.4–54.4			76.2	57.2–95.2		

Note: Number of gambling activities over the past 12 months of gamblers with monthly spending and annual debt of over $100. [§]The Mann–Whitney test was used to compare medians and the exact *p*-value is reported, and Fisher's exact test was used to compare proportions.

Table 3. Associated problems to gambling according to severity (*N* = 79)

Variables	Moderate-risk gamblers (*n* = 58)	Problem gamblers (*n* = 21)	Comparison	
	%	%	OR (95% CI)	*p*
Psychological distress	22.4	50.0	4.67 (1.4–15.4)	0.011
Daily smoking	10.3	40.0	4.44 (1.2–15.9)	0.022
Weekly use of marijuana	15.5	35.0	2.94 (0.9–9.8)	0.079
Harmful/Hazardous drinking	37.5	44.4	1.74 (0.5–5.7)	0.355
Possible alcohol dependence	19.6	38.9	4.20 (1.1–15.7)	0.033

Note: Reference group: moderate-risk gamblers; OR = odds ratio; CI = confidence interval; Controlled for gender and place of birth in all regression analyses.

DISCUSSION

The present study was conducted to contrast gambling behavioral patterns and specific associated problems of two levels of gambling severity, moderate-risk and problem gamblers. College student populations were chosen for their increased vulnerability to and prevalence of risky behaviours, including gambling (e.g., Welte et al., 2007). Results from our study, however, found prevalence of gambling problems among college students much more comparable to those of the general population than those found in previous college campus surveys (e.g., Blinn-Pike et al., 2007). Potential explanations for this discrepancy include: socio-demographic differences (e.g., age) between American college students and Quebec's university students due to Quebec's requisite pre-university CEGEP program, a lack of fraternity groups on college campuses in Quebec, differences in typical living arrangements, and the possibility of an over-estimation of gambling problems in earlier studies due to methodological limitations previously highlighted (LaBrie, Shaffer, LaPlante & Wechsler, 2003). Despite small prevalence rates of problem gambling, multiple distinctions were found between problem gamblers and moderate-risk gamblers among this sample of college students.

First, preferred gambling activities differ largely between the two categories. Problem gamblers engage massively in all types of gambling activities, but in particular they participate more often than moderate-risk gamblers with poker and sports betting. Although evidence suggests that gambling patterns and sociodemographic characteristics of gamblers differ within various types of gambling activities, heterogeneity of gambling activities is often overlooked within existing literature (LaPlante, Nelson, LaBrie & Shaffer, 2006; Oliveira & Silva, 2001). However, in general population studies looking at multiple types of gambling activities, no significant differences have been observed in the number of different games played when comparing low-risk, moderate-risk and problem gambling categories (Currie et al., 2013). Still, if broken down individually, each gambling activity could contain its own risks and problematic evolution. This is potentially the case with our results for poker and sports betting.

Second, involvement in multiple gambling activities could be conceptualized as a vulnerability factor for perilous gambling behaviours for any of the individual chosen activities. Thus, even if problem gamblers tend to prefer certain games, it brings into question if a threshold in the variety or number of games (e.g., three or more according to our results) could potentially be used as an indication of probable pathological gambling.

A third marked difference between the two groups is that problem gamblers play more often and in a greater variety of locations than moderate-risk gamblers. The diversity in reported locations also illustrates how accessible and pervasive gambling has become within students' lives. Of particular concern within the sample is the popularity of online gambling among problem gamblers. Indeed, our results replicate previous studies of online gambling among university students who found associations between online gambling and increased risk of developing gambling problems (Griffiths, Parke, Wood & Rigbye, 2010; Mihaylova, Kairouz & Nadeau, 2013; Wardle, Moody, Griffiths, Orford & Volberg, 2011; Wood, Griffiths & Parke, 2007).

Fourth, gambling problems do not constitute the same level of financial expenditure for probable problem gamblers and moderate-risk gamblers. The median monthly spending by problem gamblers is more than fourteen times that of moderate-risk gamblers ($850 versus $57.5). The variation in monthly spending among moderate-risk gamblers was nevertheless surprising, varying from $2 to over $60,000 while amongst problem gamblers, spending ranged from $1 to $20,000. While one would expect that the overall expenditures of problem gamblers is higher than that of moderate-risk gamblers, differences between the gambling categories lie not only in the amount spent, but also in the number of individuals spending greater amounts. Problem gamblers are more numerous in spending greater sums when gambling. They additionally face more significant debt than moderate-risk gamblers. Unfortunately, personal or household income was not reported and therefore could not be controlled for during analyses. This presents an important limitation given students may have been financially supported by, or living with, their parents.

Fifth, differences in other addictive behaviours and the level of psychological distress exist between problem and moderate-risk gamblers. Close to half of problem gamblers are considered daily smokers compared to only 10.3% of moderate-risk gamblers. Problem gamblers also engage in more severe drinking patterns; a finding similarly found in gamblers taken from the general population (Martins et al., 2010). Indeed, while both groups engaged strongly in harmful or hazardous drinking, problem gamblers (38.9%) were twice as likely to present possible alcohol dependence as moderate-risk gamblers (19.6%). The difference may not

be as simple as the presence or absence of substances use between the two groups, but also the level of consumption that may increase as the severity of gambling problems increases as well (Momper et al., 2010).

Finally, half of all problem gamblers present a significant level of psychological distress, an indicator of possible mental health problems, compared to less than a quarter among moderate-risk gamblers. It is plausible that gambling and/or other addictive behaviours constitute forms of self-medication for psychological distress, or that the problems caused by pathological gambling are self-medicated by alcohol, or both. Thus while this study reveals a significant association between severity of gambling problems, other addictive behaviours and psychological distress, further studies are needed to disentangle the nature of the association.

Limitations

The present study has some limitations, the foremost being its descriptive and correlational nature from which no causal inferences can be drawn. It should also be noted that university students might not be representative of the same age group in the general population. The current university based sample was drawn from Montreal, a metropolitan and multiethnic city in Quebec (Canada), which provides accessibility and proximity to multiple gambling venues. Given such context, readers should not generalize findings to other non-urban student populations.

While strong significant results came to light concerning distinctions between the two study groups, the small sample sizes of the problem and moderate-risk gambling groups have the potential to impede the statistical power of some of the analyses. Given that the proportion of moderate-risk and problem gamblers is relatively low in the population, over-sampling of those two groups might be necessary in future studies, especially if the moderate-risk gambling is defined at a cut-off point of 5 on the PGSI scale.

CONCLUSIONS

The severity of gambling and associated problems in problem gamblers is significantly different than in moderate-risk gamblers. Even though the present study could only demonstrate differences among a sub-population of college students, one can infer that the two groups are also different in the general population in terms of preferred games and gambling patterns, as well as associated problems and vulnerabilities within those parameters. Given that one of the main purposes of the PGSI is screening for problem gamblers, there are numerous advantages to maintaining a large gap between this category and the adjacent one of moderate-risk gamblers. In corollary, the development of preventive measures and strategies should take into account these differences between the two groups. Furthermore, these findings highlight the importance of early detection and prevention of moderate-risk gamblers among university students, before they progress into problem gamblers. Collaborations with university student services might be a good venue for the implementation of early detection measures and the dissemination of prevention messages.

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