

Impact of a Casino Opening on Gambling Behaviors of People Engaged in Methadone Maintenance

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Abstract This study examined gambling behavior in the context of a newly opening casino, comparing disordered gamblers to non-disordered gamblers, in a population of individuals involved in methadone maintenance treatment. Disordered gamblers ($N = 50$) and non-disordered gamblers ($N = 50$) were surveyed before and after the opening of a new casino on gambling behaviors, substance use, and psychological symptoms. No statistically significant changes in gambling behaviors were observed for disordered gamblers or non-disordered gamblers across time points; however, non-disordered gamblers demonstrated non-significant increases in horse and dog race betting, electronic games, and casino table games. As expected, disordered gamblers were found to spend significantly more money on electronic games and casino table games ($p < 0.05$) and demonstrated higher rates of drug use and impulsivity than non-disordered gamblers. The introduction of a new casino did not appear to have a major impact on gambling behaviors of individuals attending methadone maintenance treatment, though the non-significant increases in gambling among non-disordered gamblers may indicate that this population is preferentially impacted by the opening of a new casino. Future investigation into the longer term effects of opening a new casino on this population may be warranted.

Keywords Gambling disorder · Diagnostic and Statistical Manual of Mental Disorders Version 5 · Gambling behaviors · Methadone maintenance treatment · Casino opening

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Introduction

The reclassification of Gambling Disorder from an Impulse Control Disorder to a Substance Use and Related Addictive Disorder in the *Diagnostic and Statistical Manual of Mental Disorders Version 5* (DSM-5; American Psychiatric Association 2013) has renewed interest in investigating the rates and risk factors of this disorder. Recent studies have indicated that the rate of gambling disorder among the general population in the United States ranges between 0.4 and 4.2 % (Lorains et al. 2011; Shaffer and Hall 2001). Furthermore, previous studies have indicated a higher rate of lifetime prevalence of gambling disorder among individuals receiving methadone maintenance treatment, with rates ranging from 7 to 52.7 % (Feigelman et al. 1995; Himelhoch et al. 2016; Peles et al. 2009, 2010; Shepherd 1996; Spunt et al. 1995, 1996; Weinstock et al. 2006). The most commonly reported forms of gambling among this population are playing lotteries or buying lottery tickets (Peles et al. 2009; Spunt et al. 1995, 1996; Weinstock et al. 2006). However, slot machines and playing cards (Peles et al. 2009; Spunt et al. 1995, 1996; Weinstock et al. 2006), as well as electronic gaming (Himelhoch et al. 2016), are also frequently reported.

One potential risk factor associated with gambling disorder and gambling behaviors among the general population, of particular interest in recent research, is the availability and proximity of gambling facilities. One study recently found a positive association between proximity of a casino and participation in and money spent on gambling behaviors (Sévigny et al. 2008). However, the study did not find a significant association between disordered gambling and casino proximity. Other previous studies have examined the effects of introducing a new casino into a community (Jacques, et al. 2000; Jacques and Ladouceur 2006; Toneatto et al. 2003; Room et al. 1999). Results of these studies have indicated that the introduction of a new casino increased scores on the South Oaks Gambling Screen (SOGS; Lesieur and Blume 1987; Toneatto et al. 2003) increased rates of gambling behaviors (Jacques et al. 2000; Toneatto et al. 2003; Room et al. 1999), increased maximum amounts of money spend on gambling in 1 day (Jacques et al. 2000), increased pressure from others to participate in gambling behaviors (Room et al. 1999), and increased reports of family members or friends experiencing gambling problems (Jacques et al. 2000; Toneatto et al. 2003; Room et al. 1999). However, limited research is available on the longer-term effects of introducing a new casino (Jacques and Ladouceur 2006).

These study results are of particular interest as the United States has experienced an increase in the legalization of casino games in many areas, and thus increased establishment of new casinos and gambling opportunities over the last decade. While the fore-mentioned previous studies have examined effects of opening a new casino in the nearby population, to our knowledge, no studies have specifically examined the differences in these effects between those meeting criteria for gambling disorder according to the *Diagnostic and Statistical Manual of Mental Disorders Version 5* criteria and those without prior indication of gambling disorder, or specifically on high risk groups such as individuals in treatment for substance use disorders. The purpose of this study was to naturalistically study gambling behavior in the context of a newly opening casino comparing those meeting criteria for disordered gambling versus non-disordered gamblers, in a population of individuals involved in methadone maintenance treatment. The study aimed to collect information on the effects on these two groups across multiple time points; before, 3 months after, and 6 months after the opening of a local Maryland casino.

Materials and Methods

Study Participants

A prior investigation on gambling disorder in Methadone Maintenance Treatment (MMT) recruited 300 (enrolling 185) participants from an urban community methadone maintenance program (Himmelhoch et al. 2016). Participants from this study were screened for DSM-5 gambling disorder. Of these 300 participants, a total of 295 (121 meeting criteria for disordered gamblers and 174 not meeting this criteria) agreed to be contacted for future studies and provided contact information.

From this previous study population who had agreed to be contacted, this longitudinal study randomly selected 50 participants meeting DSM 5 criteria for disordered gambling and 50 not meeting criteria for disordered gambling, referred to in this paper as non-disordered gamblers. Data were collected at three time points: (Time 1) Prior to casino (approximately 1.2 miles away from the methadone clinic) opening (ranging from 1 to 26 days before); (Time 2) 3 months following opening; and (Time 3) 6 months following opening. At Time Point 1, 50 disordered gamblers and 50 non-disordered gamblers were assessed. Six disordered gamblers and 5 non-disordered gamblers were lost to follow up at Time Point 2, leaving $N = 44$ for disordered gamblers and $N = 45$ for non-disordered gamblers. A total of 40 disordered gamblers and 45 non-disordered gamblers were assessed for Time Point 3.

Casino Setting

A new casino in downtown Baltimore, MD opened in August of 2014. The casino houses 153 table games and over 2200 slot machines, including more than 150 video poker machines. It is located near the tourist centered Inner Harbor and between 2 professional sporting venues (Horseshoe Baltimore Casino Gaming, n.d.).

With regards to the surrounding neighborhood, the casino is located in Baltimore City; a county with an estimated population of 622,793 as of July 2014. Approximately 63.1 % of the population is Black or African American. Approximately 80.9 % of the population has completed high school and approximately 27.7 % hold a bachelor's degree. The median household income was estimated at \$41,819 between 2010 and 2014, with approximately 23.3 % of the population considered to be in poverty (Population Estimates n.d.).

Procedures

The previously collected contact information was used to reach selected participants. Informed consent and a Health Insurance Portability and Accountability Act (HIPAA) waiver form were completed in its entirety before assessment began. Assessments were conducted face-to-face with research assessors trained to provide all measures. This study was approved by the University of Maryland, Baltimore Institutional Review Board. Participants were paid \$20 for completion of each time point, for a total possible of \$60.

Measures

Research assessments were conducted by research assessors who were trained to provide all measures at each time point. All assessments were conducted in a private location behind a closed door. For the purpose of this study the following assessments were evaluated:

Demographics and Feedback

Socio-demographic characteristics were assessed including questions regarding age, race, gender, marital status, employment, education, housing status and debt. In addition, we asked participants to provide feedback regarding their comfort level when responding to questions about gambling behavior using a 5-point likert scale from very comfortable to very uncomfortable. Additionally we asked whether or not participants had previously spoken with a health care provider about their gambling behaviors.

Gambling Disorder:

To assess the 12-month prevalence of Gambling Disorder we used the 9-item criteria from the DSM-5 (American Psychiatric Association 2013). Based on DSM-5 criteria individuals with a score of 4 or above were considered disordered gamblers.

Gambling Behaviors Questionnaire

This standardized measure screened for a variety of gambling behaviors (Williams and Volberg 2010). The measure also included items to assess for frequency of engagement in specific gambling behaviors and average monthly amount spent over the past year.

Addictions Severity Index, Lite (ASI)

This short form version of the Addiction Severity Index (McLellan et al. 1980) is a semi-structured instrument used to assess for alcohol and drug use in the past 30 days.

I⁷ Eysenck Impulsivity Questionnaire

The Impulsivity subscale of the I⁷ Questionnaire (Eysenck and Eysenck 1978) was used to assess trait levels of impulsivity among participants. Higher scores indicate greater impulsivity.

Analysis

Univariate statistics included percentages for categorical variables and means for continuous variables. Bivariate analysis between disordered gamblers and non-disordered gamblers was assessed using *t* tests or Wilcoxon rank-sum test for continuous measures and two-tailed Chi square tests or Fisher exact tests for percentages. Longitudinal mixed model were used to assess the differences over time of gambling behaviors. Time points were baseline, approximately 3 months and approximately 6 months after the casino opened. A random intercept was used to account for the non-independence of observations over time. The test of the hypothesis of no differential changes in gambling behaviors before and after the opening of the casino was the test of the time*group interaction equal to zero. Additional contrasts were used to assess baseline versus 3 months and baseline versus 6 months. Missing data was accounted for in mixed models in order for all data collected to be used in the analyses.

Results

Participants

In total, 100 individuals were recruited and assessed. The average age of participants was 47.7 years ($SD = 8.4$). Half the participants were female and 22 % were married or living with a partner. The majority self-reported their race as being African American or Black (69.0 %). With respect to socioeconomic status, most participants reported that their average income was less than \$20,000 per year (90.9 %). Eighty-nine percent were unemployed. The majority indicated they had received a high school diploma (57.0 %). Most participants (74.7 %) reported having less than \$10,000 in debt. Compared to disordered gamblers, non-disordered gamblers were not statistically significantly different on any of the demographic measures, with the exception of length in treatment. Disordered gamblers had been in treatment an average of 763.1 days ($SD = 1006.8$), while non-disordered gamblers had been in treatment an average of 1292.4 days ($SD = 1154.9$; $p = 0.024$).

Differences in Spending Habits between Gamblers and Non-gamblers (Dichotomous)

Compared to non-disordered gamblers, disordered gamblers were found to endorse spending money on gambling behaviors within the past month significantly more when associated with lottery tickets ($p = 0.04$), instant win tickets ($p = 0.002$), sports betting ($p < 0.001$), bingo ($p < 0.006$), and games of skill ($p < 0.001$), though spending associated with these behaviors did not change significantly across time points for either group (See Table 1).

In terms of electronic gambling machines, 34 (69.4 %) disordered gamblers endorsed spending money within the previous month at Time Point 1. This was significantly greater than the non-disordered gamblers with 13 (26.0 %) participants endorsing this behavior ($p < 0.05$). At Time Point 3, the disordered gamblers decreased in the number of participants who endorsed spending money on electronic gambling machines, with 23 (57.5 %), while the non-disordered gamblers showed a slight increase in the number of endorsements with 15 (34.1 %). However, these changes across time points were not significant.

In terms of casino table games, disordered gamblers endorsed spending money on these behaviors significantly more than non-disordered gamblers at all time points. The number of disordered gamblers endorsing spending money on casino table games in the past month increased from 10 (20.0 %) at Time Point 1 to 13 (32.5 %) at Time Point 3, while non-disordered gamblers increased from 4 (8.0 %) participants endorsing this behavior, to 5 (11.1 %). However, these changes across time were not significant.

Differences in Money Spent on Gambling Behaviors between Disordered Gamblers and Non-disordered Gamblers

When examining money spent on electronic gambling behaviors, including electronic games at casinos, machines at local bars, online gambling, and video lottery terminals, disordered gamblers spent significantly more money than non-disordered gamblers, across all time points ($p < 0.05$; See Fig. 1). Disordered gamblers decreased their average spending on electronic gambling behavior from \$429.90 ($SD = \1009.90) at Time Point 1

Table 1 Monthly spending on gambling behaviors—dichotomized across time points

In a typical month, participants who spent any money on	Time point 1		Time point 2		Time point 3		Analyses	
	GD—Yes (n = 50)	GD—No (n = 50)	GD—Yes (n = 44)	GD—Yes (n = 45)	GD—Yes (n = 40)	GD—Yes (n = 45)	Comparison GD—Yes versus GD—No	Change over time
Lottery tickets	48	38	38	28	33	31	$p = 0.04$	$p = 0.41$
Instant win tickets	42	35	34	27	23	26	$p = 0.02$	$p = 0.60$
Sports betting	26	20	16	5	16	4	$p = 0.01$	$p = 0.78$
Horse or dog race betting	6	3	7	2	5	4	$p = 0.11$	n/a
Bingo	12	6	13	6	13	2	$p < 0.006^*$	n/a
Games of skill	29	12	26	8	24	8	$p < 0.001^*$	$p = 0.69$
Electronic games	34	13	25	10	23	15	$p < 0.001^*$	$p = 0.28$
Casino table games	10	4	7	4	13	5	$p = 0.02^*$	$p = 0.72$

* Indicates $p < 0.05$ as determined by a Chi square analysis. n/a indicates analyses that could not be conducted due to small cell size

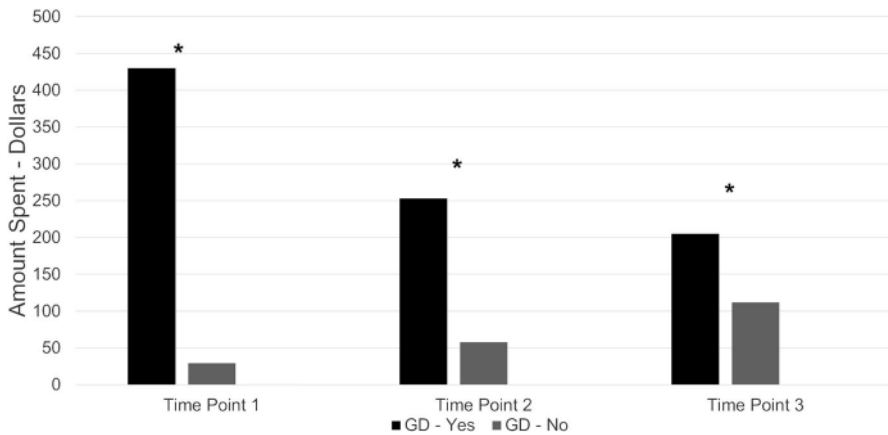


Fig. 1 Average Amount Spend on Electronic Gambling Machines at a Bar or Casino in the Past 30 Days. Note Asterisk indicates $p < 0.05$ when comparing money spent on gambling by those with and without GD

to \$205.30 (SD = \$313.40) at Time Point 3. However non-disordered gamblers were observed to have increased average spending on electronic gambling behaviors from Time Point 1 \$29.00 (SD = \$85.50) to Time Point 3 \$112.20 (SD = \$414.90), although these results were not significant.

For gambling behaviors associated with casino table games, disordered gamblers were again observed to have significantly higher average spending than non-disordered gamblers ($p < 0.05$; See Fig. 2). Disordered gamblers were found to have a small decrease in spending over time from Time Point 1 \$103.80 (SD = \$419.40) to Time Point 3 \$99.30 (SD = \$227.30). Non-disordered gamblers were again observed to have increased spending habits over time, with average money spent on casino games increasing from \$6.90 (SD = \$31.50) at Time Point 1, to \$37.80 (SD = \$131.90) at Time Point 3.

Substance Use and Impulsivity Variables

Disordered gamblers and non-disordered gamblers again did not see any significant changes in Addictions Severity Index- Lite scores across time points, nor were any differences observed in the two groups in days of alcohol use. However, the disordered gamblers did report significantly more days of drug use than the non-disordered gamblers ($p < 0.001$). Disordered gamblers also reported significantly higher scores on the I⁷ Eysenck Impulsivity Questionnaire than non-disordered gamblers ($p < 0.001$), but again neither group reported significant changes across time points.

Discussion

Changes in Gambling Behavior

Our study attempted to investigate the impact of the opening of a new casino in a population of disordered and non-disordered gamblers in a methadone maintenance treatment

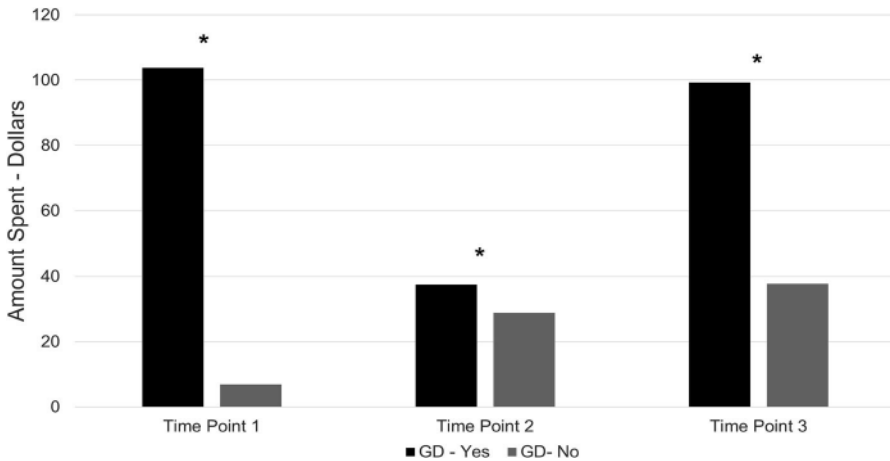


Fig. 2 Average Amount Spend on Casino Table Games at a Bar or Casino in the Past 30 Days. *Note* Asterisk indicates $p < 0.05$ when comparing money spent on gambling by those with and without GD

program. Furthermore, this new casino was in close proximity to the location of the methadone treatment program and easily accessible to study participants.

We did not find any statistically significant changes in gambling behaviors across time points, suggesting that the introduction of the new casino did not appear to have a major impact on gambling behavior nor the development of new gambling disorder diagnoses among those attending methadone maintenance treatment. Some previous studies, among people in the general population, report an increase in gambling behaviors and expenditure with the introduction of a new casino (Jacques et al. 2000; Jacques and Ladouceur 2006; Toneatto et al. 2003; Room et al. 1999), however these studies did not examine the occurrence of disordered gambling.

Data from other previous studies suggests that casino proximity is not associated with disordered gambling among those in general population (Sévigny et al., 2008), supporting our findings that the opening of a new casino in close proximity to the study population did not lead to significant gambling behavior changes. Furthermore, previous findings have examined the effects of gambling venue types, finding that small venue gamblers are more likely to be associated with problem gambling than those who gamble in larger gambling venues (Sévigny et al. 2016). As the casino in this study would easily be classified as a large scale gambling hall, this may provide some explanation as to why limited changes in gambling behaviors were reported after the casino's opening.

Our study builds on previous research by not only evaluating the change in gambling behavior and expenditure, but doing so among people already diagnosed with a gambling disorder compared to those without a gambling disorder. Furthermore, it provides new evidence regarding the relationship between the introduction of a new casino on gambling behavior outcomes among a population of people who are at high risk of gambling, that being those in methadone maintenance.

While we did not see statistically significant effects from the introduction of the new casino, it is worthy of note that small, though non-significant, changes were found in the gambling behavior of those without previous indication of gambling disorder, after the new casino opening. Specifically, from Time Point 1, prior to casino opening, to Time Point 3,

6 months after casino opening, non-disordered gamblers showed small trends for increased horse and dog race betting, electronic gambling, and casino gambling. Though not statistically significant, these trends may indicate greater effects of the opening of a casino on individuals without prior indication of gambling problems than on those already meeting criteria for the disorder. Future research may be warranted in examining the longer term effects of a new casino in this group of individuals on their gambling behaviors.

While neither disordered gamblers nor non-disordered gamblers showed significant changes in gambling behavior after the introduction of a new casino, it should be noted that this study did find significant differences in gambling behavior between the two groups. Disordered gamblers reported spending money on gambling behaviors in the past month significantly more than non-disordered gamblers on all types of gambling, including: lottery tickets, instant win tickets, sports betting, horse and dog race betting, bingo, games of skill, electronic games, and casino table games.

Substance Use and Impulsivity

Our study results found a higher prevalence of drug use in those with disordered gambling than those without. This is consistent with findings from previous research indicating that disordered gamblers are significantly more likely to have alcohol abuse than non-gamblers (Subramaniam et al. 2015). In fact, research suggests that substance use disorders are the most common comorbid disorders with gambling disorder (Bischof et al. 2013). As many as 14–46 % of substance abusers show evidence of disordered gambling (Cowlshaw et al. 2014; Himelhoch et al. 2016; Petry 2001). Conversely, nearly three-quarters (73.2 %) of disordered gamblers have a co-occurring alcohol disorder, while 38.1 % have a drug use disorder (Petry et al. 2005).

Our study findings also found that participants meeting criteria for gambling disorder displayed significantly higher scores for impulsivity. Again these results remain consistent with available research finding positive correlations between the variables of gambling, substance abuse, and impulsivity. Previous studies have indicated greater impulsivity in problem gamblers when compared to controls (Krmpotich et al. 2015). Furthermore, studies have shown that substance users with disordered gambling demonstrate significantly more impulsivity than substance users without disordered gambling (Petry 2001).

Limitations

Our study had several limitations. The first limitation was the study's lack of ability to generalize our findings to groups outside of methadone maintenance treatment population. This study cannot speak to the effects of the introduction of the new casino on the general population, as we chose to focus on a specific subset of individuals at higher risk for pathological gambling. Secondly, our study used a relatively small sample size, which may have led to type 2 errors. Further due to small sample size we weren't able to assess gender differences. Also by dichotomizing population into disordered and non-disordered gamblers, we did not look at categories of subclinical "problem gamblers" or at risk gamblers compared to non-gamblers or non- at risk gamblers. It would be good, with a larger sample size to look at the full continuum of at-risk to disordered gamblers. Additionally, for the purposes of our study, we did not use follow-up measures beyond the 6 month time point. As our results did indicate small increases in gambling behavior by the 6 month follow up

in those without disordered gambling, it is plausible that had we examined changes in gambling behavior beyond the 6 month follow up, this may have led to more information about the longer term effects of the introduction of the new casino on gambling behavior.

Another possible limitation has to do with the fact that, although this was the first casino to open in Baltimore City, it was the fifth casino to open in the state since September of 2010 with the fourth one, 13 miles away in a neighboring county, having opened more than 2 years prior. It is not clear how much these existing casinos may have affected the baseline measures for the current study. In addition, even though the new casino in Baltimore is only 1.2 miles away from the methadone program, it is not particularly convenient to reach by walking. Despite its fairly close proximity to the program, it may have not been practically close for many patients.

A final limitation to our study was that all data regarding the participants' participation in gambling behaviors were based upon self-report measurements and unable to be validated with more objective measures. However, previous research has suggested that only self-reported gambling problems may be susceptible to the biasing effects of social desirability, while gambling behaviors (frequency and money spent) remain relatively unaffected in other self-report measures (Kuentzel et al. 2008).

Conclusions

In conclusion, participants meeting DSM-5 criteria for gambling disorder display significantly higher rates of drug use and impulsivity. Additionally, significantly more disordered gamblers reported spending money on gambling behaviors in the past month, across all gambling types, than non-disordered gamblers, across all time points. In our study, the introduction of a new casino did not significantly change the gambling behaviors of individuals attending methadone maintenance treatment, regardless of whether or not individuals met criteria for DSM-5 defined gambling disorder. However, from prior to the casino opening, to 6 months after its opening, non-significant increases in gambling behavior were seen in individuals without gambling disorder who were participating in methadone maintenance treatment. This may warrant future investigation into the longer term effects of opening a new casino on this population.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval This study was approved by the Institutional Review Board at the University of Maryland, Baltimore. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. All participants provided informed consent prior to assessment administration. The present manuscript does not include any identifying information nor protected health information.

Human and Animal Rights This article does not contain any studies with animals performed by any of the authors.

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