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Exploring the Relationship Between Body Mass Index, Obesity, and Gambling Level Across Different Gambling Types

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Abstract

Individuals' body weight, measured in terms of body mass index (BMI), has been linked to various health issues in the literature. Recently, a positive relationship has been found between obesity and the level of problem gambling. In this exploratory study, we investigate the association between BMI, obesity, and gambling frequency across multiple types of leisure gambling. Data collected by the Pew Research Center among 1,473 gamblers was used to tests the links between BMI and gambling frequency for 16 types of leisure gambling activities. After we accounted for the effects of age, educational level, and family income and corrected for multiple comparisons, the results showed that obese participants (BMI $\geqslant$ 30) conducted significantly more gambling activities in two types of gambling, namely, playing bingo for money and buying state lottery tickets. Moreover, among female gamblers only, BMI was positively associated with frequency of gambling related to casinos, college basketball, and video poker machines. The findings of this exploratory study allow a better understanding of the potential risk factors of obesity and may be of value to public policy makers.

Keywords: BMI, obesity, gambling

Résumé

Dans diverses études antérieures, le poids corporel des personnes, mesuré en termes d'indice de masse corporelle (IMC), a été lié à divers problèmes de santé. Récemment, un lien positif a été constaté entre l'obésité et le niveau de jeu compulsif. Dans cette étude exploratoire, nous examinons la relation entre l'indice de masse corporelle, l'obésité et la fréquence du jeu, en nous basant sur divers types de jeux de hasard récréatifs. À l'aide de données recueillies par Pew Research Center auprès de 1 473 joueurs, l'étude sonde les liens entre l'IMC et la fréquence du jeu dans le cas de seize types de jeux récréatifs. Les résultats montrent qu'après avoir tenu compte de l'effet de l'âge, du niveau d'instruction et du revenu familial, ainsi que de la correction de comparaisons multiples, les participants obèses (IMC $\geqq$ 30) ont mené

beaucoup plus d'activités de jeu dans deux types de jeux, à savoir le bingo lucratif et l'achat d'une loterie d'État. De plus, seulement chez les joueurs de sexe féminin, l'IMC est positivement associé à la fréquence du jeu dans les cas du casino, du basketball universitaire et de la machine de vidéo poker. Les résultats de cette étude exploratoire nous permettent de mieux comprendre les facteurs de risque éventuels de l'obésité et peuvent être utiles aux décideurs publics.

Introduction

Body mass index (BMI), a measure of body fat based on an individual's mass and height, has been used to categorize body weight (Kuczmarski, Carroll, Flegal, & Troiano, 1997; Rexrode et al., 1997). Currently, the World Health Organization (WHO) categorizes adult individual weight, according to the formula kg/m^2 (Flegal, Carroll, Ogden, & Johnson, 2002; Khullar, Agarwal, & du Plessis, 2014; WHO, 2014a), as normal (BMI $\geqslant 18.5$ to <25), overweight (BMI $\geqslant 25$ to <30), or obese (BMI $\geqslant 30$). Numerous researchers have examined the prevalence of obesity in established economies such as Europe, the United States, Canada, and Australia (Seidell, 2000). Obesity is a public health epidemic, with more than 1.9 billion (39%) adults considered to be overweight worldwide and over 600 million (13%) adults deemed to be obese (WHO, 2014b). Obesity rates are also increasing in Asian countries (Ramachandran & Snehalatha, 2010; Seidell, 2000), particularly with the adoption of an adjusted BMI for Asians (i.e., BMI $\geqslant 23$ to <27.5 for overweight and BMI $\geqslant 27.5$ for obesity). The prevalence of overweight and obesity is considered a major public health concern (Simon et al., 2006). Research on BMI has often centred on its prediction of medical conditions such as risk of fracture (De Laet et al., 2005), mortality (Troiano, Frongillo, Sobal, & Levitsky, 1996), or cancer (Renehan, Tyson, Egger, Heller, & Zwahlen, 2008).

Although a large number of studies have investigated problem gambling as a mental disorder, the correlation between health and level of leisure gambling has seldom been examined (Grant, Derbyshire, Leppink, & Chamberlain, 2015). Specifically, published research on obesity and leisure gambling activities is rare. However, recent studies found a positive relationship between the level of problem gambling and obesity. Algren, Ekholm, Davidsen, Larsen, and Juel (2015), for example, compared the health behavior of two groups of gamblers—problem and non-problem—and found that problem gamblers tended to exercise less, eat more unhealthily, and have a higher BMI than non-problem gamblers. Black, Shaw, McCormick, and Allen (2013) also reported that pathological gamblers are more likely to be obese. Another study by Grant et al. (2015) showed that obese gamblers sustained greater monetary losses due to gambling, which is linked to their impaired decision making. These three limited, but related, studies on problem gambling provide some support for the presence of a positive relationship between individuals' level of leisure gambling and their BMI scores.

In this study, we explore the hypothesis that body weight measured in terms of BMI may be related to gambling frequency across a large number of gambling types. The focus is on regular or leisure gambling, rather than problem gambling. Our aim in this exploratory study is to expand the current understanding of health risk factors associated with leisure gambling and/or obesity, which may then lead to more in-depth studies and a better understanding of the lifestyle of gamblers worldwide.

Gambling and Its Potential Association With Body Weight

Research by Grant et al. (2015), who examined obesity and gambling by using neurocognitive measures, showed that obesity is associated with forms of impaired cognitive ability that affect financial risk assessment. In fact, body weight was found to be positively associated with impulsivity in children (Braet, Claus, Verbeken, & Van Vlierberghe, 2007) and cognitive rigidity in adolescents (Delgado-Rico, Río-Valle, González-Jiménez, Campoy, & Verdejo-García, 2012). Repetitive and uncontrolled eating among obese persons can be considered an impulsive behavior with a loss of cognitive control (Grant et al., 2015). Indeed, several studies reported that impulsivity is a natural attribute of gambling (Steel & Blaszczynski, 1998; Vitaro, Arseneault, & Tremblay, 1999). Furthermore, the issue of impulse control is often associated with problem gambling (Algren et al., 2015; Blain, Gill, & Teese, 2015; Nower & Blaszczynski, 2006; Tang & Wu, 2012). If this is true, BMI may also be related to gambling through the mediation of impulsivity. Higher BMI may be positively associated with higher impulsivity, which is positively related to gambling involvement.

The link between BMI and gambling can also be inferred from finance studies. Borghans and Golsteyn (2006) suggest that time discounting is positively correlated with BMI: Individuals who are increasingly overweight take on risk by consuming more calories (near-term gain) at the expense of their future health. These individuals seem to value future rewards less than immediate gain. Adams and Nettle (2009) conducted a study on time perspective, personality, and body mass. They found a negative association between the score on the Consideration of Future Consequences (CFC) Scale and BMI: higher BMI is correlated with lower consideration for the future. This result is supported by another study by Weller, Cook, Avsar, and Cox (2008), who reported a positive relationship between the need for immediate gratification (vs. higher but delayed reward) and body weight among women. On the basis of this reasoning, a higher BMI may be related to greater focus on immediate needs, wants, and concerns. This also provides support for the hypothesis that there is a positive association between BMI and gambling involvement.

Besides the recent work on problem gambling and obesity, the literature on psychology and leisure gambling may provide further hints about the hypothesized relationship between BMI and gambling level. Individuals who are overweight seek out less physical exercise (see Weinsier, Hunter, Heini, Goran, & Sell, 1998) because a high BMI is linked to less physical activity at work as well as during leisure time (Larsson, Lissner, Näslund, & Lindroos, 2008). Gambling in casinos, slot parlors,

and bingo halls may be an alternative activity for overweight individuals to relieve and/or escape from their boredom. Moreover, previous studies have shown that individuals frequently use food to cope with emotions and that it is a mechanism to reduce stress (e.g., Ozier et al., 2008). There is also a positive link between traumatic experiences and obesity (Palmisano, Innamorati & Vanderlinden, 2016). On the one hand, research shows that individuals who eat in response to emotions and stress tend to be overweight or obese (Ozier et al., 2008; Palmisano, Innamorati, & Vanderlinden, 2016). On the other hand, gambling can be an emotionally absorbing experience in which gamblers can be deeply occupied in their games (Titz, Andrus, & Miller, 2001), which can be a stressful leisure activity. Stress affects eating habits, leading to unhealthy dietary intake and higher body weight. In fact, research reveals that a high BMI increases the risk of depression and that depression is a predictor of obesity (Luppino et al., 2010). These arguments also suggest a positive link between BMI and gambling.

Given the increasing popularity of gambling as a form of leisure activity worldwide, it is still unclear how BMI may be related to this emerging lifestyle (i.e., leisure gambling). The purpose of this exploratory study is to examine the relationship between BMI and gambling frequency across 16 different gambling types in order to uncover the correlations between obesity and gambling activities. We also examine gender differences throughout the study, as this is significantly linked to eating habits and gambling behavior.

Method

To explore the correlates between leisure gambling level and body weight as measured in terms of BMI, we used a data set collected by the Pew Research Center. This data set contained relevant (and seldom found) information about individuals' BMI scores, gambling behavior, and demographics. The data came from a survey that was conducted by telephone on a nationally representative sample of adults (18 years and older) living in the United States (Taylor, Funk, & Craighill, 2006). It was designed to represent all telephone households in the continental USA. In total, 2,250 telephone interviews were conducted in early 2006. The response rate was 27.5%. Weighting was then used to offset patterns of non-response and applied with sample balancing, an iterative sample weighting program. Of the respondents, 1,473 reported participating in at least one type of gambling activity in the past 12 months. Data from these respondents were used for subsequent analyses in the current study.

Participants in the survey responded to dichotomous questions (yes/no) about 16 different types of gambling activities that they may have engaged in during the past 12 months. They then answered questions about their estimated level of gambling participation across these 16 gambling activities, which included (1) playing bingo for money, (2) visiting a casino, (3) betting on a horse race, (4) buying a state lottery ticket, (5) buying a lottery ticket, (6) playing cards for money, (7) betting on Major League Baseball when it is in season, (8) betting on professional basketball when it is in season, (9) betting on professional football when it is in season, (10) playing a slot

machine, (11) betting on college basketball when it is in season, (12) betting on college football when it is in season, (13) betting on a dog race, (14) betting on a boxing match, (15) gambling for money on the Internet, and (16) playing a video poker machine for money. The original items were measured with a 5-point scale: 1 (once a week or more often), 2 (2 to 3 times a month), 3 (once a month), 4 (once every few months), and 5 (less often). They were subsequently reverse coded for further analysis.

Multiple regression models for male and female gamblers were generated separately by using AMOS 22, with BMI score as an independent variable. AMOS 22 is particularly suitable, as it facilitates the simultaneous use of multiple indicators. Control variables were considered along with level of gambling participation for each type of gambling (dependent variable). Previous studies found that gambling level is associated with age (Burns, Gillet, Rubinstein, & Gentry, 1990; Herring & Bledsoe, 1994; Young & Stevens, 2009), education level (Lam, 2007; Rogers, 1998), and income (Abbot & Cramer, 1993; Currie et al., 2006). We also tested for multicollinearity among independent variables and found that variance inflation factors ranged from 1.006 to 1.422, which are within the acceptable range (see O'brien, 2007). Table 1 shows the correlation matrix of the key independent variables in the model.

Results

Among the 1,473 respondents who gambled in the past 12 months, the proportion of females to males was almost 1:1. The average age was 47.9 years (SD = 17.01) and the mean BMI score was 26.5 (SD = 5.17).

We first explored the difference between respondents who were considered normal weight versus those who were obese according to the WHO body weight classification for BMI. About 40% (n = 237) of obese gamblers were female versus 59.3% (n = 346) who were male (overweight gamblers were not included). In contrast, 57% of normal weight gamblers were female (n = 705) and 43% were male (χ^2 = 42.61, df = 1, $p < .001$). We conducted a series of analysis of variance (ANOVA) tests to compare normal versus obese subjects for their levels of gambling participation across all 16 gambling types. Preliminary results showed that there was a problem

Table 1
Correlation Matrix of Independent Variables

Variable	BMI	Age	Income	Education
BMI	-			
Age	.05	-		
Income	-.05	-.06*	-	
Education	-.07*	.04	.44***	-

Note. BMI = body mass index.
* $p < .05$. *** $p < .001$.

with group variances for a number of the gambling types, which were unequal and hence violated the basic assumption of the ANOVA test. As a result, we used Welch's test (see Ruxton, 2006). Preliminary results showed that the obese group had a significantly higher level of gambling participation for five gambling types: (1) bingo, (2) casino, (3) state lottery, (4) slot machine, and (5) college football (see Table 2). In order to tackle the issue of multiple comparisons in the same sample (16 tests in total), we applied the Holm-Bonferroni method using Gaetano's approach (2013). The Holm-Bonferroni method is more powerful than the traditional Bonferroni

Table 2
Comparison Between Normal and Obese Gamblers Across Types of Gambling Participation

No.	Type of Gambling[a]	Gambler	*N*	Mean	*SD*	Welch's *F*	*df*	Sign.
1	Play bingo for money	Normal	43	1.95	1.25	10.43	34.91	**
		Obese	23	3.26	1.71			
2	Visit a casino	Normal	231	1.55	0.98	4.00	201.79	*
		Obese	118	1.81	1.17			
3	Bet on a horse race	Normal	41	1.56	1.00	.635	42.35	*ns*
		Obese	27	1.81	1.44			
4	Buy a state lottery ticket	Normal	198	2.70	1.54	9.43	211.54	**
		Obese	103	3.26	1.50			
5	Buy a lottery ticket	Normal	218	2.66	1.52	1.16	209.27	*ns*
		Obese	106	2.85	1.51			
6	Play cards for money	Normal	136	2.50	1.42	0.05	125.80	*ns*
		Obese	64	2.45	1.39			
7	Bet on Major League Baseball when it is in season	Normal	106	1.48	1.06	0.09	77.68	*ns*
		Obese	46	1.54	1.19			
8	Bet on professional basketball when it is in season	Normal	104	1.57	1.16	0.18	78.86	*ns*
		Obese	44	1.48	1.19			
9	Bet on professional football when it is in season	Normal	108	2.43	1.65	1.43	89.589	*ns*
		Obese	48	2.77	1.67			
10	Play a slot machine	Normal	177	1.53	0.87	3.79	167.12	*
		Obese	104	1.79	1.20			
11	Bet on college basketball when it is in season	Normal	54	2.04	1.45	1.07	31.71	*ns*
		Obese	21	2.48	1.72			
12	Bet on college football when it is in season	Normal	55	2.31	1.64	5.77	33.894	*
		Obese	21	3.38	1.77			
13	Bet on a dog race	Normal	10	1.80	1.32	0.58	20.86	*ns*
		Obese	13	2.31	1.89			
14	Bet on a boxing match	Normal	21	2.29	1.45	0.01	13.18	*ns*
		Obese	9	2.22	1.72			
15	Gamble for money on the Internet	Normal	10	2.40	1.71	0.00	12.57	*ns*
		Obese	7	2.43	1.81			
16	Play a video poker machine for money	Normal	55	1.75	0.97	1.49	52.07	*ns*
		Obese	32	2.06	1.27			

Note. ns = not significant.
[a] Item scale: 5 (once a week or more often), 4 (two to three times a month), 3 (once a month), 2 (once every few months), 1 (less often).
* $p < .05$. ** $p < .01$.

approach (Abdi, 2010). When the Holm-Bonferroni correction was applied, the results showed that the obese group had a higher level of gambling participation only in (1) bingo and (2) the state lottery.

Next, our multiple regression analyses showed gender differences in the results. The level of gambling participation in male respondents, despite the inclusion of selected demographic variables, was positively associated ($p < .05$) with their BMI scores in only three types of gambling activities: (1) horse races, (2) state lottery ticket, and (3) college basketball (see Table 3). After the Holm-Bonferroni correction, their level of gambling participation was not correlated with their BMI scores. For female respondents, their level of gambling participation was positively associated with their BMI scores in seven types of gambling activities: (1) bingo, (2) casino, (3) professional football, (4) slot machine, (5) college football, (6) Internet, and (7) video poker machine (see Table 4). After the Holm-Bonferroni correction, the following three types of activities were significantly and positively correlated with the level of gambling participation in female gamblers: (1) casino, (2) college basketball, and (3) video poker machine.

Discussion

In this exploratory study, the association between gambling level and BMI was broadly examined. The results showed that individuals who are considered obese

Table 3
Multiple Regression Results for Male Gamblers

No.	Type of Gambling[a]	Sample Size	Standardized Regression Weights				R^2
			Age	Education	Family Income	BMI Score	
1	Bingo	39	-0.088	0.125	-0.358*	0.19	.14
2	Casino	317	0.142**	-0.215***	-0.106	0.037	.10
3	Horse race	67	0.039	-0.112	-0.322*	0.296**	.25
4	State lottery	272	0.078	-0.246***	0.101	0.118*	.07
5	Lottery	297	0.162**	-0.16*	0.006	0.044	.05
6	Cards	239	-0.118	-0.069	-0.162*	0.055	.06
7	Major League Baseball	190	-0.053	-0.039	-0.157	0.09	.04
8	Professional basketball	185	-0.208**	0.064	-0.268***	0.019	.10
9	Professional football	195	-0.053	-0.254**	0.056	0.063	.07
10	Slot machine	251	0.061	-0.11	-0.162*	0.078	.07
11	College basketball	97	0.075	-0.277*	0.054	0.207*	.12
12	College football	98	-0.025	-0.214	0.039	0.218	.09
13	Dog race	26	0.364	-0.148	-0.232	0.279	.32
14	Boxing match	40	-0.201	-0.179	0.001	0.069	.09
15	Internet	22	0.527**	-0.025	-0.111	0.093	.31
16	Video poker machine	104	0.079	-0.168	-0.239*	0.171	.16

Note. BMI = body mass index.
[a] Item scale: 5 (once a week or more often), 4 (two to three times a month), 3 (once a month), 2 (once every few months), 1 (less often).
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4
Multiple Regression Results for Female Gamblers

No.	Type of Gambling[a]	Sample Size	Standardized Regression Weights				R^2
			Age	Education	Family Income	BMI Score	
1	Bingo	87	0.242**	-0.142	-0.336***	0.254**	.39
2	Casino	319	0.094	0.031	-0.188**	0.181**	.09
3	Horse race	39	-0.11	-0.302	-0.093	0.049	.13
4	State lottery	270	0.157**	-0.1	-0.059	0.110	.07
5	Lottery	302	-0.009	-0.202**	-0.004	-0.042	.04
6	Cards	112	0.162	-0.001	-0.149	-0.029	.06
7	Major League Baseball	84	-0.058	-0.083	-0.223	0.080	.09
8	Professional basketball	84	-0.335***	0.03	-0.324**	-0.063	.17
9	Professional football	85	-0.08	-0.124	-0.133	0.257*	.14
10	Slot machine	283	-0.004	-0.047	-0.235***	0.172**	.11
11	College basketball	38	-0.512***	0.041	-0.198	0.361**	.40
12	College football	37	-0.201	0.131	-0.318	0.433	.32
13	Dog race	12	-0.199	-0.043	-0.443	-0.258	.24
14	Boxing match	11	-0.176	0.094	-0.16	0.239	.11
15	Internet[b]	-	-	-	-	-	-
16	Video poker machine	66	-0.179	0.015	-0.105	0.357**	.17

Note. BMI = body mass index.
[a] Item scale: 5 (once a week or more often), 4 (two to three times a month), 3 (once a month), 2 (once every few months), 1 (less often).
[b] Very small sample size ($n = 4$ only); hence, taken out of analysis.
* $p < .05$. ** $p < .01$. *** $p < .001$.

(vs. those who have a normal BMI) were more likely to play bingo for money and to buy a state lottery ticket. Furthermore, after we adjusted for multiple comparisons in the same sample, BMI was significantly and positively associated with the level of gambling participation for female gamblers but not for male gamblers. For female gamblers, three different types of gambling activities were positively associated with BMI scores: (1) casino, (2) college basketball, and (3) video poker machine. The results therefore reveal that there is a relationship between body weight and level of gambling participation, although this association is found only in a few gambling types and among female gamblers. These findings provide partial, but limited, support to the hypothesis that there is a positive link between BMI and gambling beyond problem gambling.

Several viable explanations can be given for the BMI-gambling link. One relates to previous studies on the positive link between time and delay discounting and BMI (e.g., Borghans & Golsteyn, 2006; Weller et al., 2008). A higher BMI was associated with greater immediate gratification, and less value was placed on future rewards (Weller et al., 2008). These studies, along with research that connects BMI to impulsivity (e.g., Algren et al., 2015) and impulsivity to gambling (e.g., Blain et al., 2015; Vitaro et al.,1999), provide support for a positive link between BMI and gambling, as observed from some of the gambling types in the current study.

Previous research found that, compared with non-obese gamblers, obese gamblers are more likely to make more irrational choices because they are less able to moderate their risk taking (Grant et al., 2015). This observation implies an association between obesity and impaired cognitive ability, particularly in risk-taking decisions. This association may have led to greater gambling frequency (for some games in the current study) among obese gamblers, resulting in more financial losses.

The results of the current study suggest that gender may be a potential moderator for the BMI-gambling link. Obese females, who are under greater social pressure to look slim and attractive, are often the subject of prejudice and deemed to be socially undesirable (Crandall, 1994). A review of the academic literature has revealed a clear and pervasive bias against obese people (see Carr & Friedman, 2005; Crandall, 1994; Puhl & Brownell, 2001). Such social bias and discrimination is evidenced even among health professionals who specialize in obesity (Schwartz, Chambliss, Brownell, Blair, & Billington, 2003). The literature also supports a significantly lower perceived self-worth among obese children, particularly girls (Franklin, Denyer, Steinbeck, Caterson, & Hill, 2006; O'dea, 2006). Moreover, obesity has been associated with major depressive symptoms (Mukamal & Miller, 2009; Scott, McGee, Wells, & Oakley Browne, 2008; Zhao et al., 2009). Hence, a higher BMI tends to be associated with mental health disorders that include major depression. To cope with depression, females may actively participate in gambling. Escape from one's daily problems through gambling is often a key motivation and coping strategy reported by gamblers (Fisher, 1993; Loroz, 2004; Wood & Griffiths, 2007).

Perhaps the most direct explanation for the BMI-gambling link in our study stems from the fact that obese individuals tend to seek out less physical activities for leisure (Larsson et al., 2008; Pagoto, Spring, Cook, McChargue, & Schneider, 2006). Gambling, in the case of casino participation, is conducted indoors within a comfortable environment. In particular, activities involving a casino typically require individuals to physically go to a specific venue (e.g., casino or related gaming centre) and thus may be substitutes for other social, leisure, or sports activities (Lam, 2007). Hence, gambling may be an attractive choice for obese individuals, similar to the relationship between a sedentary lifestyle and obesity, especially TV watching (Johnson-Taylor & Everhart, 2006). A recent study by Algren et al. (2015) also found that problem gamblers eat more unhealthily and are more likely to be obese than non-problem gamblers. This may affect females more, given that previous studies tend to support the finding that females are less engaged in physical activities (Flintoff & Scraton, 2001).

Limitations

Given the exploratory nature of the current research, we were unable to determine the cause of any association. The study aimed to stimulate more research interest and a discussion of the BMI-gambling link, as well as a better understanding of the health risks of obesity and gambling. The results have implications for understanding the

lifestyle and consumption patterns of obese people (and gamblers) for public policy makers and personnel working in the health care industry.

The findings should be read with caution, however, because the current study used a secondary data set gathered in 2006; in addition, the increasing prevalence of overweight and obesity has not been captured in this study. Sample sizes between male and female gamblers varied and with some gambling types were below 50. Self-reported weight may also involve issues of underreporting and hence underestimation in the prevalence of overweight and obesity (Elgar, Roberts, Tudor-Smith, & Moore, 2005).

In addition, the average BMI of respondents was greater than 26, meaning that they were slightly overweight on average. Notably, BMI is not the only index that reflects the body fatness of an individual: Lean body mass (Crabtree et al., 2004; Forbes & Reina, 1970; Lønbro et al., 2013) and waist circumference (Ford, Maynard, & Li, 2014; Janssen, Katzmarzyk, & Ross, 2004) can also be used as screening tools for body fatness and individual health. Since measurements of lean body mass and waist circumference require equipment to evaluate body fat percentage with a measurement error, BMI remains a practical predictor of health risk. The adjusted BMI should be used when considering racial diversity (Cole, Bellizzi, Flegal, & Dietz, 2000; Ko et al., 2001; Ramachandran & Snehalatha, 2010; Seidell, 2000).

On the issue of testing for gender differences in the BMI-gambling link across the various types of gambling, a multigroup comparison with a structural equation model would have been better; this was not, however, used in current study. Lastly, the percentage of variances explained by BMI as measured by R^2 was not that high. This means that there are other explanatory factors for gambling frequency that are not accounted for in the current study. Although small, the strength of the relationship between BMI and gambling frequency is significant and consistent across a few types of gambling activities.

Conclusion

This exploratory study was designed to provide a limited evaluation of the possibility of a BMI-gambling link. The results show that female gamblers are more likely to experience a BMI-gambling link in a few limited gambling types that include casino gambling. Although we discussed several potential reasons as to why this is the case, further in-depth primary studies are needed. Future studies must include some, if not all, of the antecedents discussed in order to achieve a more holistic understanding of the effects of gambling on the health of gamblers.

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