



Culture and age influences upon gambling and problem gambling



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ABSTRACT

Objective: This study aimed to (i) examine the prevalence and types of gambling, (ii) establish prevalence of 'pathological' gambling, (iii) explore the correlates of gambling, and (iv) establish psychiatric and physical comorbidity in a sample of older adult gamblers (≥ 60 years) in contrast to younger gamblers in a representative population sample in Singapore.

Method: This paper reports the results of a secondary analysis of data from a representative community survey of 6616 participants, of which 2252 had engaged in gambling activities at least once in their lifetime.

Results: 48.9% of older adults reported lifetime gambling. Older gamblers were more likely to be males, married or widowed (vs. never married), with pre-primary, primary and secondary education (vs. university), economically inactive (vs. employed) and had personal annual income of SGD \$19,999 and below (vs. SGD \$50,000 and above). Older gamblers had significantly higher rates of betting on horses, playing numbers or betting on lotteries, and playing Mahjong. After adjusting for demographic variables in multiple logistic regression analyses, gamblers aged 60 years and older had significantly lower odds of having pathological gambling than those in the younger age group (OR = 0.4). Older gamblers had significantly higher odds of having diabetes (OR = 3.2), hypertension (OR = 4.9), and any comorbid chronic physical condition assessed in this study.

Conclusions: For the majority of older adults, gambling remains a recreational activity that is entertaining and a way of socialization. However, one must remain cognizant of the possible risks for some to develop disordered gambling.

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1. Introduction

Gambling is often defined as 'wagering money or something of material value on an event of uncertain outcome with the primary intent of winning additional money or material goods' (Productivity Commission, 1999). However it takes on different meanings depending on the cultural and historical context in which it is used. Pathological gambling was classified by the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV-TR) as an impulse control disorder characterized by persistent and recurrent maladaptive gambling behavior with dire consequences (American Psychiatric Association, 2000). However in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) 'Gambling Disorder' has been included under 'Substance-Related and Addictive Disorders' and defined as a 'persistent and recurrent problematic gambling behavior leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or

more) symptoms as described by a checklist in a 12-month period' (American Psychiatric Association, 2013).

The relationship between gambling and age has been studied in various jurisdictions and in some studies gambling and problematic gambling behavior have been found to be more prevalent among those belonging to the younger age group (Stitt et al., 2003; Desai et al., 2004; McKay, 2005; Wiebe and Cox, 2005). However, two global phenomena that have come into play over the past few decades are influencing this trend. The first concerns the changing global population demographics (United Nations, n.d.). The World Economic Forum (World Economic Forum, 2012) reported that the proportion of those aged over 60 years has increased from 8% of the world population (200 million people) in 1950 to around 11% (760 million) in 2011, and this is projected to rapidly increase to 22% (2 billion) by 2050. The second phenomenon pertains to the increase in the number and accessibility of legal gambling avenues in many jurisdictions. The legalization of state-sanctioned gambling facilities and proliferation of casinos worldwide have resulted in increased social acceptance of gambling as a pastime among older adults (Boreham et al., 2006; Levens et al., 2005). A recent systematic review suggested that the prevalence of

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lifetime 'problem or pathological' gambling among older adults ranges from 0.01% to 10.9%. Additionally gambling disorder among older adults was associated with significant psychiatric and physical comorbidity (Subramaniam et al., 2015).

Culture plays an important role in gambling. Raylu and Oei (Raylu and Oei, 2004) noted that cultural beliefs and values can influence gambling behaviors and help-seeking attitudes. They suggested that cultures that have values and beliefs that favor gambling (such as the Chinese) are more likely to gamble or develop problem gambling compared to cultures that do not have values that encourage gambling. Similarly they opined that cultures that have negative attitudes towards getting professional help are less likely to try and get help when they initially begin experiencing problems with their gambling and, thus are more likely to continue gambling and subsequently develop problem gambling. A recent study of gambling among older adults in Hong Kong concluded that the elderly gamblers in Hong Kong 'share the social space created through gambling with fellow senior gamblers, which seems to provide social interactions in the form in which they are comfortable to participate and that gambling may provide an existential meaning to their lives in the hectic city life of Hong Kong' (Ohtsuka and Chan, 2014).

Singapore is an island city-nation off the southern tip of the Malay Peninsula. In 2013, the population of Singapore was just under 5.4 million, of which 3.85 million are Singapore residents. Of these residents, 74.2% are of Chinese descent, 13.3% are Malays, 9.1% are Indians and 3.3% are categorized as Other ethnicity. (Singapore Department of Statistics, 2013).

The population of older adults (defined as persons aged 65 years and older) in Singapore has grown. While in 1965 they comprised 2.5% of the population, this proportion had increased to 11% in 2014 (Statistics Singapore Population Trends, 2014). Gambling activities also differ significantly in the cultural groups within this population. While gambling is very popular among the Chinese due to the fact that it is an acceptable form of social activity (Raylu and Oei, 2004; Lai, 2006); gambling is forbidden according to the tenets of Islam – the predominant religion of the Malay population in Singapore. While few studies have focused on gambling trends among Indians in Singapore, a recent report from India suggests that despite being socially conservative and ambivalent about gambling, an estimated USD \$60 billion was wagered in the country in 2010 (KPMG International, 2010). Few studies in Singapore have examined the effects of age and culture on gambling on the Singaporean population. A recent study from Singapore conducted on adults aged 55 years and above using the Canadian problem gambling index (CPGI) (Ferris and Wynne, 2001), reported a lifetime gambling participation rate of 56.2%. Among those who had lifetime gambling, 69.7% had gambled in the past 12 months and 2.2% met the criteria for problem gambling. The study however did not find ethnicity to be a significant predictor of problem gambling among the older adults (Tse et al., 2013).

The aims of the current study were to (i) examine the prevalence and types of gambling (ii) establish prevalence of 'pathological' gambling (iii) explore the correlates of gambling and (iv) establish psychiatric and physical comorbidity in a sample of older adult gamblers (≥ 60 years) in contrast to younger gamblers in a representative population sample in Singapore.

2. Methods

The data for the current study was extracted from the Singapore Mental Health Study (SMHS), which was a survey of Singapore Residents (including Singapore Citizens and Permanent Residents) aged 18 years and above, conducted from December 2009 to December 2010. This was a population-based, cross-sectional, epidemiological study; the methodology of which has been described in detail previously (Subramaniam et al., 2012). A probability sample was randomly selected using a disproportionate stratified sampling design and in order to make inferences of

prevalence rates of mental disorders to the entire population of Singapore Residents, the survey data were weighted to the 2007 resident population. The weighting of the data was taken into account in data analyses using SAS software version 9.2. The study was approved by the ethics committee (National Healthcare Group, Domain Specific Review Board) and all respondents and parents/guardians of those aged below 21 years gave written informed consent for participating in the study.

2.1. Data collection and instruments

The assessment of mental disorders was established using version 3.0 of the World Mental Health Composite International Diagnostic Interview (CIDI) (Kessler and Ustun, 2004). Diagnostic modules for lifetime and 12-month prevalence of affective disorders including major depressive disorder (MDD) and bipolar disorder; anxiety disorders, including generalized anxiety disorder (GAD) and obsessive compulsive disorder (OCD) and alcohol use disorder (AUD) were included in the survey. CIDI organic exclusion rules as well as diagnostic hierarchy rules were applied to generate the final diagnoses. Nicotine dependence was established using the Modified Fagerstrom Test for Nicotine Dependence (Heatherton et al., 1991).

The interview also gathered information on a range of chronic medical conditions. We used a modified version of the CIDI checklist of chronic medical conditions for this purpose and respondents were asked to report any of the conditions listed in the checklist. The list comprised 15 chronic medical conditions which were re-classified into eight types of physical disorders: (1) respiratory disorders (asthma, chronic lung disease such as chronic bronchitis or emphysema), (2) diabetes, (3) hypertension and high blood pressure, (4) chronic pain (arthritis or rheumatism, back problems including disk or spine, migraine headaches), (5) cancer, (6) neurological disorders (epilepsy, convulsion, Parkinson's disease), (7) cardiovascular disorders (stroke or major paralysis, heart attack, coronary heart disease, angina, congestive heart failure or other heart disease), and, (8) ulcer and chronic inflamed bowel conditions (stomach ulcer, chronic inflamed bowel, enteritis, or colitis) (Chong et al., 2012).

The South Oaks Gambling Screen (SOGS) was used to screen for pathological gambling. SOGS is based on the Diagnostic and Statistical Manual of Mental Disorders Third Edition (DSM-III) (American Psychiatric Association, 1980) criteria for pathological gambling (Lesieur and Blume, 1987). The English version of SOGS has been validated in the Singapore population (Abdin et al., 2012). The SOGS is composed of 20 scoring items, all equally weighted, requiring a 'yes' or 'no' answer. To score, each 'yes' answer attains one point. The non-scoring items identify the type of gambling, amount of money gambled in a day, and relatives and friends with a gambling problem. For the purpose of this study, respondents scoring 5 or more were categorized as 'probable pathological gamblers', and those scoring 0 as 'non-problem gamblers'. Those scoring 1 to 4 in SOGS were categorized as 'problem gamblers'. Those who stated that they had never gambled in their lives were categorized as non-gamblers.

Health related quality of life (HRQOL) was measured using the Euro-Quality of Life Scale (EQ-5D) (EuroQol Group, 1990); a standardized measure of health status developed by the EuroQol Group. The utility-based EQ-5D index score ranges from -0.59 to 1.00 with negative values representing health states worse than being dead, 0 representing being dead, and 1.00 representing the state of full health. Population norms have been established for EQ-5D in Singapore (Abdin et al., 2013; Abdin et al., in press). The EQ-5D has been used widely in Singapore to examine HRQOL among different disease groups (Subramaniam et al., 2014; Wang et al., 2014).

2.2. Statistical analyses

All estimates were weighted to adjust for over sampling and post-stratified for age and ethnicity distributions between the survey sample

and the Singapore resident population in 2007. Weighted mean and standard error were calculated for continuous variables, and frequencies and percentages for categorical variables. The demographic characteristics were compared among the groups (those aged 18–59 years and those 60 years and above) and tested for significant differences using Chi-square tests. Logistic regression models were used to generate odd ratios (ORs) and 95% confidence intervals for relationship between outcome variables and predictor variables. Mean EQ-5D index scores were compared between two groups using ANOVA test followed by multiple linear regression to adjust for demographic variables. Statistical significance was evaluated at the <0.05 level using two-sided tests. All statistical analyses were carried out using the Statistical Analysis Software (SAS) System version 9 (SAS Institute Inc., 2008).

3. Results

2252 respondents who had engaged in gambling activities at least once in their lifetime were included in this study. About 57.5% of the overall sample was male, with a mean age of 43.9 years, ranging from 19 to 89 years. 1232 respondents (90.1%) were of Chinese descent, 268 (2.7%) were Malays, 628 (5%) were Indians and 123 (2.2%) belonged to 'Other' ethnic group. Table 1 shows the demographic characteristics of gamblers by age groups. Logistic regression analyses indicate that older gamblers were more likely to be males, married or widowed (vs. never married), with pre-primary, primary and secondary education (vs. university), and were economically inactive (vs. employed) and had personal annual income of SGD \$19,999 and below (vs. SGD \$50,000 and above). Malays were less likely to be older gamblers.

Gamblers aged 18–59 years had significantly higher rates of playing cards for money, betting on sports and playing dice games while older gamblers had significantly higher rates of betting on horses, playing

numbers or betting on lotteries, and Mahjong. While younger adults were more likely to have a parent, friend, or other relatives with a gambling problem, older adults were more likely to endorse having a spouse/partner with a gambling problem. There were no significant differences in the maximum amount spent per day between the two groups (Table 2).

After adjusting for demographic variables in multiple logistic regression analyses, gamblers aged 60 years and older had significantly lower odds of having pathological gambling than those in the younger age group (OR = 0.4) (Table 3). Older gamblers had significantly higher odds of having diabetes (OR = 3.2), high blood pressure (OR = 4.9), and any comorbid chronic physical condition assessed in this study (OR = 3.1) (Table 4). The proportion of the variance explained by the demographic variables on the adjusted model for the relationship between age with pathological gambling, diabetes, high blood pressure and any chronic physical conditions were 51%, 52%, 56% and 53%, respectively.

There were significant differences in the HRQOL as measured using the EQ-5D index between gamblers aged 18–59 years and gamblers aged 60 years and older (Table 5). However after adjusting for demographic variables in multiple linear regression analyses, this difference was not significant.

4. Discussion

The study found that 48.9% of older adults and 52.6% of those aged 18–59 years reported that they had ever gambled in their lives. The prevalence of lifetime gambling among older adults ranges from 28.7% (Pietrzak et al., 2007) to 100% (Ladd et al., 2003) across studies. This large disparity may be attributed to differences in sampling especially in terms of population of survey, methodology, variation in the definitions

Table 1
Demographic characteristics of gamblers by the two age groups (n = 2252).

	Gamblers aged 19–59 years (N = 1990)		Gamblers aged 60 years and older (N = 262)		P value	Gamblers aged 60 years and older versus Gamblers aged 19–59 years			
	N	%	N	%		OR	95% CI Lower Upper	P value	
<i>Ethnicity</i>									
Chinese	1075	89.5	157	93.6	<0.001	Ref.			
Malay	253	3.0	15	1.0		0.2	0.1	0.4	<0.001
Indian	562	5.2	67	4.0		0.7	0.5	1.0	0.066
Others	100	2.3	23	1.3		1.0	0.6	1.9	0.928
<i>Gender</i>									
Male	1267	56.1	184	64.6	0.038	5.1	3.1	8.3	<0.001
Female	723	43.9	78	35.4		Ref.			
<i>Marital status</i>									
Never married	607	33.1	18	8.1	<0.001	Ref.			
Currently married	1273	61.2	203	73.1		5.3	2.5	11.3	<0.001
Divorced/separated	89	4.5	9	2.8		2.2	0.7	7.4	0.1897
Widowed	20	1.1	32	16.0		68.1	19.8	233.7	<0.001
<i>Education</i>									
Pre-primary	34	2.1	40	21.0	<0.001	21.7	6.8	69.4	<0.001
Primary	226	11.9	74	31.2		7.2	2.6	19.5	0.001
Secondary	586	27.5	85	28.9		3.0	1.2	7.7	0.021
Pre-U/junior college/diploma	435	24.2	38	13.9		2.4	0.9	5.9	0.066
Vocational	205	8.4	4	1.0		0.4	0.1	2.9	0.397
University	504	25.8	21	4.1		Ref.			
<i>Employment status</i>									
Employed	1626	83.2	119	44.8	<0.001	Ref.			
Economically inactive	211	13.1	129	52.6		5.2	3.1	8.9	<0.001
Unemployed	83	3.7	6	2.7		0.6	0.2	2.4	0.478
<i>Personal income (annual in SGD)</i>									
\$S19,999 and below	781	39.8	180	81.6	<0.001	2.4	1.1	5.2	0.034
\$S20,000–49,999	722	38.3	25	10.2		0.6	0.2	1.3	0.190
\$S50,000 and above	428	21.9	26	8.1		Ref.			

OR was derived from logistic regression model after adjusting for covariates.

Table 2
Type of gambling, amount spent and family history of gamblers by two age groups (n = 2252).

	Gamblers aged 18–59 years (N = 1990)		Gamblers aged 60 and older (N = 262) years		P value
	N	%	N	%	
<i>Type of gambling</i>					
Played cards for money	596	34.7	35	14.6	<0.001
Bet on horses	92	4.0	22	9.4	0.002
Bet on sport	204	11.3	5	1.0	<0.001
Played dice games	113	6.5	2	0.9	0.008
Went to casinos	378	22.7	39	17.6	0.140
Played the numbers or bet on lotteries	1640	81.9	239	91.3	0.004
Played bingo	140	6.5	15	5.3	0.551
Played the stock	330	19.5	42	19.2	0.933
Played slot machines	313	17.9	31	14.1	0.235
Bowled, shot pool, played golf or other game of skill for money	136	5.2	9	3.5	0.346
Played pull tabs	47	2.5	4	1.4	0.368
Mahjong	106	8.5	20	13.7	0.042
Others	6	0.2	1	0.8	0.215
<i>Amount spent (in SGD)</i>					
\$1 or less	90	3.4	8	1.6	0.390
More than \$1.00 up to \$10.00	814	34.9	126	41.6	
More than \$10.00 up to \$100.00	712	38.5	92	38.0	
More than \$100.00 up to \$1,000.00	271	16.8	24	12.1	
More than \$1,000.00 up to \$10,000.00	71	4.4	8	4.6	
More than \$10,000.00	32	2.1	4	2.1	
<i>Family/relatives with a gambling problem</i>					
Father	129	8.0	5	2.5	0.015
Brother/sister	93	5.7	5	2.6	0.100
Children	3	0.1	1	0.8	0.065
A friend	103	5.1	10	2.1	0.032
Mother	43	3.1	1	0.4	0.023
Spouse/partner	35	1.7	8	4.6	0.015
Another relative	95	5.9	2	0.8	0.015

of “older adult,” the type of gambling activity investigated, and the definition of gambling (Tse et al., 2012). Nevertheless the prevalence rate was comparable to that of the study by Tse et al. (Tse et al., 2013) conducted in Singapore on adults aged 55 years and above using the CPGI, where the reported lifetime participation rate for the sample of 3010 older adults was 56.2%.

Several sociodemographic factors were found to be associated with gambling. Those belonging to Malay ethnicity were less likely to be older gamblers; this finding was expected as there are religious restrictions on gambling in Islam. While those of Indian ethnicity were less likely to be older gamblers as compared to those of Chinese ethnicity, the difference was not significant. More research on the gambling behavior among Indians is needed as there is presently very little empirical data available on this population.

As reported in previous studies, we found that older gamblers were likely to be males. It has been suggested that males are the main breadwinners of the family and believe they have the right to spend money in any way they deem fit without interference from friends and families (Zheng et al., 2010), unlike females. Ohtsuka and Chan (Ohtsuka and Chan, 2009) similarly alluded to cultural stereotypes that “good” women should not gamble and that their expected social role in the Chinese society is predominantly that of the caregivers who attend to family duties, while explaining biases in portrayal of male and female gamblers in Chinese movies. Such cultural expectations and associated stigma could have led to under-reporting of gambling behavior by women.

Older gamblers were also more likely to be married or widowed (vs. never married), with primary and secondary education (vs. university)

Table 3
Prevalence of and odds ratio for lifetime mental disorders among gamblers aged 18–59 years, and gamblers aged 60 years and older.

	Gamblers aged 18–59 years (N = 1990)		Gamblers aged 60 years and older (N = 262)		Gamblers aged 60 years and older vs. Gamblers aged 19–59 years							
	n	%	n	%	Unadjusted			Adjusted ^a				
					OR	95% CI	P-value	OR	95% CI	P-value		
MDD	152	5.9	10	3.5	0.6	0.2	1.5	0.305	1.4	0.6	3.4	0.480
Bipolar disorder	38	1.5	0									
GAD	23	0.8	1	0.01								
OCD	90	3.9	4	1.0	0.1	0.02	0.9	0.035	0.3	0.05	1.04	0.174
Alcohol abuse	124	4.7	10	2.8	0.7	0.3	1.7	0.437	1.2	0.4	3.7	0.748
Alcohol dependence	25	0.7	1	0.1								
Any mental disorder	360	14.3	22	6.9	0.5	0.3	0.9	0.028	1.1	0.5	2.1	0.845
Pathological gambling	98	5.4	6	4.0	0.9	0.4	2.1	0.722	0.4	0.2	0.95	0.039
Nicotine dependence	154	6.0	12	4.0	0.7	0.3	1.7	0.456	0.5	0.2	1.7	0.277

Note:

MDD: Major Depressive Disorder; GAD: Generalized Anxiety Disorder; OCD: Obsessive Compulsive Disorder.

Significance set at P-value <0.05.

^a Adjusted by gender, ethnicity, marital status, education, employment and income.

Table 4

Prevalence of and odds ratio for lifetime chronic medical conditions among gamblers aged 18–59 years, and gamblers aged 60 years and older.

	Gamblers aged 18–59 (N = 1990)		Gamblers aged 60 and older (N = 262)		Gamblers aged 60 years and older vs. gamblers aged 18–59 years							
	n	%	n	%	Unadjusted			Adjusted*				
					OR	95% CI	P-value	OR	95% CI	P-value		
Respiratory conditions	224	9.6	23	8.0	0.6	0.3	1.3	0.201	0.6	0.3	1.1	0.113
Diabetes	131	5.5	69	23.4	5.7	3.6	9.0	<0.001	3.2	1.8	5.7	<0.001
High blood pressure	268	13.8	144	60.0	9.4	6.5	13.6	<0.001	4.9	3.1	7.6	<0.001
Chronic pain	318	14.7	61	23.7	1.5	0.98	2.3	0.061	1.3	0.8	2.2	0.280
Cancer	7	0.5	6	2.6	5.3	1.1	24.8	0.034	2.0	0.6	6.8	0.263
Neurological conditions	67	3.9	19	7.8	2.3	1.2	4.6	0.017	2.0	0.8	5.0	0.118
Cardiovascular disease	53	2.1	36	11.8	6.3	3.3	12.0	<0.001	1.9	0.9	4.3	0.098
Ulcer	44	2.1	13	5.3	2.6	1.1	6.1	0.024	2.3	0.9	5.8	0.072
Any chronic physical condition	806	38.4	200	76.9	4.6	3.1	6.9	<0.001	3.1	2.0	4.9	<0.001

Note: *Adjusted by gender, ethnicity, marital status, education, employment and income; Significance set at P-value <0.05

and were economically inactive (vs. employed). It is unclear why being married is associated with increased odds of gambling in this sample. Nevertheless, it is important to highlight that participation in controlled, recreational gambling is not akin to problem gambling. Rather, it could be that older married individuals are more financially stable and may have more disposable income for recreational gambling. Unfortunately, due to the lack of statistical power, we were unable to test the association between marital status and pathological gambling. A growing body of evidence indicates that a variety of health problems including problem gambling have social determinants (Evans and Delfabbro, 2005). McCready et al. (McCready et al., 2008) reported that increasing education for example reduces gambling-related problems.

Results from the current study indicate that the prevalence of pathological gambling among those aged 60 years and above was 2%, while among those with a history of lifetime gambling (i.e. have ever gambled in their life) was 4%. Lifetime prevalence of pathological gambling among older adults in other population-based studies has been reported as 0.29% (among those aged 60 years and above, USA) (Pietrzak et al., 2007), 0.3% (aged 65 years and older, NZ) (Abbott and Volberg, 2000) and 0.8% (aged 55 years and above, USA) among older adults (Volberg and McNeilly, 2003).

The overall prevalence of gambling as well as pathological gambling was higher in those aged 18–59 years as compared to those aged 60 years and above. Consistent with findings from previous studies (Desai et al., 2007; Volberg et al., 2006), older adults who gamble had significantly lower odds of having pathological gambling than those in the younger age group after adjusting for demographic variables in multiple logistic regression analyses. Studies comparing the prevalence rates of pathological gambling between older and younger adults (Desai et al., 2007; Volberg et al., 2006) have reported that the prevalence rates of both current and lifetime pathological gambling among older adults were lower than those among younger adults. Welte et al. (Welte et al., 2011) examined gambling across the lifespan and reported that the percentage of respondents who gambled in the past year peaks in the age range of 22 to 30, frequent gambling peaks in the 30s to 50s, and problem gambling peaks between the ages 31 and 40. The authors speculated that the age-related decline in gambling is a developmental effect, and a part of the general decline in problem behaviors which occurs with age. The higher odds of pathological gambling in the younger

gamblers are a cause for concern. Studies have shown that younger gamblers have more legal, drug and alcohol problems (Petry, 2002) and are at a higher risk of treatment drop-out (Jiménez-Murcia et al., 2015). Longitudinal studies in the local population are needed to better understand the onset, course and outcomes in these two groups.

Older gamblers had significantly higher rates of involvement in playing numbers or betting on lotteries, betting on horses and playing Mahjong as compared to younger adults.

A number of studies on older adults have similarly reported that the most prevalent form of gambling was lottery gambling (Volberg and McNeilly, 2003; Levens et al., 2005). It is postulated that forms of gambling based on pure chance, which have relatively low personal engagement but high potential payouts seem to be preferred by older adults (Wiebe et al., 2004). The preference for horse racing and Mahjong gambling (considered strategic forms of gambling) differ from the results of Nower and Blaszczynski (2008) who found that older adults were significantly less likely than younger adults to engage in strategic and mixed forms of play and more likely to prefer nonstrategic gambling activities such as video poker and slot machines. The preference for horse race gambling among older adults is unique to our study; however we are unable to provide reasons for the same. Mahjong is a four-player gambling game which originated in China and is played in Chinese communities across the World (Papineau, 2000). Studies suggest that, Mahjong is especially popular with women and the older generation (Scull, 2003; Tang et al., 2007; Scull and Woolcock, 2005), and there is some evidence to show that participation can prevent mental deterioration associated with old-age (Cheng et al., 2006). The game has strong cultural roots with many Chinese learning the game at a very young age, usually through exposure to game-play by family and friends. Often, the game is played during important occasions like the Chinese New Year celebrations. Given the strong traditions and cultural roots of the game, it is not surprising that those of the older age group had a higher association with this game in our population where Chinese are the majority ethnic group.

The current study also examined co-occurring psychiatric and physical illnesses among older adult gamblers. Gamblers aged 60 and older had significantly higher odds of having diabetes and high blood pressure/hypertension in our study. Older adults overall are at an increased risk for serious health conditions. Disordered gambling has

Table 5

Comparison of EQ-5D index scores among gamblers aged 18 years, and gamblers aged 60 years and older.

	Gamblers aged 18–59 years (N = 1990)		Gamblers aged 60 years and older (N = 262)		Statistical significance		Statistical significance	
	N	Mean	n	Mean	t	P value ^a	t	P value ^b
EQ-5D UK index	1691	0.95	221	0.932	2.38	0.017	1.14	0.255

^a Independent T test.^b Multiple linear regression adjusted for gender, ethnicity, marital status, education, employment and income.

been significantly associated with nicotine dependence (Grant et al., 2009; Petry et al., 2005), and smoking in turn is associated with the development of heart disease (Kannel et al., 2000). It is thus suggested that medical disorders such as hypertension and heart disease may be more common in older adults with a history of disordered gambling due to exposure to both direct and/or secondhand smoke in gambling venues (Pietrzak et al., 2007). Gambling can be a stressful activity especially when associated with financial losses, marital discord or other social problems. This in turn may further increase their susceptibility to gamble for reasons such as to divert attention from their problems, to seek fun and excitement or to chase losses, thus creating a vicious cycle which increases the risk of chronic medical conditions. It is also possible that gambling being a sedentary activity may increase the risk for chronic diseases like diabetes and hypertension (Pietrzak et al., 2007). However, most of the associations between poor physical health and gambling have been established among those with disordered gambling in other studies (Erickson et al., 2005). Desai et al. (2004) on the other hand reported that higher rates of good to excellent subjective general health in recreational gamblers were mainly attributable to the older age group. However it is important to note that those with disordered gambling were excluded from their study.

Our study had several limitations. This was a household survey that excluded those in institutional settings including the prison population. Since the design of the survey was cross-sectional it was not possible to establish a causal relationship between gambling and other comorbid disorders. Lastly, we did not establish help-seeking behavior among gamblers. However, the strengths of the study are that it is a nationwide survey that comprehensively examined socio-demographic correlates, and comorbidity among gamblers in a multi-ethnic Asian community. Diagnoses of mental disorders were established using structured interview based on DSM-IV criteria using face to face interview techniques. It is also among one of the few community surveys that examined the association of gambling with chronic physical conditions and quality of life. Our high response rate of about 76% ensures the generalizability of our findings in this population.

More research is needed to understand gambling among older adults. For the majority of older adults gambling remains a recreational activity that is entertaining and a way of socialization. However, it remains important to be aware of the possible risks for some to develop disordered gambling. Financial problems associated with gambling are particularly concerning for older adults who gamble. Since they are likely to be on fixed incomes and have limited ability to work they may not be able to recover financially as quickly as those who are working for full incomes. Thus the economic consequences of pathological gambling are likely to be more severe, both for the individuals concerned and for society as well. Fewer older gamblers call gambling helplines (Potenza et al., 2006) or are seen in treatment programs (Petry, 2002), thus studies to understand help-seeking and barriers to care are needed. Lastly longitudinal, in-depth studies on both younger and older adults who gamble would provide more clarity into the course, and effects of gambling in these populations.

Conflicts of interest

The authors have no conflict of interest to declare.

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