Suicidal Ideation and Familicidal-Suicidal Ideation Among Individuals Presenting to Problem Gambling Services

A Retrospective Data Analysis

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Abstract. *Background:* Studies have consistently reported high rates of suicidal ideation (SI) among individuals with disordered gambling. None have explored gambling-related familicidal-suicidal ideation (FSI). *Aims:* This study examined the (1) prevalence of SI and FSI among treatment-seeking gamblers in Hong Kong, (2) characteristic profile of factors associated with SI and FSI, and (3) factors that predict SI and FSI. *Method: Design*. A retrospective analysis of data collected at initial clinical assessments. *Setting*. A specialized gambling counseling center in Hong Kong. *Participants*. Gamblers (N = 3,686) sought treatment at the center between 2003 and 2012. *Measurement*. Socio-gambling demographics, physical, mental health and current presenting problems, self-rated South Oaks Gambling Screen (SOGS, Chinese version), and occurrence of SI or FSI were examined. *Statistical Analysis*. Descriptive analysis and ordinal regression analysis.[author: please incorporate Design, Participants, Measurement, and Statistics info into Method section] *Results:* In our sample, 720 (20.0%) individuals reported SI, and 22 (0.6%) individuals reported FSI at the initial assessment. Individuals with SI and FSI differed from the nonsuicidal individuals in terms of their demographics, gambling experiences and severity, mental and physical wellbeing, and types of gambling-related problems. The adjusted ordinal regression model shows that participating in table games in casinos and having familial and financial problems seem to enhance the likelihood of having SI and FSI. *Conclusion:* While mental health issues are significantly related to SI and FSI among gambling treatment seekers, the impacts of physical, family, and financial strains should not be underestimated.

Keywords: counseling, suicidality, gambling, Chinese, Hong Kong

Prevalence rates for adult disordered gambling (problem and pathological), now known as gambling disorder as listed in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013) range from 0.2 to 5.3% (Hodgins, Stea, & Grant, 2011) with further increases anticipated in response to the continued expansion of legalized gambling opportunities (Stucki & Rihs-Middel, 2007). In the Pan-Pacific region, there has been an almost fivefold increase from 16 to 77 in the number of casinos between 1995 and 2010 (Tse, Rossen, & Wang, 2010). Disordered gambling is associated with impaired work and family functions, bankruptcy, child neglect, domestic violence, and criminal involvement (Ashley & Boehlke, 2012; Potenza, Kosten, & Rounsaville, 2011;). Gambling-related problems may also increase the risk and prevalence of suicide among vulnerable individuals (Middleton & Latif, 2007; Phillips, Welty, & Smith, 1997).

Many studies have reported positive relationships between disordered gambling and suicidal ideation (SI) and suicide attempt among the general population (Hodgins, Mansley, & Thygesen, 2006; Ledgerwood & Petry, 2004; Newman & Thompson, 2003; Pfhulmann & Schmidtke, 2002). Among individuals presenting to problem gambling services, the lifetime prevalence of SI and number of attempts were between 36 and 50% (Lejoyeux, Feuche, Loi,

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Solomon, & Ades, 1999) and between 4 and 40% (Battersby, Tolchard, Scurrah, & Thomas, 2006; Brewer, Potenza, & Desai, 2010; Seguin et al., 2010;). The wide range in prevalence rate may be attributed to the small number of studies that have been conducted among this population. Moreover, treatment seekers experiencing SI and attempted suicide also reported having started gambling at an earlier age, greater frequency of theft, and more gambling-related problems (Battersby et al., 2006; Frank, Lester, & Wexler, 1991). Petry and Kiluk **[author: ref correct?]** (2002) surveyed 362 people with pathological gambling at intake and reported that 32% had SI and 17% had made attempts. Those with SI had spent more money on gambling in the month before entering treatment, and had a more severe gambling problem as measured by the South Oaks Gambling Screen (SOGS).

There is anecdotal evidence (Anderson, Sisask, & Varnik, 2011) to suggest that gambling and gambling-related debts are related to familicide-suicide – the killing of a family member after which the perpetrator completes suicide within 1 week (Yip, Wong, Cheung, Chan, & Beh, 2009). In a previous study in Hong Kong, it was found that about 16.9% of all homicide-suicide cases in 1989–2005 were familicide-suicides and the killing of an intimate partner and/or children was most commonly related to financial reasons (Yip et al., 2009). Gambling accounts for 33% of the cause of unmanageable indebtedness among the suicides in Hong Kong (Yip, Yang, Ip, Law, & Watson, 2007). No known studies, however, have examined the relationship between gambling and familicidal-suicidal ideation and behaviors. The aims of this study were: (1) to identify the prevalence of SI and FSI among individuals with gambling problems; (2) to compare individuals with and without SI or FSI; and (3) to identify factors that may help to predict the occurrence of SI and FSI.

Method

Participants

Hong Kong residents have easy access to multiple forms of legal gambling such as horse racing and casino table games in Macau (frequent 60-min ferry rides from Hong Kong). Between 2003 and early 2012, 3,686 individuals with gambling problems sought services from the Caritas Addicted Gamblers Counseling Centre, one of the four counseling and treatment centers on gambling in Hong Kong. We extracted data of the intake clinical assessment of the 3,686 individuals to examine their SI and FSI at the time of seeking help. No identifying information about individual clients was included in the extracted data, and participants remained completely anonymous.

Procedure

Every individual who seeks treatment services from the center is required to complete an assessment with a gambling addiction counselor, and the client report information from this assessment provides much of the data entered into the database. The intake clinical assessment collects information mainly on individuals' demographic characteristics, gambling-related behaviors, and other presenting problems. They are also required to complete a self-rated SOGS for assessing the severity of their gambling problems. They are informed that the information is collected for tabulation of center statistics and for research purposes, and that no individually identifiable information would be reported. Oral consent is obtained from clients prior to completing the assessment form. The Human Research Ethics Committee for Nonclinical Faculties, The University of Hong Kong (EA480212), approved this study.

Measurements

Demographic Information

Basic personal information such as gender, age, education level, referral source, marital status, occupation, residential district, individual monthly income, indebtedness, and declaration of bankruptcy were collected.

Suicidal Ideation and Familicidal-Suicidal Ideation

SI was assessed as whether the individual had ever considered committing suicide at the time of the intake assessment, while FSI was assessed as whether they had ever thought of taking the life of their family member(s) before completing suicide. Two items were used at the intake of assessment: (1) "I thought of taking my life (yes/no)"; (2) if yes, "I would take my family members with me together (yes/no)." If the individuals reported yes to both items, they were classified as individuals with FSI. Those who did not report any SI or FSI at the intake, also termed individuals with nonsuicidal ideation (non-SI), served as the control comparison group in this study.

Severity and Types of Gambling Behavior

The severity of gamblers was assessed by the Chinese version of the self-administrated SOGS, which comprises 20 evenly weighed dichotomous items; for example, "Did you ever gamble more than you intended to?"; "Have people criticized your betting or told you that you had a problem, regardless of whether or not you thought it was true?"; "Have you ever felt guilty about the way you gamble, or what happens when you gamble?"; "Have you ever felt like you would like to stop betting money on gambling, but didn't think you could?" Scoring one on each item indicated affirmative response (i.e., responding *yes*; Lesieur & Blume, 1987). The Chinese version of the SOGS was validated with internal consistency estimates of Cronbach's α equal to .69 among treatment-seeking gam-

blers in a former study (Tang, Wu, Tang, & Yan, 2010). In our sample, Cronbach's α in the standardized Chinese SOGS was .68. The number of valid observations for the reliability test was 2,981 (response rate was 80% of the entire sample of 3,686 cases). The severity was categorized based on the SOGS scores (0–4 as *normal*, 5–6 as *possible risk of developing gambling problem*, 7–9 as *significant gambling problem*, and 10 or higher as *pathological gambling*; Battersby et al., 2006). We also examined other gambling-related information to enrich the internal validity of the study such as years of gambling experience, the age of onset of gambling behaviors, and whether they were engaging in particular gambling entertainment such as legal or illegal bets on soccer, horse races, Internet gambling, and buying lottery tickets.

Physical and Psychological Wellness

Dichotomous items were included to assess the occurrence of somatic discomfort, emotional distress, insomnia, loss of appetite, and the lack of motivation to work. Other concurrently encountering problems such as family, work, financial, and mental health problems were also examined.

Statistical Analysis

There were two major steps in the analyses. First, we studied the prevalence of SI and FSI and the similarities and differences between individuals with SI, FSI, and non-SI using descriptive analyses and Pearson χ^2 tests. Second, variables that showed significant differences between the groups in the χ^2 tests were selected to examine their associations with the occurrence of SI or FSI by ordinal regression analyses controlled for age and gender. Ordinal regression analysis was chosen as the analysis method because we assumed that individuals normally progress from not having SI, to having SI, to having FSI, and ordinal regression analysis is suitable for predicting a dependent variable that has an escalating and ordinal nature. Listwise deletion, which was agreed to be a robust method for handling missing data (Allison, 2001) that counts only the cases with a complete set of data, was adopted to handle missing values in the other variables. All analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 20.

Results

Table 1 shows the demographic information of our sample. Overall, the sample was predominantly male (n = 3,172, 86.2%), most (73.2%) received secondary education, and 62.1% were aged between 30 and 49 years. The median and the modal class of individual monthly income among the individuals (n = 1,132, 30.7%) were HK $5,001–10,000 (equivalent to US $641–1,280). Most of them (n = 875, 23.9%) had gambled for 21–30 years and around 60% of the whole sample started to gamble before the age of 20. Most individuals (n = 2,287, 62.1%) were self-referred to the treatment center.

Prevalence Rates of SI and FSI

About 20% (n = 720) of the individuals reported SI and 0.6% (n = 22) reported FSI at the time of intake assessment. Table 1 shows the characteristics of the FSI, SI, and the nonsuicidal groups. In all, 40.9% of individuals with FSI reported suffering from physical problems (SI = 25.4%, non-SI = 13.4%), 68.2% reported having insomnia (SI = 57.1%, non-SI = 32.6%), 59.1% reported loss of appetite (SI = 16.8%, non-SI = 33.1%), and 63.6% reported lack of motivation to work (SI = 42.6%, non-SI = 26.0%). Individuals with FSI reported having more problems in life than the other two groups; for instance, 86.4% in the FSI group (SI = 72.5%, non-SI = 63.0%) were concurrently encountering family problems. Among the FSI group there were also higher percentages of work-related problems (FSI = 59.1%, SI = 38.5%, non-SI = 28.3%) and mental health status problems (FSI = 68.2%, SI = 47.9%, non-SI = 43.0%). For gambling severity, the proportion of individuals with SI among the groups of normal, possibly at risk, significant gambling problem, and pathological gamblers was 7.5% (3/40), 17.6% (15/85), 13.0% (59/453), and 22.7% (588/2,596), respectively.

Comparisons Between the Non-SI, SI, and FSI Groups

Table 2 shows the results of the four adjusted multivariate binary logistic regressions that were conducted to examine the similarities and differences in the profiles of individuals with and without SI or FSI controlled for age and gender. Individuals with FSI were about nine times more likely to be referred to treatment by others and around six times more likely to have appetite problems. Individuals with SI and FSI were, in general, very different from those without SI.

Predictors of SI and FSI

Table 3 shows the statistically significant results of Pearson's χ^2 tests for three pairs of comparisons: (1) individuals with SI or FSI versus non-SI; (2) those with SI only versus non-SI; and (3) those with FSI only versus non-SI. In the first comparison group, correlates with $p \leq .05$ were chosen as predictors of SI/FSI to be included in the multivariate ordinal analysis. Variables that show significantly different **[author: change ok?]**results in this comparison are indicated with asterisks. The results indicate that the SI/FSI group was more likely to report physical problems (25.6% of SI/FSI group, 13.4% of non-SI group), emotional problems (86.3% of SI/FSI group, 75.8% of non-SI

Table 1. Demographics of the sample (N = 3,685)

	None (n = 2,943)		SI (n = 720)		FSI (n = 22)		Total (N = 3,685)	
	n	%	*n*	%	*n*	%	*n*	%
Gender								
Male	2,577	87.60%	576	80.00%	18	81.80%	3,171	86.05%
Female	366	12.40%	144	20.00%	4	18.20%	514	13.95%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Age group								
18 or below	6	0.20%	1	0.10%	0	0.00%	7	0.19%
19–25	220	7.50%	31	4.30%	1	4.50%	252	6.84%
26–29	297	10.10%	66	9.20%	1	4.50%	364	9.88%
30–39	906	30.80%	239	33.20%	6	27.30%	1,151	31.23%
40–49	907	30.80%	220	30.60%	11	50.00%	1,138	30.88%
50–59	503	17.10%	129	17.90%	3	13.60%	635	17.23%
60 or above	104	3.50%	34	4.70%	0	0.00%	138	3.74%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Residential district								
New Territories	2296	78.20%	552	77.20%	16	72.73%	2864	77.97%
Kowloon	510	17.37%	136	19.02%	5	22.73%	651	17.72%
Hong Kong Island	29	0.99%	9	1.26%	0	0.00%	38	1.03%
Islands	61	2.08%	15	2.10%	0	0.00%	76	2.07%
Others	40	1.36%	3	0.42%	1	4.55%	44	1.20%
Total	2936	100.00%	715	100.00%	22	100.00%	3673	100.00%
Education attainment								
Not educated	24	0.80%	7	1.00%	0	0.00%	31	0.85%
Primary	442	15.20%	122	17.10%	2	9.10%	566	15.52%
Secondary	2,133	73.30%	516	72.30%	18	81.80%	2,667	73.15%
Tertiary	311	10.70%	69	9.70%	2	9.10%	382	10.48%
Total	2,910	100.00%	714	100.00%	22	100.00%	3,646	100.00%
Marital status								
Never married	786	26.70%	183	25.40%	2	9.10%	971	26.36%
Married	1,739	59.10%	397	55.10%	15	68.20%	2,151	58.39%
Widowed	36	1.20%	17	2.40%	0	0.00%	53	1.44%
Divorced	193	6.60%	75	10.40%	0	0.00%	268	7.27%
Separated	74	2.50%	22	3.10%	1	4.50%	97	2.63%
Cohabiting	75	2.50%	15	2.10%	2	9.10%	92	2.50%
Remarried	38	1.30%	10	1.40%	2	9.10%	50	1.36%
Other	1	0.00%	1	0.10%	0	0.00%	2	0.05%
Total	2,942	100.00%	720	100.00%	22	100.00%	3,684	100.00%
Income (HKD)								
$0	413	14.40%	165	23.80%	5	23.80%	583	16.31%
$1–$5,000	137	4.80%	38	5.50%	0	0.00%	175	4.90%
$5,001–$10,000	903	31.60%	220	31.70%	8	38.10%	1,131	31.65%
$10,001–$15,000	692	24.20%	131	18.90%	6	28.60%	829	23.20%
$15,001–$20,000	352	12.30%	72	10.40%	0	0.00%	424	11.86%
$20,001–$25,000	146	5.10%	34	4.90%	0	0.00%	180	5.04%
$25,001–$30,000	91	3.20%	17	2.40%	1	4.80%	109	3.05%

Table 1. Demographics of the sample (*N* = 3,685) (*continuation*)

	None (*n* = 2,943)		SI (*n* = 720)		FSI (*n* = 22)		Total (*N* = 3,685)	
	n	%	*n*	%	*n*	%	*n*	%
$30,001–$40,000	61	2.10%	8	1.20%	0	0.00%	69	1.93%
$40,001 or above	64	2.20%	9	1.30%	1	4.80%	74	2.07%
Total	2,859	100.00%	694	100.00%	21	100.00%	3,574	100.00%
referral source								
Self-referral	1,804	61.30%	469	65.14%	14	63.64%	2,287	62.06%
Relatives and friends	877	29.80%	161	22.36%	4	18.18%	1,042	28.28%
Organization	254	8.63%	89	12.36%	4	18.18%	347	9.42%
Others	8	0.27%	1	0.14%	0	0.00%	9	0.24%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Amount of debt								
Below $50,000	503	17.30%	84	11.70%	3	13.60%	590	16.18%
$50,001–$100,000	447	15.40%	104	14.50%	3	13.60%	554	15.19%
$100,001–$200,000	606	20.80%	180	25.20%	5	22.70%	791	21.69%
$200,001–$300,000	344	11.80%	74	10.30%	3	13.60%	421	11.54%
$300,001–$400,000	220	7.60%	59	8.30%	1	4.50%	280	7.68%
$400,001–$500,000	121	4.20%	30	4.20%	2	9.10%	153	4.20%
$500,001–$600,000	72	2.50%	26	3.60%	0	0.00%	98	2.69%
Above $600,001	215	7.40%	93	13.00%	2	9.10%	310	8.50%
None	382	13.10%	65	9.10%	3	13.60%	450	12.34%
Total	2,910	100.00%	715	100.00%	22	100.00%	3,647	100.00%
Years of gambling								
0–5	369	12.60%	79	11.00%	1	4.80%	449	12.26%
6–10	477	16.30%	128	17.90%	4	19.00%	609	16.63%
11–15	498	17.00%	114	15.90%	2	9.50%	614	16.77%
16–20	481	16.40%	141	19.70%	7	33.30%	629	17.18%
21–30	724	24.80%	149	20.80%	2	9.50%	875	23.89%
31–40	287	9.80%	84	11.70%	5	23.80%	376	10.27%
41–50	70	2.40%	21	2.90%	0	0.00%	91	2.48%
Above 50 years	19	0.60%	0	0.00%	0	0.00%	19	0.52%
Total	2,925	100.00%	716	100.00%	21	100.00%	3,662	100.00%
Onset of gambling behavior (age)								
10 or below	112	3.80%	27	3.80%	0	0.00%	139	3.81%
11–15	453	15.50%	88	12.40%	3	14.30%	544	14.91%
16–20	1,180	40.50%	275	38.60%	7	33.30%	1,462	40.07%
21–25	571	19.60%	136	19.10%	2	9.50%	709	19.43%
26–30	252	8.60%	72	10.10%	4	19.00%	328	8.99%
31–35	140	4.80%	41	5.80%	1	4.80%	182	4.99%
36–40	92	3.20%	31	4.40%	4	19.00%	127	3.48%
41–50	97	3.30%	37	5.20%	0	0.00%	134	3.67%
Above 50	19	0.70%	5	0.70%	0	0.00%	24	0.66%
Total	2,916	100.00%	712	100.00%	21	100.00%	3,649	100.00%
Severity of gambling (SOGS score)								
Normal	40	1.54%	3	0.45%	1	5.00%	44	1.34%
Possible risk of developing gambling Problem	73	2.82%	16	2.40%	0	0.00%	89	2.72%

Table 1. Demographics of the sample (*N* = 3,685) (*continuation*)

	None (*n* = 2,943)		SI (*n* = 720)		FSI (*n* = 22)		Total (*N* = 3,685)	
	n	%	*n*	%	*n*	%	*n*	%
Significant gambling problem	413	15.95%	59	8.86%	1	5.00%	473	14.44%
Pathological gambling	2,063	79.68%	588	88.29%	18	90.00%	2,669	81.50%
	2,589	100.00%	666	100.00%	20	100.00%	3,275	100.00%
Gambling activities								
Gambling in casinos								
Yes	1,540	52.33%	452	62.78%	14	63.64%	2,006	54.44%
No	1,403	47.67%	268	37.22%	8	36.36%	1,679	45.56%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Legal bets on horse races (HKJC)								
Yes	1,881	63.91%	428	59.44%	13	59.09%	2,322	63.01%
No	1,062	36.09%	292	40.56%	9	40.91%	1,363	36.99%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Illegal bets on horse races								
Yes	85	2.95%	36	5.12%	0	0.00%	121	3.28%
No	2,801	97.05%	667	94.88%	22	100.00%	3,490	94.71%
Total	2,886	100.00%	703	100.00%	22	100.00%	3,611	97.99%
Legal bets on soccer (HKJC)								
Yes	1,637	55.62%	362	50.28%	7	31.82%	2,006	54.44%
No	1,306	44.38%	358	49.72%	15	68.18%	1,679	45.56%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Illegal bets on soccer								
Yes	174	6.03%	62	8.81%	0	0.00%	236	6.54%
No	2,711	93.97%	642	91.19%	22	100.00%	3,375	93.46%
Total	2,885	100.00%	704	100.00%	22	100.00%	3,611	100.00%
Mahjong								
Yes	1,004	34.13%	264	36.67%	11	50.00%	1,279	34.72%
No	1,938	65.87%	456	63.33%	11	50.00%	2,405	65.28%
Total	2,942	100.00%	720	100.00%	22	100.00%	3,684	100.00%
Internet gambling								
Yes	87	3.01%	31	4.40%	0	0.00%	118	3.27%
No	2,800	96.99%	674	95.60%	22	100.00%	3,496	96.73%
Total	2,887	100.00%	705	100.00%	22	100.00%	3,614	100.00%
Illegal gambling								
Yes	261	8.87%	93	12.92%	2	9.09%	356	9.66%
No	2,682	91.13%	627	87.08%	20	90.91%	3,329	90.34%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Financial derivatives								
Yes	197	6.69%	64	8.89%	0	0.00%	261	7.08%
No	2,746	93.31%	656	91.11%	22	100.00%	3,424	92.92%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Lottery tickets (*Mark Six* HKJC)								
Yes	117	22.59%	39	20.97%	0	0.00%	156	22.10%
No	401	77.41%	147	79.03%	2	100.00%	550	77.9%
Total	518	100.00%	186	100.00%	2	100.00%	706	100.00%

Table 1. Demographics of the sample (*N* = 3,685) (*continuation*)

	None (*n* = 2,943)		SI (*n* = 720)		FSI (*n* = 22)		Total (*N* = 3,685)	
	n	%	*n*	%	*n*	%	*n*	%
Others								
Yes	132	4.49%	40	5.56%	0	0.00%	172	4.67%
No	2,808	95.51%	679	94.44%	22	100.00%	3,509	95.33%
Total	2,940	100.00%	719	100.00%	22	100.00%	3,681	100.00%
Physical and mental wellness								
Physical problems								
Yes	395	13.42%	183	25.42%	9	40.91%	587	15.93%
No	2,548	86.58%	537	74.58%	13	59.09%	3,098	84.07%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Emotional problems								
Yes	2,230	75.77%	621	86.25%	19	86.36%	2,870	77.88%
No	713	24.23%	99	13.75%	3	13.64%	815	22.12%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Insomnia								
Yes	959	32.59%	411	57.08%	15	68.18%	1,385	37.58%
No	1,984	67.41%	309	42.92%	7	31.82%	2,300	62.42%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Loss of appetite								
Yes	494	16.79%	238	33.06%	13	59.09%	745	20.22%
No	2,449	83.21%	482	66.94%	9	40.91%	2,940	79.78%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Unmotivated at work								
Yes	765	25.99%	307	42.64%	14	63.64%	1,086	29.47%
No	2,178	74.01%	413	57.36%	8	36.36%	2,599	70.53%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Other presenting problem								
Family								
Yes	1,855	63.03%	522	72.50%	19	86.36%	2,396	65.02%
No	1,088	36.97%	198	27.50%	3	13.64%	1,289	34.98%
Total	2,943	100.00%	720	100.00%	22	100.00%	3,685	100.00%
Work								
Yes	834	28.35%	277	38.47%	13	59.09%	1,124	30.51%
No	2,108	71.65%	443	61.53%	9	40.91%	2,560	69.49%
Total	2,942	100.00%	720	100.00%	22	100.00%	3,684	100.00%
Mental health								
Yes	1,263	42.96%	345	47.92%	15	68.18%	1,623	44.08%
No	1,677	57.04%	375	52.08%	7	31.82%	2,059	55.92%
Total	2,940	100.00%	720	100.00%	22	100.00%	3,682	100.00%
Finance								
Yes	2,263	76.89%	626	86.94%	19	86.36%	2,908	78.91%
No	680	23.11%	94	13.06%	3	13.64%	777	21.09%
Total	2943	100.00%	720	100.00%	22	100.00%	3,685	100.00%

Note. HKJC: Hong Kong Jockey Club.

Table 2. Multivariate binary logistic regression models, controlled for age and gender

	FSI vs. SI[a]		SI vs. none		FSI vs. none		SI or FSI vs. none	
	OR (95% CI)	*p*	OR (95% CI)	*p*	OR (95% CI)	*p*	OR (95% CI)	*p*
Referral source								
Self-referral	1.00 (Reference)		1.00 (Reference)		1.00 (Reference)		1.00 (Reference)	
Relatives and friends			0.76 (0.61–0.95)	.02			0.75 (0.60–0.93)	.01
Organization	9.49 (1.01–89.38)	.05						
Income (HKD)								
$0	1.00 (Reference)		1.00 (Reference)		1.00 (Reference)		1.00 (Reference)	
$1–$5,000			0.61 (0.38–0.96)	.03			0.59 (0.37–0.93)	.02
$5,001–$10,000			0.68 (0.52–0.90)	.01			0.69 (0.52–0.90)	.01
$10,001–$15,000			0.49 (0.36–0.67)	.00			0.50 (0.37–0.68)	.00
$15,001–$20,000			0.53 (0.36–0.77)	.00			0.52 (0.36–0.75)	.00
$20,001–$25,000			0.46 (0.28–0.75)	.00			0.45 (0.27–0.73)	.00
$25,001–$30,000			0.38 (0.20–0.70)	.00			0.36 (0.19–0.68)	.00
$30,001–$40,000			0.30 (0.13–0.69)	.00			0.29 (0.13–0.66)	.00
$40,001 or above			0.29 (0.13–0.64)	.00			0.30 (0.14–0.66)	.00
Amount of debt (HKD)								
Below $50,000	1.00 (Reference)		1.00 (Reference)		1.00 (Reference)		1.00 (Reference)	
$50,001–$100,000			1.47 (1.03–2.09)	.03			1.46 (1.03–2.07)	.03
$100,001–$200,000			2.03 (1.48–2.81)	.00			2.01 (1.46–2.77)	.00
$200,001–$300,000			1.52 (1.03–2.24)	.03			1.53 (1.05–2.25)	.03
$300,001–$400,000			2.16 (1.41–3.32)	.00			2.16 (1.41–3.31)	.00
$400,001–$500,000			2.40 (1.42–4.06)	.00			2.51 (1.50–4.20)	.00
$500,001–$600,000			2.85 (1.61–5.06)	.00			2.81 (1.58–4.98)	.00
Above $600,001			3.41 (2.27–5.12)	.00			3.42 (2.28–5.12)	.00
None			1.55 (1.01–2.38)	.04			1.56 (1.02–2.38)	.04
Years of gambling								
0–5	1.00 (Reference)		1.00 (Reference)		1.00 (Reference)		1.00 (Reference)	
6–10			1.53 (1.06–2.21)	.02			1.57 (1.09–2.25)	.02
11–15								
16–20			1.81 (1.17–2.78)	.01			1.93 (1.26–2.95)	.00
21–30								
31–40			2.06 (1.17–3.62)	.01			2.28 (1.31–3.97)	.00
41–50							2.24 (1.02–2.32)	.04
Above 50 years								
Gambling activities								
Gambling in casinos[b]			1.23 (1.02–1.49)	.03			1.23 (1.02–1.49)	03
Illegal bets on soccer games[b]			1.54 (1.01–2.35)	.05			1.56 (0.99–2.32)	.05
Physical and emotional wellness								
Physical problem[b]			1.49 (1.17–1.89)	.00			1.50 (1.18–1.90)	.00
Emotional problem[b]							1.31 (1.01–1.70)	.04
Insomnia[b]			1.88 (1.53–2.30)	.00			1.88 (1.53–2.30)	.00

Table 2. Multivariate binary logistic regression models, controlled for age and gender (*continuation*)

	FSI vs. SI[a]		SI vs. none		FSI vs. none		SI or FSI vs. none	
	OR (95% CI)	*p*	OR (95% CI)	*p*	OR (95% CI)	*p*	OR (95% CI)	*p*
Loss of appetite[b]	5.99 (1.01–35.61)	.05					1.26 (1.00–1.59)	.05
Unmotivated at work[b]			1.64 (1.33–2.02)	.00	7.58 (1.90–30.26)	.00	1.68 (1.36–2.06)	.00
Other presenting problem								
Family[b]			1.33 (1.08–1.64)	.01			1.35 (1.09–1.66)	.01
Financial[b]			1.46 (1.06–2.01)	.02			1.47 (1.07–2.01)	.02
Statistics of model-fitness								
n (response rate)	685 (92.32%)		3414 (93.20%)		2769 (93.39%)		3434 (93.1%)	
Model coefficients								
χ^2 value	102.683		415.31		116.96		440.67	
Degree of freedom	66		67		67		67	
p value	.00		.00		.00		.00	
Nagelkerke R^2	.60		.18		.50		.19	

Notes. [a]Outcome variable for columns 2, 3, 4 is *occurrence of SI,* while outcome variable for column 1 is *being FSI group.*
[b]The reference category (or the baseline) responds "no" on the dichotomous items.

group), insomnia (57.4% of SI/FSI group, 32.6% of non-SI group), loss of appetite (33.8% of SI group, 16.8% of non-SI group), and lack of motivation to work (43.3% of SI group, 26.0% of non-SI group), with all these results significantly ($p < .01$) higher compared with those without SI. Separate comparisons between the SI-only and non-SI and the FSI and non-SI groups are also presented in Table 3 for supplementary information. Significant variables ($p \leq .05$) are in bold.

Ordinal Regression Analysis

Table 4 presents the unadjusted and adjusted odds ratios of the factors to show their predictive values on the presence of SI and FSI. In general, no income and low income (OR = 3.08 and 2.18, respectively), debt amount higher than HK $600K (OR = 1.99), bankruptcy (OR = 1.39), gambling at casino (OR = 1.27), multiple physical and mental health issues, especially insomnia (OR = 1.85) and lack of motivation to work (OR = 1.64) accumulate the risk of moving from nonsuicidal to suicidal and familicidal-suicidal ideation.

Discussion

We examined the prevalence rates and identified predictors of SI and FSI among treatment-seeking individuals. First, SI was prevalent among the individuals but FSI was relatively much lower. Second, nonsuicidal individuals seem to be different from individuals with SI or FSI. Third, the significant contribution to SI and FSI made by individual incomes, amount of debt, years of gambling, physical problems, insomnia, and lack of motivation to work were identified.

We found that only a minority of treatment seekers had thought of killing their family members before completing suicide. Familicide-suicide is very rare relative to other forms of unnatural deaths (Saleva, Putkonen, Kiviruusu, & Lonnqvist, 2007). Annually, an average of four familicide-suicide cases were reported in Canada, three in England and Wales, and around 23 cases in the US (Liem, Levin, Holland, & Fox, 2013). However, familicide-suicides have profound ripple effects that shock the community and also lead to a great reliance on human services professionals in assessing and intervening in these events (Barraclough & Harris, 2002; Cooper & Eaves, 1996; Marzuk, Tardiff, & Hirsch, 1992). In a previous local study that examined 98 episodes of homicide-suicide between 1989 and 2005 in Hong Kong, 231 people had completed suicide after killing others**[author: pls check sentence, are numbers correct?]**. Among these 98 homicide-suicide incidents, about 17% were considered as altrustic acts toward family members, with financial problems, disputes, and domestic violence found to be significant precipitants of these incidents (Yip et al., 2009). Previous research on familicide has distinguished two major motivations underlying the incident: (1) murder by proxy and (2) suicide by proxy (Frazier, 1975). The first applies to perpetrators who are motivated by anger and revenge following their intimate partner's threat of withdrawal or estrangement. The second applies to the familicidal male who aims to "protect" his family from the fate that would befall them without his support. Although the motives of FSI were not assessed at the intake interview in this study, it is specu-

Table 3. Pearson's χ^2 comparisons

	SI or FSI (n = 720 + 22 = 742) and without SI (n = 2,943)				SI (n = 720) vs. without SI (n = 2,943)				FSI (n = 22) vs. without SI (n = 2,943)			
	n[b]	χ^2	df	p	n[b]	χ^2	df	p	n[b]	χ^2	df	p
Demographics												
Gender***	3,685	**27.20**	**1**	**.00**	3,663	**27.61**	**1**	**.00**	2,96,5	0.66	1	.42
Education	3,646	1.80	3	.61	3,624	2.11	3	.55	2,932	0.98	3	.81
Age group	3,685	**12.40**	**6**	**.05**	3,663	**12.77**	**6**	**.05**	2,965	4.58	6	.60
Marital status**	3,684	**19.50**	**7**	**.01**	3,662	**21.22**	**7**	**.00**	2,964	**18.37**	**7**	**.01**
Referral source***	3,685	**23.40**	**3**	**.00**	3,663	**21.68**	**3**	**.00**	2,965	3.36	3	.34
Occupation***	3,683	**53.80**	**11**	**.00**	3,661	54.30	11	.00	2,964	13.39	11	.27
Residential district	3,673	12.50	14	.57	3,651	12.01	14	.61	2,958	10.45	14	.73
Income***	3,574	**45.50**	**8**	**.00**	3,553	**45.17**	**8**	**.00**	2,880	7.56	8	.48
Amount of debt***	3,647	**48.00**	**8**	**.00**	3,625	**49.40**	**8**	**.00**	2,932	2.47	8	.96
Bankruptcy**	3,683	**4.60**	**1**	**.03**	3,661	**4.55**	**1**	**.03**	2,963	0.52	1	.47
Gambling experiences												
Years of gambling**	3,662	**20.20**	**7**	**.01**	3,641	**17.21**	**7**	**.02**	2,946	12.13	7	.10
Onset of gambling behavior (age)**	3,649	**16.70**	**8**	**.03**	3,628	14.82	8	.06	2,937	**21.74**	**8**	**.01**
Severity of gambling problems (SOGS)***	3,275	**28.70**	**3**	**.00**	3,255	**28.34**	**3**	**.00**	2,609	3.84	3	.28
Gambling activities												
Gambling in casinos***	3,685	**25.80**	**1**	**.00**	3,663	**25.47**	**1**	**.00**	2,965	1.12	1	.29
Legal bets on horse racing (HKJC[b])**	3,685	**4.90**	**1**	**.03**	3,663	**4.96**	**1**	**.03**	2,965	0.22	1	.64
Illegal bets on horse racing **	3,611	**6.70**	**1**	**.01**	3,589	**8.21**	**1**	**.00**	2,908	0.67	1	.41
Legal bets on soccer (HKJC)**	3,685	**8.10**	**1**	**.00**	3,663	**6.75**	**1**	**.01**	2,965	**5.02**	**1**	**.03**
Illegal bets on soccer **	3,611	**5.60**	**1**	**.02**	3,589	**7.10**	**1**	**.01**	2,907	1.41	1	.24
Mahjong	3,684	2.10	1	.14	3,662	1.65	1	.20	2,964	2.44	1	.12
Internet gambling	3,614	2.50	1	.11	3,592	3.41	1	.07	2,909	0.68	1	.41
Illegal gambling**	3,685	**10.10**	**1**	**.00**	3,663	**10.86**	**1**	**.00**	2,965	0.00	1	.97
Lottery tickets - *Mark Six* (HKJC)	705	0.20	1	.67	704	0.21	1	.65	520	0.58	1	.45
Financial derivatives	3,685	3.10	1	.08	3,663	**4.21**	**1**	**.04**	2,965	1.58	1	.21
Other gambling activities	3,681	0.90	1	.34	3,659	1.49	1	.22	2,962	1.03	1	.31
Physical and mental wellness												
Physical problems***	3,685	**67.70**	**1**	**.00**	3,663	**62.63**	**1**	**.00**	2,965	**14.02**	1	.00
Emotional problems***	3,685	**37.20**	**1**	**.00**	3,663	**36.80**	**1**	**.00**	2,965	1.34	1	.25
Insomnia***	3,685	**154.60**	**1**	**.00**	3,663	**148.28**	**1**	**.00**	2,965	**12.54**	**1**	**.00**
Loss of appetite***	3,685	**105.70**	**1**	**.00**	3,663	**95.27**	**1**	**.00**	2,965	**27.48**	**1**	**.00**
Lack of motivation at work***	3,685	**84.20**	**1**	**.00**	3,663	**77.06**	**1**	**.00**	2,965	**15.93**	**1**	**.00**
Other presenting problem												
Family***	3,685	**25.00**	**1**	**.00**	3,663	**22.77**	**1**	**.00**	2,965	**5.11**	**1**	**.02**
Work***	3,684	**31.70**	**1**	**.00**	3,662	**27.85**	**1**	**.00**	2,964	**10.08**	**1**	**.00**
Mental health**	3,682	**7.20**	**1**	**.01**	3,660	**5.69**	1	.02	2,962	**5.65**	**1**	**.02**
Financial problem***	3,685	**35.30**	**1**	**.00**	3,663	**35.06**	**1**	**.00**	2,965	1.10	1	.29

Notes. Besides the variables, *** $p < .01$ and ** $p < .05$ indicate variables that showed significant differences between the FSI/SI group and non-SI group and were chosen for multivariate analyses.
[a] HKJC: Hong Kong Jockey Club.
[b] Sample sizes are varied because of missing data. **[author: explain use of bold]**

Table 4. Unadjusted and adjusted ordinal regression

	Unadjusted			Adjusted		
	OR (95% CI)	*p*	1/OR[b]	OR (95% CI)	*p*	1/OR[b]
Income						
$0	2.42 (1.21–4.85)	.01	0.41	3.08 (1.45–6.56)	.00	0.32
$1–$5,000						
$5,001–$10,000				2.18 (1.04–4.59)	.04	0.46
$10,001–$15,000						
$15,001–$20,000						
$20,001–$25,000						
$25,001–$30,000						
$30,001–$40,000						
$40,001 or above	1.00 (Reference)[a]			1.00 (Reference)		
Amount of debt						
Below $50,000				0.63 (0.41–0.95)	.03	1.59
$50,001–$100,000	1.43 (1.02–2.00)	.04	0.70			
$100,001–$200,000	1.84 (1.35–2.51)	.00	0.54			
$200,001–$300,000						
$300,001–$400,000	1.67 (1.13–2.47)	.01	0.60			
$400,001–$500,000	1.63 (1.02–2.61)	.04	0.61			
$500,001–$600,000	2.11 (1.25–3.56)	.01	0.47			
Above $600,001	2.65 (1.86–3.79)	.00	0.38	1.99 (1.26–3.13)	.00	0.50
None	1.00 (Reference)[a]			1.00 (Reference)[a]		
Bankruptcy						
No bankruptcy[a]	0.74 (0.57–0.95)	.02	1.35	0.72 (0.54–0.95)	.02	1.39
Severity of gambling behavior						
Normal						
Possible risk of developing gambling problem						
Significant gambling problem	0.52 (0.39–0.69)	.00	1.92			
Pathological gambling	1.00 (Reference)[a]					
Gambling activities						
Gambling in casinos[a]	0.69 (0.58–0.81)	.00	1.45	0.79 (0.66–0.96)	.02	1.27
Illegal bets on horse races[a]	0.56 (0.37–0.83)	.00	1.79			
Illegal bet on soccer games[a]	0.62 (0.45–0.84)	.00	1.61			
Illegal gambling[a]	0.68 (0.53–0.87)	.00	1.47			
Physical and mental wellness						
Physical problems[a]	0.46 (0.38–0.56)	.00	2.17	0.68 (0.54–0.86)	.00	1.47
Emotional problems[a]	0.51 (0.41–0.64)	.00	1.96	0.76 (0.59–0.98)	.03	1.32
Insomnia[a]	0.37 (0.31–0.43)	.00	2.70	0.54 (0.44–0.66)	.00	1.85
Loss of appetite[a]	0.40 (0.33–0.47)	.00	2.50	0.77 (0.61–0.96)	.02	1.30
Unmotivated at work[a]	0.44 (0.37–0.52)	.00	2.27	0.61 (0.50–0.75)	.00	1.64
Other presenting problem						
Family[a]	0.64 (0.54–0.77)	.00	1.56	0.76 (0.62–0.93)	.01	1.32
Work[a]	0.59 (0.50–0.70)	.00	1.69			
Mental health[a]	0.80 (0.68–0.94)	.01	1.25			
Financial[a]	0.49 (0.39–0.62)	.00	2.04	0.63 (0.46–0.86)	.00	1.59

Notes. Only models with significant χ^2value ($p < .00$) and significant odds ratios ($p < .05$) are listed above.

[a] Reference category is the one of the highest rank under the particular variable. For example, responding positive on dichotomous item.

[b] The reciprocal of original odds ratio indicates reversed association when the original odds ratio is less than 1.

lated that those who reported FSI could be categorized as the "suicide by proxy" group because the general profile of these individuals seems to represent those who were employed, with significant appetite problems (a significant psychosomatic manifestation of depression among Chinese and a likely comorbid psychiatric illness with pathological gambling in Hong Kong; Wong, Cheung, Conner, Conwell, & Yip, 2010), and referred by their own working organizations for treatment (this may have also represented the pressures of losing one's job and supporting one's family). We are unaware of any studies in the literature that provide estimates for the prevalence of FSI among community samples. Thus, whether or not individuals with gambling problems are more likely than the general public to experience FSI remains unknown (Anderson et al., 2011). Further studies are needed to examine the relationship between FSI and gambling. Moreover, qualitative studies are needed to investigate the motives of those who thought of killing themselves and their family members when encountering gambling-related problems. The information is greatly needed to generate preventive and crisis intervention strategies so as to prevent rare but profound tragedies. We acknowledge that FSI is a rare event and universal screening for it is not feasible without many false-positive findings. However, a better understanding of the characteristics of individuals who are prone to killing themselves and others when encountering gambling-related problems may help alert mental health professionals to the risk of possible family tragedies.

We found that nearly one fifth of the treatment-seeking participants reported having SI at the time of assessment. This finding is similar to reports from other studies that investigated suicidality among individuals from gambling counseling centers located within the community (Frank et al., 1991; Kausch, 2004; Meltzer et al., 2011; Petry & Kiluk, 2002). Given that the prevalence rate of past-year SI among the general public in Hong Kong was about 6% (Liu et al., 2006), it is estimated that users of problem gambling services are about three times more likely to be suicidal. This warrants a recommendation for universal screening for suicide risk among treatment-seeking individuals with gambling problems (Wong, Chan, Conwell, Conner, & Yip, 2010).

Multiple factors are involved and identified in the development of suicidal ideation and behavior in a person who has gambling problems and has sought help. We found that suicidal treatment-seeking individuals were more likely to be male, older, in debt, and to have started gambling relatively younger in life. Suicidal individuals were as likely to report having physical, family, financial, and emotional problems. These results are consistent with those from another report. Frank et al. (1991) found that about half of Gamblers Anonymous members reported SI, and there was an increased severity of gambling problems, greater debts, and earlier onset of gambling in suicidal gamblers compared with nonsuicidal gamblers. Battersby et al. (2006) also found that higher debt was associated with a greater risk of suicidal ideation and behavior and they suggested that the incursion of debt may be a signal that gambling has extended from an enjoyable social activity to a state where the dire consequences of gambling contribute to a sense of hopelessness through the chasing of losses. We want to highlight that although emotional and mental wellbeing were found to be significant correlates of suicidality among treatment seekers, the burden of socioeconomic and physical problems can exacerbate the suicidality or even familicidality of gamblers. Hence, gambling counseling professionals should not overlook the significance of treatment seekers' financial burden and acute physical problems and should provide tailor-made risk assessments and interventions for treatment seekers of problem gambling services.

Among the predictors that differentiate nonsuicidal and suicidal treatment-seeking individuals, insomnia has received less attention in the literature and is also often overlooked in clinical practice (Oquendo, Malone, & Mann, 1997; Parhami et al., 2012). A recent review proposed that abnormal sleep and brain disorders have a common mechanistic origin and that many comorbid pathologies found in brain disease arise from a destabilization of sleep mechanisms, hence, the stabilization of sleep may be a means of reducing the symptoms of — and permit early intervention of — psychiatric and neurodegenerative disease (Wulff, Gatti, Wettstein, & Foster, 2010). Insomnia has been identified as a very robust independent indicator of suicidal behavior among individuals with depression, even taking into account the core symptoms of depression such as low mood and anhedonia in a clinical study (McCall et al., 2010). Without a thorough understanding of the insomnia–gambling–suicide link, it is too early to suggest that managing insomnia may help reduce suicidal behavior among people with gambling problems; however, our findings point to the relevance of monitoring and managing insomnia in problem gambling clients and considering it as an indicator of the risk of SI (Parhami et al., 2012).

Several limitations of this study must be noted. First, the sample consisted solely of treatment-seeking pathological gamblers from one treatment center. Whether these results are generalizable to nontreatment-seeking pathological gamblers remains to be determined. Second, structured screening instruments were not administered to assess the full spectrum of suicidality and psychopathology. Future studies should employ such instruments and also control for the presence of psychiatric disorders in analyzing the correlates of gambling with SI. Third, Internet gambling seems to be an emerging problem especially among the younger generation; however, Internet gambling was not assessed and it is recommended that the impact and prevalence of Internet gambling should be included assessed in future studies.

Starting gambling at young age and length of gambling are crucial factors in developing gambling problems. Increasing the legal gambling age may prevent young people from engaging in gambling at an earlier age and may help reduce the negative impacts of gambling. A more comprehensive social security system and an emergency financial and familial crisis intervention for indebted gamblers may help to alleviate the short-term stress of potential familicidal-suicidal perpetrators or suicidal individuals. Raising awareness of the familicide-suicide risk among individuals

with gambling problems in the helping profession community, and equipping frontline workers in dealing with potential risks, will undoubtedly help to reduce its occurrence.

Conclusion

Despite the limitations of this study, these results have implications for the assessment and treatment of gamblers with SI. Our findings suggested that both male and female individuals with gambling problems, when confronted with financial and physical difficulties, especially insomnia, are prepared to seek professional help. Gamblers with a current suicidality and familicidality may represent a distinct group who require broad and intensive treatment. Multiple factors, for example, indebtedness, insomnia, demotivation to work, seem to be an essential but modifiable risk factor for gamblers with SI. Financial counseling and health check-ups must remain an integral part of intervention to relieve the stress of debt and sleep problems in order to reduce suicidal behaviors among this group who may have an enhanced risk of attempting or completing suicide.

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