

Prevalence of Pachinko-Pachislot Playing Disorder and the Characteristics of Individuals with the Disorder: Analysis of National Pachinko/Pachislot Survey Results

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Abstract

To understand the reality of gambling disorder caused by playing pachinko/pachislot, a national pachinko/pachislot survey was conducted. Based on the survey result, we examined the appearance ratio and the characteristics of individuals with a suspected pachinko-pachislot playing disorder. The analysis result indicated that approximately 0.4% of survey respondents were suspected to have the disorder. This appearance ratio was comparable to the prevalence of gambling disorder in the general population. Those who had a suspected disorder were likely to be divorced, and have no savings. Meanwhile, no distinctive characteristics were found in their gender, annual household income, or the highest educational attainment.

Keywords

Gambling Disorder, Pachinko/Pachislot Playing Disorder, National Survey, Japan

1. Introduction

Gambling disorder falls into the category of Substance-Related and Addictive

Disorders in the DSM-5. Within this category, gambling disorders are included as Non-Substance-Related Disorders while disorders caused by drinking and drug use are considered as Substance-Related Disorders [1]. According to the DSM-5, the lifetime prevalence rate of gambling disorder is about 0.4% - 1.0% and the past-year prevalence rate of the same disorder is about 0.2% - 0.3% in the general population [1]. Meanwhile, a study conducted in Japan found that there were quite a number of disordered gamblers [2]. Among various types of entertainment associated with gambling disorder in Japan, Pachinko and pachislot play the most important role. Both pachinko and pachislot are legally defined as games but not gambling ones. They are widely played across Japan, and pachinko/pachislot parlors are found in people's areas of daily living such as downtown and shopping streets. The total sales revenue for pachinko and pachislot combined is 21.626 trillion yen, far exceeding the total sales revenue of legal Japanese gambling, including horse racing and the lottery, which is 5.888 trillion yen [3]. While being hugely popular, pachinko/pachislot has been considered problematic particularly in terms of gambling disorder issues. In fact, most gambling disorder outpatients are pachinko/pachislot players [4] [5]. Understanding of the characteristics of Japanese gambling disorder therefore will require insight into the characteristics of pachinko-pachislot playing disorder.

There have been only a few studies that examined Japanese gambling disorder with the focus on pachinko/pachislot. One possible reason for this is the use of scales administered primarily in Europe and the US in Japanese research on gambling disorder, prohibiting researchers from studying the disorder with the focus on pachinko/pachislot. To overcome this situation, Akiyama *et al.* [6] [7] developed the Pachinko-pachislot Playing Disorder Scale (PPDS) in their series of research projects and specified the cut-off value in line with the DSM-5 criteria. Using the PPDS, we examined gambling disorder with the focus on pachinko/pachislot.

It should be noted that, like any entertainment that causes gambling disorders, playing pachinko/pachislot itself will not automatically result in gambling disorder. While exposure to pachinko/pachislot is naturally a prerequisite for Pachinko-pachislot Playing Disorder, there should be player characteristics that have stronger connections to the disorder. Therefore, we closely examined the PPDS responses from individuals who played pachinko/pachislot in the past year to discover how many of them were likely to develop the disorder and what kind of characteristics they had. In this paper, we report results and discussions obtained by reorganizing simple results found in a domestic report written in Japanese [8] in order to examine those issues.

2. Method

2.1. Sample

The sample size was 9000 consisting of males and females from 18 to 79 years old living in Japan selected through two-stage stratified random sampling. There

were 5173 questionnaire responses (57.5%) and 5060 (56.2%) were valid.

2.2. Survey Period

The survey was conducted from January 4 to February 17, 2017.

2.3. Items Asked in the Survey

2.3.1. Demographic Variables

“Gender” and “Age” of the respondents were obtained from the Basic Resident Register. Age was then divided into the three categories: “Under 20,” “20 to 64,” and “65 and over.” “Community size” of the respondents was obtained from the population statistics disclosed by municipalities listed in the Basic Resident Register and was divided into the four categories: “City designated by government ordinance or Tokyo’s 23 wards,” “City (population of 150,000 and more),” “City (population less than 150,000),” and “Town or village.”

2.3.2. SES

As indicators of the socio economic status of the respondents, data on their “Annual household income” and “Amount of savings” was collected. Respondents who knew their annual household income or amount of savings used a 14-point scale ranging from “Less than 1 million yen” to “13 million yen or more” to answer. If they did not know their annual household income or amount of savings, they were asked to choose “Don’t know.” In the tabulation process, “Annual household income” was divided into five categories: “Don’t know” and four categories ranging from “Less than 3 million yen” to “8 million yen or more.” Similarly, “Amount of savings” was divided into the three categories: “Don’t know,” “Have no savings,” and “Have savings.” As an indicator of educational level, the respondents were asked about their highest educational attainment.

2.3.3. Divorce Experience

The respondents were asked whether or not they had divorce experience.

2.3.4. Experience of Playing Other Gambling Games

Regarding nine types of official gambling games, such as horse racing and the lottery, the respondents were asked how frequently they had played them in the past 12 months. Again, a 4-point scale was used. In the tabulation process, respondents who experienced at least one of the nine gambling games were categorized as “Have experience” and those who had no experience with any of the gambling games were categorized as “No experience.”

2.3.5. Pachinko-Pachislot Playing Disorder Scale (PPDS)

The PPDS was developed based on items in gambling disorder scales such as the SOGS, DSM-IV, NODS, PGSI, and G-SAS [9] [10] [11] [12] [13]. It consists of 27 items in 12 categories to measure the three factors of the disorder: motivation, behavior, and consequence (See **Table 1**). It is designed to ask individuals

Table 1. Average and standard deviation for each PPDS item.

	n	M	SD
Motivation	576	8.56	3.23
Preoccupation and needs	579	3.06	1.35
I cannot stop thinking about pachinko/pachislot.	579	1.61	0.78
Once pachinko/pachislot comes into my mind, I feel compelled to play it	579	1.45	0.70
Escape	576	5.50	2.29
I feel calm only when I am playing pachinko/pachislot	578	1.79	0.89
I don't have to think about anything else while I am playing pachinko/pachislot	577	2.07	1.01
To escape from stress, pachinko/pachislot is indispensable for me	579	1.64	0.87
Behavior	577	9.37	3.12
Tolerance	578	2.82	1.22
I want to get more money so much that the amount of money I spend on pachinko/pachislot is increasing	578	1.51	0.76
Since I feel less anxiety or regret about losing at pachinko/pachislot than before, I am spending more time and money on this activity	579	1.31	0.57
Withdrawal	578	2.47	0.92
After reducing the frequency or time of playing pachinko/pachislot, I started to feel restless	578	1.31	0.58
When I tried to quit pachinko/pachislot, I couldn't concentrate on work, doing housework, or study	578	1.16	0.44
Chasing losses and difficulty controlling yourself	579	4.09	1.61
When I lost at pachinko/pachislot, I have returned to play it on the same day or the next day in order to recover the loss	579	2.10	0.87
I have spent much more money on pachinko/pachislot than the planned daily limit	579	1.99	0.90
Consequence	562	20.14	6.15
Health problems	577	2.19	0.64
Playing pachinko/pachislot worsened my physical illness under treatment	578	1.10	0.36
Playing pachinko/pachislot worsened my mental illness under treatment	577	1.09	0.31
Sense of guilt and shame	572	5.29	2.16
For the problems I caused by playing pachinko/pachislot, I have felt sorry for causing trouble for my family and people around me	578	1.96	0.92
I sometimes feel guilty about playing pachinko/pachislot	575	1.63	0.81
When I thought of my own problems caused by playing pachinko/pachislot, I have felt embarrassment or shame	574	1.70	0.83

Continued

	n	M	SD
Secret and lies	578	3.08	1.48
I have lied in order to hide my losses or debts resulting from pachinko/pachislot	578	1.50	0.78
I have lied to my family, friends, co-workers, or other people to play pachinko/pachislot	579	1.58	0.81
Financial problems	572	2.79	1.65
I have put myself into financial difficulties by playing pachinko/pachislot and asked someone for financial support	579	1.32	0.67
I have borrowed money from someone in order to play pachinko/pachislot	579	1.31	0.68
Have you borrowed money from the following in order to play pachinko/pachislot or to repay debts from playing pachinko/pachislot? (1. Family or household budget, 2. Friend or acquaintance, 3. Bank, 4. Loan company, 5. Consumer finance company, 6. Loan shark, 7. Others, 8. Never borrowed before)	572	0.16	0.51
Study and work	579	2.22	0.68
By playing pachinko/pachislot, I almost lost or I have lost opportunities for education	579	1.13	0.41
By playing pachinko/pachislot, I have made mistakes at work or almost lost my job	579	1.09	0.35
Relationship with important people	579	2.46	1.03
Playing pachinko/pachislot almost broke or has broken the relationship with my family or boyfriend/girlfriend	579	1.16	0.48
I have had an argument with a person that I live with over how I spend money on pachinko/pachislot	579	1.31	0.64
Suicide	578	2.10	0.50
I was so emotionally distressed about my pachinko or pachislot problems that I have tried to kill myself	578	1.07	0.32
As a result of being emotionally distressed about my pachinko/pachislot problems, I have thought about ending my life	578	1.03	0.23
PPDS total score	558	38.09	10.79

who played pachinko/pachislot in the last 12 months about their behavior and experience associated with gambling disorder in that period. Among 27 items, 26 were in the form of a 4-point scale ranging from “Disagree” to “Agree” or from “Never” to “Often.” The remaining item was about borrowing money and was presented in the form of a multiple answer question. The respondents were asked to select all places from which they borrowed money. Responses on the

4-point scales were converted into 1 to 4 points, with “Disagree” and “Never” being 1 point. Responses on the multiple answer question on borrowing money were converted into 0 to 7 points. The score was 0 if the respondents selected “Never borrowed,” but otherwise the number of places from which the respondents borrowed money became the points for that question. The sum of the 4-point scale points and the points for the question on borrowing money were used in the analysis as the Pachinko-pachislot Playing Disorder Scale score (PPDS score). The obtained PPDS score ranged from 26 to 111.

2.4. Procedure

A request for survey participation was sent by mail to 9000 individuals chosen by two-stage stratified random sampling. More specifically, postcards requesting survey participation were first sent to them and a package of survey materials followed. The questionnaire was collected either manually by investigators, via mail, or through a web-based form. Those who submitted responses received a 1000 yen-worth reward either directly or via mail.

3. Result and Discussion

3.1. Data Used in Analysis

Using the cut-off value proposed by Akiyama *et al.* [7], respondents whose PPDS score was 61 or higher were categorized as “pachinko/pachislot players suspected to have a gambling disorder” (Disorder Group). Their responses were compared with those of respondents who played pachinko/pachislot in the past year and had a PPDS score of 60 or lower (Non-Disorder Group). Among all who submitted survey responses (5060), 582 played pachinko/pachislot in the past year. Among these 582 individuals, 24 submitted invalid PPDS responses and thus were excluded from analysis. As a result, data obtained from 558 PPDS respondents were analyzed.

3.2. Disorder Score Distribution

Table 1 shows the average and standard deviation of the score for each PPDS item, sub-scale score, and total score. Among the 558 PPDS respondents, 3.8% (21 individuals) had a “suspected gambling disorder.” These 21 individuals accounted for 0.4% of all 5,060 respondents (95% confidence interval: 0.2% - 0.6%). The DSM-5 (APA, 2013) reports that the past-year prevalence rate of gambling disorder is about 0.2% - 0.3% in the general population, and our study resulted in approximately the same appearance ratio.

3.3. Experience of Playing Other Gambling Games

There were no significant differences in the past-year gambling experience (excluding pachinko/pachislot) between those who had gambling disorder and those who did not. Engagement in non-pachinko/pachislot gambling games did not indicate any possibility of resulting in higher likelihood of developing Pa-

chinko-pachislot Playing Disorder ($\chi^2(1) = 1.04$, *n.s.*, $V = .04$; see **Table 2**).

3.4. Differences Attributable to Demographic Variables and SES

Table 2 shows the frequency and breakdown of responses to the demographic and SES items by the Disorder and Non-Disorder Groups.

Table 2. Demographic variables and experience of other types of gambling games.

	Non-Disorder Group		Disorder Group	
	n = 537		n = 21	
	n	(%)	n	(%)
Gender				
Female	134	(25.0)	2	(9.5)
Male	403	(75.0)	19	(90.5)
Age				
Under 20	5	(0.9)	0	(0.0)
20 to 64	423	(78.8)	18	(85.7)
65 and over	109	(20.3)	3	(14.3)
Highest educational attainment				
Junior high school	87	(16.2)	4	(19.0)
Senior high school	237	(44.1)	10	(47.6)
Specialized training college or vocational school (after graduating from senior high school)	61	(11.4)	0	(0.0)
Two year college or college of technology	20	(3.7)	1	(4.8)
University (including 6-year programs)	92	(17.1)	4	(19.0)
Graduate school	9	(1.7)	0	(0.0)
No response	31	(5.8)	2	(9.5)
Annual household income				
Less than 3 million yen	87	(16.2)	5	(23.8)
3 million yen to less than 5 million yen	121	(22.5)	7	(33.3)
5 million yen to less than 8 million yen	108	(20.1)	3	(14.3)
8 million yen or more	57	(10.6)	1	(4.8)
Don't know	40	(7.4)	2	(9.5)
No response	124	(23.1)	3	(14.3)
Amount of savings				
Have no savings	80	(14.9)	10	(47.6)
Have savings	335	(62.4)	3	(14.3)
Don't know	91	(16.9)	7	(33.3)
No response	31	(5.8)	1	(4.8)
Divorce experience				
	78	(14.5)	8	(38.1)

Continued

Community size				
City designated by government ordinance or Tokyo's 23 wards	132	(24.6)	7	(33.3)
City (population of 150,000 and more)	150	(27.9)	2	(9.5)
City (population of less than 150,000)	194	(36.1)	9	(42.9)
Town or village	61	(11.4)	3	(14.3)
Other gambling games (past 12 months)	278	(51.8)	9	(42.9)

3.4.1. Demographic Variables

No significant gender difference was found between the Disorder and Non-Disorder Groups. In both groups, male pachinko/pachislot players accounted for more than the female counterparts ($\chi^2(1) = 2.61$, *n.s.*, $V = .07$). No significant age differences were found between the two groups either. There were no particular age groups having high percentages of individuals with gambling disorder ($\chi^2(2) = 0.68$, *n.s.*, $V = .03$). There was also no significant difference in distribution of areas of living ($\chi^2(3) = 3.93$, *n.s.*, $V = .08$). Although some studies reported that the prevalence of gambling disorder was higher for men or younger age groups [14], there were also study results showing the possibility of gender and age influencing the prevalence at different levels depending on how they interact with other variables. In the case of electronic gambling machines (EGMs), which are similar to pachinko/pachislot machines, no sexual difference was found in the prevalence when the frequency of play was controlled [15]. In a previous gambling disorder study in Japan, Nishimura and Ishida [16] used data from individuals who called a telephone consulting agency to talk about their pachinko addiction to show that men scored significantly higher on the short form of the SOGS for addicted gamblers. When the same callers were divided into problem gamblers and non-problem gamblers using the cut-off value, however, there was no significant sexual difference. In pachinko/pachislot, gender strongly influences the rate of participation, but its influence on the level of disorder seems marginal.

3.4.2. SES

Individuals with gambling disorder and those without showed no differences in the distributions of the two socio-economic status indicators, "Highest educational attainment" and "Annual household income". (Highest education attainment: $\chi^2(5) = 3.08$, *n.s.*, $V = .08$; Annual household income $U = 2380.50$, *n.s.*, $r = -.07$). On the other hand, a significant difference was found in the distribution of "Amount of savings." The Disorder Group had a higher percentage of individuals who reported they had no savings ($\chi^2(2) = 23.98$, $p < .001$, $V = .21$). SES, like gender, is considered to be a risk factor for gambling disorder. However, the influence of SES could change with other variables as reported in a previous study where its relationship with gambling disorder became apparent only after other risk factors such as race and marital history were controlled [17].

3.5. Divorce Experience

Table 2 shows the frequency distributions of “Divorce experience” for both the Disorder and Non-Disorder Groups. The Disorder Group had a higher percentage of individuals who responded that they had divorce experience ($\chi^2(2) = 8.61, p < .01, V = .12$). This agreed with previous studies that reported a higher divorce rate for problem gamblers than for non-problem gamblers [18] [19].

The relationship between problem gambling and negative emotions, such as depression, anxiety, and stress, has been pointed out in gambling disorder research. Some studies concluded that gambling was an escape-based coping strategy and was a maladaptive coping style [20], and other studies suggested higher psychological stress resulted in a heightened desire to gamble [21]. Both the present and previous studies showed a higher divorce rate for problem gamblers than non-problem gamblers [18] [19] pointing out that a higher percentage of problem gamblers experienced negative life events than non-problem gamblers. Therefore, psychological stress caused by negative life events may make individuals rely more heavily on pachinko/pachislot as a method of releasing stress, resulting in higher likeliness of developing Pachinko-pachislot Playing Disorder.

4. Summary

The present study indicated that approximately 0.4% of the survey respondents had Pachinko-pachislot Playing Disorder. The study also showed that individuals with a suspected disorder were more likely than those without it to have been divorced, and have no savings. There were not enough levels of difference in gender, annual household income, or the highest education attainment between the two groups to consider them as characteristics of either group. Based on these findings, an important risk factor for Pachinko-pachislot Playing Disorder may be the personality that easily accepts pachinko/pachislot as a form of entertainment that provides enjoyment or allows an escape from uncomfortable situations rather than the social background of the individual. Note, however, the present study was a one-point correlational study. Examination of the influences or causal relationships of these variables will require detailed investigation through longitudinal studies involving surveys conducted twice or more.

Authors' Contributions

All authors designed the study, had advises during the study and reviewed the completed manuscript. YH performed the statistical analysis and wrote the manuscript. HI monitored data collection. KA and AS performed the statistical analysis. All authors read and approved the final manuscript.

Competing Interests

Kikunori Shinohara is on the board of trustees of Nichiyukyo (Japan Pachinko Pachi-Slot industry association).

Ethical Approval and Consent to Participate

This study was approved by the Ethical Review Board for Research in the Humanities at Ochanomizu University (Approval No. 2016-98).

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