

acted on the hypothalamus to create an antistress effect,⁴¹ and promoted general health in the DP group. In the future, methods of maintaining motivation in subjects to practice the yoga therapy program daily need to be identified.

A limitation of this study is that the yoga therapy program was administered by the first author of this article, who is a psychotherapist and a yoga therapist; therefore, the effects of the program administered by other therapists should be assessed. The second limitation is that the effect of the daily practice of the yoga therapy program was evaluated only using the GHQ28. Not only is it necessary to assess the effects using other scales, but biological, physiological, and/or qualitative methods should also be used.

Conclusion

The present results suggest that the daily practice of integrated yoga taught during a single session of an integrated yoga program that we developed as a stress management education tool is effective for improving mental health, including that of somatic symptoms, anxiety and insomnia, and social dysfunction, among school employees.

Author Disclosure Statement

No competing financial interests exist.

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Study on Factors Associated with Repeated Gambling Among Gamblers Anonymous Participants

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Abstract

Objective: While there are some Gamblers Anonymous (GA) participants who gamble again, no studies have investigated factors that differentiate GA participants who can quit repeated gambling from those who gamble again. The purpose of this study was to investigate whether individuals who participated in GA, a self-help groups, gambled again, and to identify the factors that were associated with those who gambled again after participating in GA.

Methods: The subjects were 58 pathological gamblers who had participated in GA group meetings. We divided the subjects into 2 groups, a group who had gambled again and group who had not, and we investigated associations with their basic information, State-Trait Anxiety Inventory Trait Version (STAI-T), Generalized Self Efficacy Scale (GSES), and Effortful Control Scale for Adults (ECSA).

Results: The replies regarding whether they had gambled again after participating in GA showed that 25 (43.1%) had not and 33 had (56.9%). A logistic regression analysis showed that GSES and ECSA "inhibitory control" as significant factors that were associated with whether a subject returned to gambling.

Conclusion: These results suggested that it may be possible to identify people who have a temperament that makes them tend to gamble again by evaluating their self-efficacy and inhibitory control.

Key words:

Gamblers anonymous; Self-help group; Gambling; Anxiety; Self-efficacy; Effortful control; Inhibitory control

Introduction

People who participate in public gambling in Japan (hereinafter, gamblers) are estimated to include 16.7 million pachinko gamblers, 14.9 million horse race gamblers, 2.5 million boat race gamblers, and 2 million bicycle race gamblers [1]. Some gamblers can never resist the desire and drive for gambling and gamble repeatedly without taking any breaks, resulting in having social life problems such as multiple debts, unemployment, and family collapse. This state is called gambling disorder in the DSM-5 [2]. The number of gambling disorder estimated from the adult population in Japan is as many as 5.36 million (4.8% of adult population) in total, including 4.38 million men (8.7% of adult male) and 0.98 million women (1.8% of adult female) (Ministry of Health, Labour and Welfare). Treatment takes a few years and its purpose is to make patients quit gambling. However, many of the patients succumb to their addiction, and it can be said that this gambling disorder is a disease that is difficult to completely cure.

An effective therapeutic approach for gambling disorder is psychological therapies [3]. However, at present, there are a small number of specialized medical institutions that provide psychological therapies for this disease. Gamblers Anonymous (GA) actually plays a psychotherapy-like role [4]. GA is a self-help group aiming at recovery

from gambling addiction, in which anonymity, i.e., no need to reveal the real names of participants, is ensured and regular meetings (4 to 12 times per month) are held [5]. In the meetings, an environment is created in which participants "just speak, just listen, and do not discuss" so that they can talk without anxiety. Furthermore, the participants implement "12 steps for recovery" such as "having an insight into the disease, reviewing failure, and making amends for wrongs" to prevent gambling addictive behavior, to recover their humanity, and to improve their way of life [6]. Studies of GA have reported the effect of participation in GA on the inhibition of gambling behavior [7,8] or the effect after the introduction of cognitive-behavioral therapy [9,10]. However, while there are some GA participants who gamble again, no studies have investigated factors that differentiate GA participants who can quit repeated gambling from those who gamble again.

Therefore, this study examined the presence or absence of repeated gambling, the degree of gambling addiction, the state of anxiety, attentional control ability, and self-efficacy in gambling addicts participating in GA to investigate what factors, particularly what mental state factors, were associated with those who gambled again after participating in GA.

Methods

Selection of Subjects

There are 158 GA groups in Japan, and the total number of GA members is not clear. In this study, eligibility criteria for subjects were GA members participating in 2 GA groups in Hiroshima prefecture in Japan who regularly participated in GA meetings at least once a month. In addition, exclusion criteria were those who were hospitalized with or attending hospital for psychiatric disorders and who were not allowed to participate by their physicians at the time of the survey.

Measurements

1) Subjects' characteristics

A self-report questionnaire was used to assess the age, sex, the presence or absence of repeated gambling, and if present, the number of repeated gambling episodes after participating in GA, the type of gambling, the duration of gambling, the duration of participation in GA, and the presence or absence of debt with the total debt from all source.

2) State-Trait Anxiety Inventory (STAI)

The State-Trait Anxiety Inventory (STAI) is a self-assessment questionnaire created by Spielberger et al. [11] to measure the degree of anxiety, consisting of 20 items assessing state anxiety and another 20 assessing trait anxiety. This study used the trait anxiety scale to measure whether natural personality trait anxiety affects addictive behavior. Each item is answered on a 4-point scale ranging from "almost never (1 point)" to "always (4 points)." The total score is calculated and higher total scores indicate higher trait anxiety.

3) Effortful Control Scale for Adults (ECSA)

The Effortful Control Scale for Adults (ECSA) is a conceptual scale of individual differences in attentional control ability, which is the Japanese translated version [12] of the 35-item Effortful Control (EC) Scale of the Adult Temperament Questionnaire created by Rothbart et al. [13]. The ECSA is a self-assessment questionnaire consisting of a total of 35 question items including 1) 11 items of inhibitory control (capacity to suppress inappropriate approach behavior), 2) 12 items of activation control (capacity to perform an action when there is a strong tendency to avoid it), and 3) 12 items of attentional control (capacity to focus attention as well as to shift attention when desired). Each item is answered on a 4-point scale ranging from "no (1 point)" to "yes (4 points)." The total score is calculated for each subscale, and higher total scores indicate higher control ability. The previous study examined the relationship between the EC Scale and problem behavior before adulthood and revealed that it is not incompatible with psychiatric disorders [12].

4) General Self-Efficacy Scale (GSES)

The General Self-Efficacy Scale (GSES) is a self-assessment questionnaire created by Sakano et al. [14], consisting of 16 items to measure the level of individual recognition of general self-efficacy. The GSES can assess whether one can perform appropriate coping behavior and problem-solving behavior without impairment of physical and mental health under stressful conditions. Each item is answered on a two-point scale: "Yes (1 point)" or "No (0 point)." Higher scores indicate higher self-efficacy.

Survey Methods

The survey was conducted by distributing and collecting the questionnaires. Researchers participated in open GA meetings in which non-members could participate and distributed documents including those describing an outline of the study, consent form, and self-administered questionnaires. Participants who consented were asked to complete the questionnaires on the same day during the meetings, and the completed questionnaires were collected at once. In addition, if there were members absent from the GA meeting, the group leader was asked to distribute a letter explaining the purpose of the study and the self-administered questionnaires. These members were asked to complete the questionnaires at home and send the completed questionnaires to the researcher.

Analysis

To examine the relationship of the subjects' characteristics and important factors for preventing repeated gambling to the state of gambling addiction, trait anxiety, attentional control ability, and self-efficacy, the subjects were divided into two groups: those who gambled again after participating in GA and those who did not. The Kolmogorov-Smirnov test was used to test normality, and then the relationship with trait anxiety (STAI), attentional control ability (ECSA), and self-efficacy (GSES) was tested using the t-test, Mann-Whitney U-test, and logistic regression analysis.

For the analysis, IBM SPSS ver.22.0 for Windows was used. All tests were two-sided, and the level of significance was set at $P < 0.05$.

Ethical Considerations

This study was conducted with the approval of the Ethical Review Board of the Graduate School of Health Sciences, Hiroshima University. Before the study, we participated in open GA meetings and explained in writing to the subjects the purpose, methods, and details of the study, possibility of withdrawal from the study at any time, absence of any disadvantages accruing from withdrawal, strict protection of privacy, and method of publication of the results. The survey was conducted only among GA participants who consented.

Results

Participation of the subjects in the study

The questionnaires and a consent form were distributed to 72 GA members who met the eligibility criteria and consented in 7 GA groups, and 61 (84.7%) responded to the questionnaires. Those with missing data were excluded, and the final analysis subjects consisted of 58 members (80.6%). We could not get information about the 14 members who were excluded.

Overview of the subjects

Table 1 shows the age, gender, type of gambling, duration of gambling, duration of participation in GA (number of months of participation in GA), presence or absence, and number of times, of repeated gambling after participating in GA, presence or absence of debt, and the total debt from all sources. Pachinko was the most common types of gambling ($n = 51$, 87.9%). Twenty-five subjects (43.1%) did not gamble again after participating in GA, while 33 (56.9%) gambled again. One or two was the most common number of times of repeated gambling ($n = 17$, 29.3%), followed by 10 or more ($n = 9$, 15.5%).

		N		
Age (years)	20 - 29	7	12.10%	
	30 - 39	11	19.00%	
	40 - 49	17	29.30%	
	50 - 59	16	12.60%	
	>= 60	7	12.10%	
	Mean (SD)			
Gender	Male	54	93.10%	
	Female	4	6.90%	
Type of gambling	Pachinko	51	87.90%	
	Horse race	5	8.60%	
	Boat race	1	1.70%	
	Foreign exchange	1	1.70%	
Duration of gambling (years)	1-9	9	15.50%	
	10-19	10	17.20%	
	20 - 29	21	36.20%	
	>= 30	18	31.00%	
	Mean (SD)			
Repeated gambling after participating in GA (times)	none	25	43.10%	
	1-2	17	29.30%	
	3-5	5	8.60%	
	6-9	2	3.40%	
	>= 10	9	15.50%	
Debt (ten thousand yen)	none	4	6.90%	
	1-99	4	6.90%	
	100 - 99	24	41.40%	
	500 - 999	15	25.90%	
	>= 1000	11	19.00%	
	Mean (SD)			
Number of months of participation in GA	< 12	16	27.60%	
	24-24	11	19.00%	
	24 - 60	17	29.30%	
	>= 60	14	24.10%	
	Mean (SD)			

Table 1: Demographic profile

Factors associated with the presence or absence of repeated gambling -univariate analysis

The subjects' characteristics and assessment items were compared between the 31 subjects who gambled again and the 27 who did not. As

a result, there were significant differences between the two groups in the following 8 items (Table 2): STAI (P = 0.004), GSES (P < 0.001), ECSA (inhibitory control) (P = 0.001), ECSA (activation control) (P = 0.004), duration of gambling (number of years) (P = 0.001), age (P = 0.001), GA 20 questions (P = 0.046), and ECSA (attentional control) (P = 0.024).

	Repeated gambling	N	Mean (SD)	P ^a
STAI	Absence	27	43.07 (11.77)	0.004
	Presence	31	51.80 (10.21)	
GSES	Absence	27	10.26 (3.53)	<0.001
	Presence	31	6.42 (3.79)	
ECSA (inhibitory control)	Absence	27	32.33 (4.82)	0.001
	Presence	31	27.74 (4.89)	
ECSA (activation control)	Absence	27	34.96 (7.43)	0.004
	Presence	31	28.94 (8.04)	
Duration of gambling (years)	Absence	27	26.59 (7.75)	0.005
	Presence	31	19.16 (11.25)	
Age (years)	Absence	27	50.55 (9.70)	0.001
	Presence	31	40.90 (11.60)	
		N	Median (range)	P ^b
ECSA (attentional control)	Absence	27	32 (2-48)	0.024
	Presence	31	28 (1-43)	
Number of months of participation in GA	Absence	27	33 (1-138)	0.839
	Presence	31	32 (1-121)	
Debt (ten thousand yen)	Absence	27	400 (0-6000)	0.574
	Presence	31	400 (0-1300)	

Table 2: Factors associated with the presence or absence of repeated gambling –univariate analysis. a: t-test, b: Mann-Whitney U-test

Factors associated with the presence or absence of repeated gambling -multivariate analysis-

A logistic regression analysis was performed with the presence or absence of repeated gambling as the dependent variable and 8 items showing significant differences in the univariate analysis as explanatory variables. As a result, two items, GSES (P = 0.029) and ECSA (inhibitory control) (P = 0.049), were identified as significant factors (Table 3).

	Estimate (beta)	Standard error	Odds ratio	95% confidence interval	P	VIF
STAI	0.01	0.06	1.02	0.90-1.14	0.828	1.626
GSES	-0.31	0.14	0.72	0.55-0.96	0.029	2.257
ECSA (inhibitory control)	-0.24	0.12	0.78	0.62-0.99	0.049	2.984
ECSA (inhibitory control)	0.04	0.08	1.04	0.89-1.23	0.572	3.057
ECSA (attentional control)	0.13	0.01	1.14	0.94-1.37	0.180	2.641
Duration of gambling	0.06	0.07	1.06	0.93-1.22	0.364	4.370
Age	-0.10	0.06	0.89	0.80-1.02	0.098	4.092

Table 3: Factors associated with the presence or absence of repeated gambling -multivariate analysis. VIF: Variance inflation factors

Discussion

The male-to-female ratio of gambling disorder is approximately 6:1 (86% in male and 14% in female) in Japan (Ministry of Health, Labour and Welfare), and the number of female who participates in GA is less than that of male. Therefore, female participants in this study were also too small, and we could not assess the differences in characteristics between male and female with gambling disorder.

The multivariate analysis identified two factors associated with repeated gambling, i.e., GSES (self-efficacy) and ECSA (inhibitory control). Self-efficacy is “the expectation of whether one can properly perform an action,” an antecedent factor of an action, and a cognitive variable determining a person’s behavior [9]. The results of this study revealed that self-efficacy was significantly higher in the non-repeated gambling group than in the repeated gambling group. “Modeling” and “successful experience” are said to be effective factors that increase self-efficacy [15]. Namely, it is easily imaginable that members who began to participate in GA could not control their desire for gambling, had social problems such as false words and actions and multiple debts, were not trusted by their families or people at their workplaces, and lived with the loss of confidence and anticipatory anxiety. Those who did not gamble again were likely to begin to expect that “they might be able to stop gambling” by encountering “senior members” (models) in GA meetings, who had similar experiences but continuously quit gambling, thereby getting rid of anticipatory anxiety and increasing self-efficacy. Furthermore, it is also suggested that these members increased self-affirmation and self-efficacy by repeated “successful experiences,” while imitating (modeling) the method to overcome gambling disorder. Increased self-efficacy seemed to allow them to perform appropriate coping behavior and problem-solving behavior even under impulsive desire for gambling.

On the other hand, however, not all participants could continuously quit repeated gambling after participating in GA, and 56.9% of the participants gambled again. Approximately half of these participants (29.3% of all participants) gambled again once or twice, but 15.5% were habitual and gambled again 10 times or more. These subjects in

the repeated gambling group might originally have had low self-efficacy and had not changed after participation, resulting in repeated gambling. However, it could not be determined whether this was the case from this survey alone. Even if these subjects gamble repeatedly, continuous participation in GA may reduce the possibility of having social problems such as multiple debts like before, and allow them to increase self-efficacy through “successful experience.”

The Effortful Control (EC), which is a conceptual scale of individual differences in attentional control ability [13], is thought to be associated not only with the control of approach/avoidance behavior and attention but also with the control of emotional experience and expression [12]. For example, inhibitory control prevents sad emotions due to painful experiences from leading to impulsive behavior. Inhibitory control in EC is the “capacity to suppress inappropriate approach behavior,” [13] and this can be said to be the “ability to control oneself without approaching things that must not be done.” This is the ability to actively and intentionally control behavior and control thoughts and emotions with subjective feelings through executive attention according to the demands of the situation [16], unlike a similar system, Gray’s behavior control system, i.e., “passive and automatic behavioral suppression as a cue for punishment.”

The results of this study revealed that inhibitory control of EC was significantly lower in the repeated gambling group than in the non-repeated gambling group. Cheetham et al. [17] reported that drug addicts were unable to escape from unpleasant feelings or overcome the impact of strong feelings, resulting in inappropriate responses to distress such as continuous pathological addiction, and furthermore that low levels of EC may affect substance and behavioral addictions, thereby impairing various abilities to control behavior. Pathological gamblers may have similar responses, because it has been reported that brain activation in pathological gamblers is very similar to that in drug addicts [18,19]. These findings suggest that the subjects in the repeated gambling group could not control behavior, resulting in repeated gambling, and it can be said that our findings were similar to those of previous studies.

There are some limitations in this study. First, this study involved GA groups only in a particular district and the sample size was small, limiting the generalization of the results. For generalizing the results, it is necessary to conduct a nationwide survey in the future. Second, in this study, the questionnaires contained no items concerning family background. It is also necessary to conduct a survey of family background, because it has been reported that the higher the family’s recognition of emotional support networks, the higher the self-esteem and problem-solving behavioral traits, indicating that family background greatly affects the disease condition [20]. Likewise, other variables that may be related to gambling, for example, level of gambling addiction, time spent gambling, or other personality and health-related factors, should have been assessed. Third, for elucidating factors associated with continuous abstinence from gambling after participation in GA, it is necessary to conduct time-series and longitudinal surveys and studies of the timing of participation, level of achievement of program tasks, evaluation of psychological scales, and so on. Finally, the sample size was too low to analyze the data using multivariate analysis. Therefore, the results in the present study are tentative.

Conclusions

The results of this study revealed that approximately 60% of the subjects gambled again after participating in GA, indicating the difficulty in suppressing impulsive gambling addiction. Self-efficacy and the Effortful Control (inhibitory control) were significantly associated with the presence or absence of repeated gambling after participation in GA. These results suggested that it may be possible to identify people who have a temperament that makes them tend to gamble again by evaluating their self-efficacy and inhibitory control. However, the present study was conducted by a cross-sectional design. Therefore, it is necessary to clarify causal relationship between repeated gambling and self-efficacy or inhibitory control in future larger surveys.

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RESEARCH ARTICLE

The State of Health in Older Adults in Japan: Trends in Disability, Chronic Medical Conditions and Mortality

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Abstract

Both life expectancy and healthy life expectancy in Japan have been increasing and are among the highest in the world, but the gap between them has also been widening. To examine the recent trends in old age disability, chronic medical conditions and mortality in Japan, we retrospectively analyzed three nationally representative datasets: Comprehensive Survey of Living Conditions (2001–2013), Patient Survey (1996–2011) and Vital Statistics (1995–2010). We obtained the sex- and age-stratified trends in disability rate, treatment rates of nine selected chronic medical conditions (cerebrovascular diseases, joint disorders, fractures, osteoporosis, ischemic heart disease, diabetes mellitus, hypertension, pneumonia and malignant neoplasms), total mortality rate and mortality rates from specific causes (cerebrovascular diseases, heart diseases, pneumonia and malignant neoplasms) in both sexes in four age strata (65–69, 70–74, 75–79, 80–84 years). Disability rates declined significantly in both sexes. Treatment rates of all selected medical conditions also decreased significantly, except for fractures in women and pneumonia. Both total mortality rate and cause-specific mortality rates decreased in both sexes. We concluded that the recent decline in disability rates, treatment rates of chronic medical conditions and mortality rates points toward overall improvement in health conditions in adults over the age of 65 years in Japan. Nonetheless, considering the increase in the number of older adults, the absolute number of older adults with disability or chronic medical conditions will continue to increase and challenge medical and long-term care systems.

Introduction

Japan's life expectancy has increased steadily over the past several decades and is one of the highest in the world [1–3]. Despite the gradual and continuous rise in life expectancy, the definition of old age has not changed and the age of 65 has been considered the beginning of old age [3, 4]. Consequently, the increase in life expectancy, coupled with the falling birth rate, has resulted in a dramatic increase in the proportion of the “old age” population, from 14.6% in 1995 to 25.1% in 2013 [3]. The shift in demography to older ages has had a large impact on



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Data Availability Statement: Data are available from the Japanese government's official website (URL: <http://www.mhlw.go.jp/english/database/db-hw/index.html>; <http://www.mhlw.go.jp/english/database/db-hss/ps.html>; <http://www.mhlw.go.jp/english/database/db-hss/cslc-index.html>).

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society and the economy, which has led to discussion of the definition of old age [5], since the timing of old age is roughly equivalent to the age of retirement and receiving pension benefit.

The Survey on the Senior Citizens' Attitude toward Daily Life, conducted by the Cabinet Office of the Government of Japan in 2009, reported that the majority of respondents considered that the threshold for old age should be higher than the current one, 65 years, and more than 40% thought it should be 70 years [6]. This survey also showed that more than a quarter of the respondents answered that an even higher threshold of 75 years is appropriate for old age [6]. This may reflect the change in people's perception towards aging, and it is possible that the biological age, which involves multitudinous factors including not only elapsed time but also nutrition, living environment and medical conditions, may be going down compared with the chronological age. This hypothesis is compatible with the increase in healthy life expectancy that has occurred simultaneously with the increase in life expectancy [1, 3, 7].

Although both life expectancy and healthy life expectancy have been increasing, the gap between them has also been widening [1, 3]. In order to prevent disability and extend healthy life expectancy, a number of epidemiological studies have been conducted, and comorbid chronic medical conditions have been identified as significant risk factors for disability or the requirement for long-term care [8–13]. However, the prevalence of disability does not necessarily change in parallel with the prevalence of chronic medical conditions. Indeed, studies in some developed countries have reported an increase in the prevalence of chronic medical conditions but a stable or declining disability rate [14–17]. Therefore, examination of the trends in disability and chronic medical conditions in Japan, whose proportion of the old age population is the highest in the world, may facilitate our understanding of the relationship between chronic medical conditions and disability, and the medical and nursing care needs in the old adult population.

In this study, we aimed to characterize the trends in disability and chronic medical conditions over the age of 65 years, the current threshold for old age. We hypothesized that the prevalence of disability, along with the prevalence of chronic medical conditions, has been declining over time, consistent with increasing healthy life expectancy.

Materials and Methods

All the data analyzed in the current study are publicly available on the Japanese government's official website, and therefore ethical review is deemed not to be required [18].

We retrospectively analyzed three databases, Comprehensive Survey of Living Conditions, Patient Survey, and Vital Statistics, all of which are conducted by the Ministry of Health, Labour and Welfare and whose details and tabulated data are available on the website of the Statistics Bureau, Ministry of Internal Affairs and Communications [2, 19, 20].

The Comprehensive Survey of Living Conditions is a series of cross-sectional national surveys on a random stratified sample of households and their members [20]. A long-term care questionnaire has been administered every three years starting from 2001, covering persons requiring long-term care (approximately 6000 persons) in 2,500 districts from the National Census. Results from the long-term care questionnaire include the rate of persons certified for long-term care under the Long-Term Care Insurance System per 100,000 population (hereafter referred to as the disability rate), which is approximately equivalent to the prevalence of disability.

The Patient Survey is a series of cross-sectional national surveys on a random sample of medical institutions (including hospitals and outpatient clinics) [19]. All hospitals with more than 500 beds were included in the surveys. Data from medical institutions in Fukushima prefecture and the Ishinomaki and Kesennnuma medical areas of Miyagi prefecture were not