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Impact of Cognitive Function-Focused Mental Health Promotion Campaign for Psychiatric Help-Seeking Behavior in Japanese University Students

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Abstract

We developed a mental health promotion campaign program to promote psychiatric help-seeking behavior among university students by adopting a social marketing approach and nudge theory from behavioral economics. The purpose of this study was to examine the effectiveness of the campaign. The campaign focused on the illustration of cognitive function-related symptoms and was called the "Fatigue of Brain" campaign.

This study retrospectively compared the duration until psychiatric consultation at health care centers in a Japanese university between data obtained from our previous study (2016-2018) with data from our newly developed mental health campaign (2018-2020). The campaign program included a small leaflet, given to all students during their physical examinations, which directed them to a special website.

The results of logistic regression analysis using data that met the eligibility and inclusion/exclusion criteria showed that the proportion of students (40.3%) who visited psychiatric consultations within two weeks of the campaign's onset was significantly higher than the proportion of students visiting before the campaign (37.6%; OR=0.578, 95% CI=0.343-0.972, p=0.039). Multivariate analysis revealed that the proportion of students with depressive symptoms (31.6%) was significantly higher during the campaign than before the campaign (17.3%; OR=0.444, 95% CI=0.234-0.843, p=0.013).

The results suggest that our cognitive function-focused mental health campaign promotes earlier psychiatric consultation needs to be further verified by using it in actual workplaces in the future.

Keywords: Mental health; Help-seeking behavior; University student; Psychiatry; Stigma

Abbreviations: DUI: Duration of Untreated Illness; DUPC: Duration Until Psychiatric Consultation; GHQ-12: General Health Questionnaire-12.

Introduction

The incidence of mental health problems among university students is increasing in Japan [1]. In addition, the number of students utilizing university health administration departments for mental health services is increasing. A poor prognosis for treatment can lead to flunking, dropping out of school, serious psychosis, and even suicide. One way to improve the prognosis of psychiatric treatment is to shorten the Duration of Untreated Illness (DUI) [2]. A previous study indicated that the treatment success rate for an individual's first major depressive disorder was better when the period from the onset to the start of treatment was shorter [3]. It has also been reported that DUI 2 affects prognosis and social functioning in other mental disorders, such as bipolar disorder and obsessive-compulsive disorder [4-7]. Our previous study on DUI among university students revealed that physical symptoms and deteriorating mental health accelerated students' consulting with psychiatrists [8]. Still, many students are not able to receive psychiatric consultation until their physical or mental symptoms become severe and the prolonged DUI causes poor prognosis in psychiatric treatment [9].

Thus, there is a need to develop methods to shorten the DUI. According to a meta-analysis, of 68 indirect intervention studies, 15 studies found effects on mental health literacy, four on stigma reduction, and seven on motivational enhancement, and only few studies have investigated help-seeking behavior itself as the main outcome, and there have been few attempts at specific measures, such as interventions aimed at reducing DUI [10].

Therefore, we applied a social marketing approach and nudge theory, a behavioral economics concept, to develop a health promotion campaign to shorten the DUI of college students' psychiatric consultations. Social marketing involves the use of corporate marketing techniques to solve social problems. Marketing techniques are used to group the target population based on their characteristics and features to create messages reflecting the characteristics and features of the target population [11]. Social marketing involves a series of processes and planning a program that encourages the voluntary behavior of the target audience. Behavioral economics assumes bounded rationality and proposes nudges as adaptive designs of the decision environment (choice architecture) which influence the behavior and decision-making of groups or individuals [12].

In our previous research on social marketing and behavioral economics, we clarified the characteristics of delayed psychiatric treatment recipients, who are affected by strong biases such as stigma against psychiatry [13]. Stigma toward psychiatric help-seeking is a

result of the confirmation bias of "people believing that their problems before receiving treatment are due to weaknesses in their personality and that they therefore cannot be treated," which is perceived as a major cost when they receive treatment. Furthermore, psychiatric help-seeking was thought to be delayed by present bias, which leads people to underestimate future risks and by negativity bias arising from negative information processing due to depressive symptoms [14]. Therefore, as countermeasures against these biases, we should consider providing information that does not make people aware of their current losses, leading people to intend to seek professional help, and using new concepts to avoid stigma [15]. In particular, since stigma generates feelings of fear, and fear-appeal messages such as "if you do not go to a doctor, you will get worse" are said to provoke defensive responses, it is necessary to use creative messaging [16]. To counteract present bias, it is said that messaging should convey that the person is at risk for future severity while simultaneously reinforcing self-efficacy in implementing effective risk-reduction behaviors [17].

In this study, we developed a mental health promotion campaign program to promote psychiatric help-seeking behavior among university students adopting a social marketing approach and the behavioral economics nudge theory. We then examined the effectiveness of the campaign program by employing a retrospective design comparing the perceived duration until psychiatric consultation using pre and during campaign data. Our campaign program was designed to avoid the stigma and also provided information on how to easily recognize the early symptoms of depression and adjustment disorders by using the easy and simple illustration of cognitive function-related symptoms caused by deterioration in cognitive function, which is a major component of depression.

Materials and Methods

Study design and participants

This study retrospectively compared the data from our previous study investigating the period from symptom onset to the first visit to a psychiatric consultation and the factors that influence psychiatric consultation behavior in university students, with data from the start of our newly developed mental health campaign [8]. The campaign included the distribution of a leaflet with an illustration and website address and promoted psychiatric consultation at the university health care center during the annual physical examination for all students. Individuals with missing data on age, sex, duration until psychiatric consultation, and mental health status measurements were excluded. Students who had previously consulted a psychiatrist were excluded.

During the campaign, a questionnaire survey was conducted for consecutive patients of the university students who first visited the psychiatric department of Osaka University Health Care Center and provided consent to participate in the study protocol. Our previous research, as the campaign's pre-period, was from April 1, 2016, to March 31, 2018. The post-campaign, after the start of the mental health campaign, was from April 1, 2018, to March 31, 2020. The study protocol was approved by the Ethics Committee of the Health and Counseling Center, Osaka University (number 15, 2019).

Cognitive function-focused mental health campaign ("Fatigue of Brain" campaign)

The health promotion campaign program, which focused on the illustration of cognitive function-related symptoms, called the "Fatigue of Brain" campaign, is an original campaign developed by the authors. The program included a small leaflet given to all students during their physical examinations which directed them to an original website (http://mhc.grappo.jp/brain/). Although in a general mental health campaign, the goal is to present accurate information about depression and depressive states to facilitate psychiatric consultation, we did not use the terms "depression" or "depressive" and decided to use the term "Fatigue of the Brain" as a new frame of reference for only the cognitive or executive dysfunction included in depression [18]. This is because there are already various stigmas and stereotypes regarding mental health problems, and the terms "depression" and "depressive" have become commonly recognized as serious illnesses and are less able to indicate the early stage of the disorder [13].

The contents and design of the leaflet and the website were developed by conducting a formative survey by the researchers (Kei Hirai and Asayo Yamamura) for five graduate students who had visited psychiatric consultation at the university health service center. The first page of the leaflet included as short a message as possible with the catchphrase "Is your brain tired?" and information on six cognitive function-related symptoms leading to poor academic performance: deep sleep disorder, poor working memory, decreased interest, decreased concentration, not completing tasks, and a lack of interest in meeting with others, which are among the initial symptoms of depression that university students can identify and are less resistant to consultation in formative research. The second page presents a guide for the website with more detailed information, a QR code, and specific instructions on how to reserve and access the psychiatric services on the campus to facilitate students' implementation intention for psychiatric consultation [19].

In addition to the content of the leaflet, four types of student personas were created for the campaign website (http://mhc.grappo.jp/brain/), and four-frame cartoons were used to show situations in which "Fatigue of Brain" is likely to occur so that people can understand that their condition may be "Fatigue of Brain." The checkboxes are designed to encourage students to check the boxes for six symptoms, and if three or more symptoms apply to them, they are encouraged to see a psychiatrist. To increase the implementation intention, a map from an external map site was embedded to show the location of the health administration center contact points on each campus, and the phone number for making an appointment was also included.

Measures

The main outcome measure was the Duration Until Psychiatric Consultation (DUPC) equivalent to the DUI, which was measured as the period from symptom onset to the first visit to the department of psychiatry of the university health care center, as follows: A few days, one week, two weeks, one month, three months, six months, and over a year.

The reasons for psychiatric consultation were assessed by open-ended single items, and the consultation content was categorized as follows: Sleep problems, depressive symptoms, anxiety/nervousness, physical symptoms (e.g., pain, diarrhea, headache, palpitation, and change in body weight), other psychiatric symptoms, awareness of mental disorders, school attendance problems, stress, such as with relationships, awareness of developmental disorders and problems in daily life. Others we used the general health questionnaire-12 (GHQ-12) to evaluate students' mental health status [20]. Stigma toward receiving psychiatric consultation was assessed using five

modified questions regarding the perception of stigma associated with receiving psychiatric consultation used in our previous report [8]. The sum of these questions' scores was used as the stigma score. Information on age, sex, and university grade was obtained from the questionnaire.

Statistics

First, we performed a univariate logistic regression analysis of the differences in DUPC and consultation contents before and after the campaign. We also performed an analysis of variance for the GHQ-12 and stigma scores. We then performed univariate logistic regression analysis to identify the cut-off points for DUPC and a multivariate hierarchical logistic regression analysis with the identified cut-off points as the independent variable and campaign, age, sex, GHQ-12, stigma, and consultation content as dependent variables. Finally, we performed a χ^2 test for a detailed analysis of the results of the multivariate analysis. All statistical analyses were performed using SPSS Statistics for Windows, version 22 (SPSS Inc., Chicago, IL, USA). Differences were considered statistically significant at $p<0.05$.

Results

Demographic characteristics

Of the 333 students who were provided with the questionnaire before the campaign, 239 (71.8%) responded; of the 339 students who were provided with the questionnaire during the intervention, 244 (70.5%) responded. Eight students were excluded because of missing data regarding their history of consultation with a psychiatrist, 61 excluded as they had visited a psychiatrist, and 100 because of missing data on age, sex, DUPC, and GHQ-12 score. Data on 380 students (Pre-campaign: N=185; During-campaign: N=195) were used for analysis. The demographic data are shown in Table 1. As the result of a one-way analysis of variance with the, no significant difference in age among two camapaign groups was observed ($F(1,380)=0.127$, $p=0.721$). Next, a χ^2 test during the school years revealed that no significant difference was found ($\chi^2=2.241$, $df=10$, $p=0.994$). Univariate logistic regression analysis confirmed that there was a significant difference in sex (female), and the percentage of females was smaller during the intervention period (OR=1.764, 95%CI (confidence interval)=1.172-2.654, p=0.006).

A factor analysis was conducted on the five items for which stigma were measured. The eigenvalue changes were 2.86, 0.79, 0.62, and 0.43. A one-factor structure was considered appropriate due to its interpretability. The cumulative contribution of one factor was 57.12. Cronbach's alpha coefficient was 0.81, confirming sufficient reliability. In subsequent analyses, the sum of the five items will be treated as the stigma score.

Demographic									
	Pre-Campaign		**On-Campaign**		**Total**				
	M	**SD**	**M**	**SD**	**M**	**SD**	**F(,)**	**P**	
Age (year)	22.6	3.2	22.8	3.3	22.7	3.3	F(1,380)= 0.127	0.721	
	Pre-Campaign		**On-Campaign**		**Total**				
	N	**%**	**N**	**%**	**N**	**%**	**OR**	**(95% CI)**	**P**
Sex, female	96	51.9	74	37.9	170	44.7	OR=1.764	(1.172-2.654)	0.006
Grade	**Pre-Campaign**		**On-Campaign**		**Total**				
	N	**%**	**N**	**%**	**N**	**%**	**χ^2**	**df**	**P**
B1	19	10.3	17	8.7	36	9.5	2.241	10	0.994
B2	23	12.4	22	11.3	45	11.8			
B3	27	14.6	31	15.9	58	15.3			
B4	37	20	38	19.5	75	19.7			
M1	26	14.1	26	13.3	52	13.7			
M2	30	16.2	36	18.5	66	17.4			
D1	7	3.8	9	4.6	16	4.2			
D2	7	3.8	5	2.6	12	3.2			
D3	7	3.8	10	5.1	17	4.5			
Research student	1	0.5	1	0.5	2	0.5			
Blank	1	0.5	0	0	1	0.3			
Total	185	100	195	100	380	100			

Table 1: Characteristics of study participants.

Differences in DUPC, reasons for consultation, and mental health status before and after the campaign

We categorized DUPC and the reasons for psychiatric consultation and compared the frequency of each category, the GHQ-12 total score, and the stigma before or during the campaign. For DUPC, no significant differences were observed between the over a year before the campaign and over the year after the campaign cases. Among reasons for psychiatric consultation, the frequency of sleep problems (N=58, 23.3%), which were most common before the campaign, did not differ significantly from the frequency (N=51, 19.5%) during the campaign (OR=0.776, p<0.263). On the other hand, the frequency (N=34, 13.7%) of depressive problems before the campaign increased significantly to the highest frequency (N=68, 26.1%) during the campaign (OR=2.522, p<0.000). The frequency of other psychiatric symptoms decreased significantly from before the campaign (N=17, 6.8%) to during the campaign (N=2, 0.8%; OR=0.102, p=0.003). There were no significant differences in the GHQ-12 total score (F (1, 378)=0.631, p=0.428), or stigma score (F(1,373)=0.293, p=0.588) (Table 2).

Duration until psychiatric consultation	Pre-Campaign		On-Campaign		Total		OR	(95% CI)	P
A few days	4	2.2	6	3.1	10	2.6	1.437	(0.399-5.174)	0.58
One week	7	3.8	11	5.6	18	4.7	1.52	(0.576-4.009)	0.397
Two weeks	17	9.2	29	14.9	46	12.1	1.726	(0.914-3.261)	0.092
One month	34	18.4	31	15.9	65	17.1	0.839	(0.492-1.433)	0.521
Three months	25	13.5	27	13.8	52	13.7	1.029	(0.573-1.847)	0.925
Six months	18	9.7	15	7.7	33	8.7	0.773	(0.378-1.583)	0.482
Over a year	80	43.2	76	39	156	41.1	0.838	(0.557-1.262)	0.398
Main consultation contents									
Sleep problems	58	23.3	51	19.5	109	21.4	0.776	(0.497-1.211)	0.263
Anxiety/ Nervousness	29	11.6	27	10.3	56	11	0.902	(0.513-1.584)	0.719
Depressive symptom	34	13.7	68	26.1	102	20	2.522	(1.565-4.065)	0
Physical symptoms	7	2.8	5	1.9	12	2.4	0.669	(0.209-2.147)	0.499
Other psychiatric symptoms	17	6.8	2	0.8	19	3.7	0.102	(0.023-0.450)	0.003
Awareness of mental disoders	26	10.4	24	9.2	50	9.8	0.818	(0.448-1.492)	0.512
School attendance problems	34	13.7	33	12.6	67	13.1	0.938	(0.555-1.585)	0.811
Stress such as with human relations	16	6.4	20	7.7	36	7.1	1.207	(0.605-2.408)	0.593
Awareness of developmental disoders	9	3.6	12	4.6	21	4.1	1.282	(0.527-3.119)	0.583
Problem in daily life	8	3.2	8	3.1	16	3.1	0.947	(0.348-2.578)	0.914
Others	1	0.4	5	1.9	6	1.2	4.842	(0.560-41.843)	0.152

	Mean	SD	Mean	SD	Mean	SD	F	P	
GHQ-12 total score	8.4	3.4	8.6	3	8.5	3.2	F (1,378)=0.631	0.428	
Stigma	7.2	3.4	7.3	3.5	7.3	3.4	F (1,373)=0.293	0.588	

Table 2: Characteristics of study participants 2.

Significant cut-off points on DUPC affected by the campaign

Table 3 presents the distribution of students in the pre-and during-campaign divided by five different DUPC cut-off points and it also presents the results of univariate logistic regression analyses. The proportion of students (40.3%) who visited psychiatric consultation within two weeks from the start of the campaign was significantly higher than the proportion of students visiting before the campaign (37.6%; OR=0.578, 95% CI=0.343-0.972, p=0.039).

Characteristics of consultations within 2 weeks of DUPC

To examine the combination of variables that explain the increase of students in DUPC within 2 weeks shown in 3.3, whether or not DUPC is within 2 weeks is used as the dependent variable, and the logistic regression analysis was performed using the stepwise variable increase method, as we entered the dependent variables in the order: campaign, sex, age, GHQ-12 total score, stigma, and depressive symptoms (Table 4).

It was confirmed that when depressive symptoms were entered, the proportion of people with depressive symptoms (31.6%) was significantly higher during the campaign than before the campaign (17.3%; OR=0.444, 95%CI=0.234-0.843, p=0.013). To ensure that people with depressive symptoms frequently visited within 2 weeks during the intervention period, a $\chi 2$ test of 2×2×2 consisting of pre/during-campaign, with/without depressive symptoms, and within/over DUPC 2 weeks showed significant independence during the campaign period (total: $\chi 2=6.266$, df=1, p=0.012; Pre: $\chi 2=2.170$, df=1, p=0.141; On: $\chi 2=4.469$, df=1, p=0.035). Table 5 shows that 24.1% of the students had reported depressive symptoms as the primary reasons for consultation within two weeks of DUPC before the campaign, whereas 39.3% reported depressive symptoms during the campaign.

Variables	**OR**	**(95% CI)**	**P**
DUPC one week	0.662	(0.301-1.454)	0.304
DUPC two week	0.578	(0.343-0.972)	0.039
DUPC one month	0.772	(0.508-1.175)	0.227
DUPC three month	0.777	(0.519-1.162)	0.219
DUPC six month	0.838	(0.557-1.262)	0.398

Table 3: Logistic regression analysis of the camapaign on each DUPC cut-offs.

	OR	**(95% CI)**	**P**	**OR**	**(95% CI)**	**P**	**OR**	**(95% CI)**	**P**
Campaign	0.578	(0.343-0.972)	0.039	0.602	(0.355-1.021)	0.06	0.604	(0.356-1.024)	0.061
Sex				0.758	(0.446-1.287)	0.305	0.757	(0.446-1.287)	0.304
Age				0.942	(0.877-1.012)	0.102	0.942	(0.877-1.012)	0.104
GHQ total							0.99	(0.912-1.074)	0.805
Stigma									
Depressive symptom*									

Note: *The variables excluded from final model by stepwise procedure: sleep problems, physical symptoms, school attendance problems, awareness of developmental disorders, problems in daily life.

Table 4: Multiple logistic regression analysis (Dependent variable: DUPC 2 weeks).

		DUPC 2 weeks		DUPC over 2 weeks	
		N	%	N	%
Pre-campaign	No depressive symptom	21	13.5	135	86.5
	Depressive symptom	7	24.1	22	75.9
	Total	28	15.1	157	84.9
On-campaign	No depressive symptom	35	21	132	79
	Depressive symptom	11	39.3	17	60.7
	Total	46	23.6	149	76.4

Table 5: Cross table between depressive symptom, DUPC 2 week and campaign.

Discussion

The most important finding was that the number of students within a 2-week DUPC period during the campaign increased significantly compared with that in the pre-campaign period. This is important because, to our knowledge, there is limited evidence showing the behavioral outcomes of mental health promotion campaigns. Although there might be a public change in mental health literacy and norms over time, we think the results show the effectiveness of the cognitive function-focused mental health promotion campaign in shortening students' DUPC.

Further to the above, in the additional analysis, students within the 2-week DUPC period during the campaign reported significantly more depressive symptoms than those in pre-campaign. Since the campaign intended to promote students' awareness of cognitive and executive function-related symptoms among depressive symptoms (poor working memory, decreased interest, etc.), during the campaign, students could more effectively recognize depressive symptoms because of the campaign and were more motivated to engage early psychiatric consultation.

Previous studies on mental health campaigns have focused on improving mental health literacy, mainly regarding depression [18]. However, previous research has shown that stigma against psychiatry influences the period until psychiatric help-seeking behavior [21-23]. Therefore, in our cognitive function-focused campaign, we did not used the terms "depression," "Utsu" in Japanese, or "depressed mood," because these terms have stigmas associated with term [13]. Instead, we used the term "Fatigue of Brain," which represented the status of problematic executive function, and the list of the executive function-related symptoms on our leaflet and website. This implies that our approach, in which the presentation of specific information, including cognitive and executive function symptoms that cause difficulties in students' daily lives, and the process of preparation for psychiatric consultation, is an effective way to facilitate early psychiatric consultation and shorten DUPC.

This study had some limitations. First, our study design utilized a retrospective comparison between pre-campaign and during-campaign data and did not use a prospective design with the control group. Thus, as there might be social changes in mental health literacy and norms over time, these may influence shorter DUPC. However, because there was no difference in students' demographics, except for sex, and multivariate analysis confirmed that it had no effect on DUPC except for the campaign and depressive symptoms, we believe our findings are valid. Second, the DUPC index in this study was subjectively and retrospectively identified from students' responses to the questionnaire. A prospective survey design is required for a more accurate DUPC evaluation. In future research, it will be necessary to adopt a prospective cohort study in which regular mental health screening is conducted to detect highly stressed or vulnerable students and a web-based follow-up system will enable the tracking and evaluation of behaviors related to psychiatric consultation.

Conclusion

We developed a cognitive function-focused mental health promotion campaign that included a small leaflet and website based on social marketing and behavioral economic approaches to facilitate early psychiatric consultation among Japanese university students. Compared to before the campaign started, the proportion of students with a DUPC within two weeks of the campaign starting significantly increased. Furthermore, multivariate analysis revealed that the number of people who reported depressive symptoms as their reason for consultation significantly increased. From these results, our approach, in which the presentation of specific information including cognitive and executive function symptoms and the process of preparation for psychiatric consultation, is an effective way to facilitate early psychiatric consultation.

Author Contribution

Hirai K is a principal investigator, coordinated the study, analyzed and interpreted the data, and wrote the first draft. Adachi H contributed to study coordination, acquisition of the data, and interpretation of the data, and wrote the first draft. Yamamura A, Nakamura-Taira N, Tanimukai H, and Fujino R contributed to study coordination and interpretation of the data. Kudo T contributed to acquisition of the data and interpretation of the data.

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