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Psychological impact of the prolonged COVID-19 pandemic on Japanese university students

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Abstract

Introduction: The coronavirus disease (COVID-19) pandemic has had notable negative effects on the mental health of young adults. Japanese students who entered university in 2020 were expected to have poorer mental health than older students, as their student life has primarily been online. The present study investigated the psychological impact of the prolonged COVID-19 pandemic on Japanese university students.

Methods: A total of 1,313 students responded via the university portal site to a demographic questionnaire, the 6-Item Kessler Psychological Distress Scale (K6), the Three-Item Loneliness Scale, and original questions that focused on sense of university belongingness and satisfaction with student life.

Results: Our results revealed that more than 50% of students experienced moderate or greater psychological distress regardless of academic year. Female students experienced more psychological distress than their male counterparts. Psychological distress was also found to be associated with loneliness, sense of university belongingness and satisfaction with student life.

Discussion: Given the prolonged pandemic, university authorities need to support the social relationship among students by providing opportunities for combined face-to-face and online interactions.

Keywords: prolonged COVID-19 pandemic; psychological distress; loneliness; sense of university belongingness; satisfaction with student life

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1. Introduction

Since the first case of coronavirus disease (COVID-19) infection was reported in Japan in January 2020, the number of infected people continues to increase. According to statistics from the World Health Organization (2021), there were more than 1,727,000 cumulative cases and 18,000 cumulative deaths in Japan as of November 30, 2021. A systematic review demonstrated that the COVID-19 pandemic has caused a variety of mental health problems globally (Xiong et al., 2020). Thus, it is vital to identify the factors that contribute to mental health problems so that they can be targeted by prevention and intervention efforts.

With the spread of COVID-19, many universities worldwide have imposed restricted access to the campus and switched to online-based classes from traditional face-to-face classes (Sahu, 2020). According to a recent narrative review (Cielo et al., 2021), the COVID-19 pandemic and lockdowns have created or increased mental distress for university students. This distress can influence various aspects of student academic life. Generally, the academic year in Japanese universities begins in April. Owing to the first peak of COVID-19 infection that occurred in April 2020, the Japanese government declared a first-time state of emergency, which lasted from April 16 to May 25, 2020. Under the declared state of emergency, citizens were asked to cooperate with the measures taken by the prefectural government and were required to refrain from going out and to work from home (Yamamoto et al., 2020). As of mid-2021, the same conditions and restrictions remain. As a result, Japanese university students, like those in other countries, are no longer able to lead normal student lives, as they were before the COVID-19 pandemic.

Specifically, the first-year class of 2020 experienced difficulty building relationships at the university, as they began online student life without an introductory ceremony and adequate guidance for new students. In 2020, Japanese first-year students had higher academic distress than those in 2019 (Horita et al., 2020). Other studies conducted between April and June 2020 reported that 18.4% to 28.5% of Japanese university students had moderate or higher psychological distress (Arima et al., 2020; Fuse-Nagase et al., 2020). Previous global studies reported that younger university students had more psychological problems during the lockdown period than older students (Padrón et al., 2021; Yunus et al., 2021). One study showed that a stay-at-home order was associated with greater loneliness (Tull et al., 2020); an earlier study reported that loneliness was a predictor of increased depressive symptoms among university students (Vanhalst et al., 2012). Another study conducted during the lockdown period revealed a positive association between loneliness and psychological distress (Losada-Baltar et al., 2021).

It is possible that in 2020, Japanese first-year university students who were unable to

appropriately establish fulfilling relationships immediately after entering university experienced more loneliness than students in higher academic classes or years. As they could not attend university classes in person or access university facilities, these students may have felt a lower sense of university belongingness compared to older students. Therefore, first-year students in 2020 are also likely to have lower levels of satisfaction with student life than older students. These social relationships in the university campus have a meaningful role in buffering stress, and the absence of such relationships can adversely affect students' mental health (Cohen and Willis, 1985; Thoits, 1985). Research on college students during the COVID-19 pandemic also reported that increased social support (either perceived or received) was associated with better psychological health (Szkody et al., 2021). Furthermore, younger age groups and females in particular have been associated with higher psychological distress under the pandemic (Qiu et al., 2020; Wang et al., 2020). Furthermore, previous studies revealed that women had higher levels of loneliness than men during the first lockdown (Li and Wang, 2020; McQuaid et al., 2021). Moreover, although the number of suicides in Japan had been declining over the past decade, there was an upward trend in 2020. The number of suicides, especially among young people, has been increasing (Ministry of Health, Labour and Welfare, 2021). In particular, the number of suicides among Japanese women has increased since July of 2020 (Nomura et al., 2021; Sakamoto et al., 2021). However, most existing studies on the psychological effects of the COVID-19 pandemic on Japanese university students have been conducted in the early stages of the pandemic. The effects of the prolonged COVID-19 pandemic, which has profound restrictions on social relationships and interactions on the psychological states of university students, remains unclear.

This study explored the psychological impact of the prolonged COVID-19 pandemic on Japanese university students. The study's hypotheses were:

Hypothesis 1a: Among first-year students, the percentage of severe psychological distress is higher than those of students in higher academic classes.

Hypothesis 1b: Loneliness levels among first-year students is higher than those of students in higher academic classes. Sense of university belongingness and satisfaction with student life for first-year students are lower than those of students in higher academic classes.

Hypothesis 2a: The percentage of serious psychological distress are higher among women than men.

Hypothesis 2b: The level of loneliness for women is higher than men. Owing to higher levels of loneliness, women have a lower sense of university belongingness and lower levels of satisfaction with student life than men.

Hypothesis 3: Loneliness is positively associated with psychological distress.

Hypothesis 4: The sense of university belongingness and satisfaction with student life are negatively associated with psychological distress.

2. Methods

2.1. Procedures

This study was conducted in Japan as part of the annual survey on student life at the university. The university is in the center of Sapporo City, with a population of approximately 1.96 million; it has more than 8,000 students with five majors (Economics, Business Administration, Law, Humanities, and Engineering) and a graduate school. A cross-sectional, web-based survey was conducted with all undergraduate students who were present at the university in December 2020. The invitation to participate in the survey was sent via the university portal site. The survey was administered anonymously, and students who agreed to participate in the research did so voluntarily. This research protocol was approved by the Institutional Review Board of the Graduate School of Business Administration, Hokkai-Gakuen University (BA-20-3).

2.2. Participants

Of the 8,221 undergraduates, 1,398 students (17.0%) responded to the online survey. Data from 85 students who were identified as having provided incomplete responses were excluded from the analysis. The final number of respondents for the study was 1,313 (16.0%).

2.3. Measures

2.3.1. Demographic variables

All participants were asked to answer questions about their academic year, gender, and major. These characteristics are summarized in Table 1.

2.3.2. 6-Item Kessler Psychological Distress (K6) Scale

The K6 is a self-reported questionnaire that includes six items to assess psychological distress (Kessler et al., 2003). It is widely used as a severity assessment to screen for psychiatric disorders. Each item is evaluated on a 5-point Likert scale (0 to 4), with the total score ranging from 0 to 24. A score of 13 or higher indicates severe psychological distress (Kessler et al., 2003), and a score ranging from 5 to 12 represents moderate psychological distress (Prochaska et al., 2012). In accordance with the score interpretations from these earlier studies, this study defined psychological distress as severe (K6 score $\geq$ 13), moderate, (K6 score $\geq$ 5), and low (K6 score $\leq$ 4). In this study, the Japanese version of the K6 was employed (Furukawa et al., 2008) and the

Table 1. Participant demographic characteristics ($n = 1,313$)

Characteristic	n (%)
Academic year	
First year	400 (30.5)
Second year	350 (26.7)
Third year	389 (29.6)
Fourth year or higher	174 (13.3)
Gender	
Men	808 (61.5)
Women	505 (38.5)
Major area of study	
Economics	327 (24.9)
Business Administration	291 (22.2)
Law	252 (19.2)
Humanities	207 (15.8)
Engineering	233 (17.7)
Unknown	3 (0.2)

Cronbach's alpha was excellent ($\alpha = .91$).

2.3.3. Three-Item Loneliness (TIL) Scale

The TIL scale is a self-reported questionnaire based on the 20-item revised UCLA Loneliness Scale (Hughes et al., 2004). It was first developed as a telephone survey for older adults in the United States and has been applied in undergraduate research (Pittman and Reich, 2016). The scale contains three items to evaluate loneliness. Each item is rated on a 3-point Likert scale ranging from 1 to 3, with the total score ranging from 3 to 9. A higher TIL score indicates greater loneliness. This study employed the Japanese version of the TIL scale, which has adequate reliability and validity for the assessment of loneliness (Igarashi, 2019). The Cronbach's alpha of the TIL scale in the present study was fair ($\alpha = .79$).

2.3.4. Sense of university belongingness and satisfaction with student life

Original items were employed to measure the student's sense of university belongingness and satisfaction with student life. Participants were asked to respond to the questions: "How much do you feel a sense of belonging to the university?" and "How much do you feel satisfied with your student life?" to measure university belongingness and satisfaction with student life, respectively. These questions seem to have face validity. Responses were rated on a 5-point Likert scale (1 to 5), with a higher score indicating a greater sense of university belongingness and greater satisfaction with student life.

2.4. Analyses

A chi-square test was performed to investigate the differences in the percentage of severe, moderate, and low degrees of psychological distress in first-year students and students in higher academic classes and among genders. Unpaired two-tailed t-tests were performed to compare the differences in the mean scores of each indicator between the two groups. Correlation analysis was conducted for both groups to examine the relationships among psychological distress, loneliness, sense of university belongingness, and satisfaction with student life. Hierarchical multiple regression analysis was used to identify the variables associated with psychological distress. In the first step, academic year, gender, and psychological variables (loneliness, sense of belonging to the university, and satisfaction with student life, respectively) were entered as independent variables. To examine the moderation effect of academic year and gender, the interaction effect of the two variables among the first step was included in the second step. In the third step, the interaction effects of all three variables were entered. A statistical significance level of 5% was used. All data were analyzed using SPSS Version 25.0 (IBM, Japan).

3. Results

3.1. Descriptive statistics for academic year

Table 2 shows the percentage of psychological distress (severe, moderate, low) as well as the mean scores for loneliness, sense of university belongingness, and satisfaction with student life among first-year students, students in higher academic classes, and among genders. A chi-square test revealed no significant difference between first-year students and students in higher academic classes in terms of level of psychological distress. Unpaired two-tailed t-tests showed there were significant score differences between first-year students and students in higher academic classes for loneliness, sense of university belongingness, and satisfaction with university life.

3.2. Descriptive statistics for genders

A chi-square test found that there was a significant difference in terms of level of psychological distress among genders. Unpaired two-tailed t-tests revealed there were no significant differences across genders in the mean scores of loneliness and sense of university belongingness. The mean score for satisfaction with student life was significantly greater for women than men.

Table 2. Descriptive statistics

Variables	Total (n = 1313)	First-year students (n = 400)	Higher academic students (n = 913)	Statistics	Effect sizes	Men (n = 808)	Women (n = 505)	Statistics	Effect sizes
Psychological distress (in %)		n (%)					n (%)		
Severe[a]	251 (19.1%)	75 (18.8%)	176 (19.3%)	χ^2 = .56[d]	V = .02	139 (17.2%)	112 (22.2%)	χ^2 = 21.80***[d]	V = .13
Moderate[b]	488 (37.2%)	144 (36.0%)	344 (37.7%)			275 (34.0%)	213 (42.2%)		
Low[c]	574 (43.7%)	181 (45.3%)	393 (43.0%)			394 (48.8%)	180 (35.6%)		
		M (SD)					M (SD)		
Loneliness	4.80 (1.75)	4.97 (1.79)	4.73 (1.72)	t = 2.23*[e]	d = .14	4.79 (1.75)	4.82 (1.74)	t = .31[e]	d = .02
Sense of university belongingness	2.18 (.93)	2.02 (.94)	2.25 (.93)	t = 4.04***[e]	d = .25	2.14 (.98)	2.24 (.86)	t = 1.74[e]	d = .11
Satisfaction with student life	2.76 (.76)	2.66 (.80)	2.81 (.74)	t = 3.35**[e]	d = .20	2.73 (.81)	2.82 (.69)	t = 2.17*[e]	d = .12

Note. [a]13 ≤ K6 total score. [b]5 ≤ K6 total score < 13. [c]K6 total score < 5. [d]df = 2. [e]df = 1311. *p < .05, **p < .01, ***p < .001

Table 3. Intercorrelation matrix of psychological distress, loneliness, sense of university belongingness, and satisfaction with student life among first-year students and higher academic students

Variables	1	2	3	4
1. Psychological distress	-	.41*	-.15*	-.26*
2. Loneliness	.43*	-	-.21*	-.18*
3. Sense of university belongingness	-.16*	-.18*	-	.47*
4. Satisfaction with student life	-.24*	-.22*	.44*	-

Note. Intercorrelations for first-year students ($n = 400$) are represented above the leading diagonal and intercorrelations for higher academic students ($n = 913$) are shown below the leading diagonal; *$p < .01$

Table 4. Intercorrelation matrix of psychological distress, loneliness, sense of university belongingness, and satisfaction with student life among men and women

Variables	1	2	3	4
1. Psychological distress	-	.42*	-.19*	-.28*
2. Loneliness	.43*	-	-.20*	-.19*
3. Sense of university belongingness	-.12*	-.19*	-	.45*
4. Satisfaction with student life	-.21*	-.24*	.46*	-

Note. Intercorrelations for men ($n = 808$) are represented above the leading diagonal and intercorrelations for women ($n = 505$) are shown below the leading diagonal; *$p < .01$

3.3. Correlation analysis

Table 3 presents a zero-order correlation matrix of psychological distress, loneliness, sense of university belongingness, and satisfaction with student life for first-year students and students in higher academic classes separately. In both academic years, significant correlations were found for all variables. Table 4 represents a zero-order correlation matrix between psychological distress, loneliness, sense of university belongingness, and satisfaction with student life for both men and women. Significant correlations were confirmed among all variables for both gender groups.

3.4. Hierarchical multiple regression analysis

Table 5 shows the results of the hierarchical multiple regression analyses with the academic years, gender, and psychological variables (loneliness, sense of university belongingness, and satisfaction with student life) as independent variables, and psychological distress as the dependent variable. According to the analysis with academic year, gender, and loneliness as independent variables, there were significant associations between the main effects of both gender and loneliness and psychological distress in the third step ($F (7, 1305) = 44.37, p < .001$). The results showed that there was a significant association between the main effects of gender and sense of university belongingness and psychological distress in the third step when academic year,

Table 5. Hierarchical multiple regression analysis with psychological distress as a dependent variable

Independent variables	Psychological distress					
	Step 1		Step 2		Step 3	
	β	t	β	t	β	t
Academic year	.04	1.39	.05	1.63	.05	1.63
Gender	.11**	4.33	.14*	3.11	.14*	3.09
Loneliness	.42**	17.02	.41**	8.47	.40**	7.23
Academic year*Gender			-.05	-.90	-.05	-.89
Academic year*Loneliness			.02	.34	.02	.37
Gender*Loneliness			.01	.31	.02	.31
Academic year*Gender*Loneliness					-.01	-.17
R^2	.19**		.19**		.19**	
ΔR^2			.00		.00	
Academic year	.03	.97	.05	1.33	.05	1.31
Gender	.12**	4.40	.16*	3.15	.16*	3.12
Sense of university belongingness	-.16**	-6.01	-.18*	-3.40	-.18*	-2.94
Academic year*Gender			-.05	-.93	-.05	-.92
Academic year*Sense of university belongingness			-.01	-.11	-.01	-.17
Gender*Sense of university belongingness			.03	.94	.02	.39
Academic year*Gender*Sense of university belongingness					.01	.15
R^2	.04**		.04**		.04**	
ΔR^2			.00		.00	
Academic year	.03	1.18	.05	1.57	.05	1.52
Gender	.13**	4.76	.17*	3.43	.17*	3.39
Satisfaction with student life	-.26**	-9.54	-.28**	-5.64	-.26**	-4.72
Academic year*Gender			-.06	-1.02	-.05	-1.01
Academic year*Satisfaction with student life			.01	.30	-.01	-.18
Gender*Satisfaction with student life			.02	.49	-.02	-.38
Academic year*Gender*Satisfaction with student life					.05	.79
R^2	.08**		.08**		.08**	
ΔR^2			.00		.00	

Note: Students in first year and men were coded as 0, students in higher academic classes and women were coded as 1; *p < .01, **p < .001

gender, and sense of university belongingness were analyzed as independent variables (F (7, 1305) = 7.84, p < .001). When the academic year, gender, and satisfaction with student life were analyzed as independent variables, a significant association was found between the main effects of gender and satisfaction with student life and psychological distress in the third step (F (7, 1305) = 15.80, p < .001).

4. Discussion

The present study investigated the psychological impact of the prolonged COVID-19 pandemic on Japanese undergraduate students. The study demonstrated that there were no significant differences between first-year students and students in the higher academic classes in terms of the percentage of severe psychological distress. These results do not support the Hypothesis 1a. However, the rates of severe and moderate psychological distress discovered in this study were higher than results of previous studies conducted from April to May 2020 that assessed psychological distress among Japanese university students via the K6 (28.5%: Arima et al., 2020; 18.4%; Fuse-Nagase et al., 2020). Another study in Japan, between 2007 and 2016, reported that the percentage of severe psychological distress could range from 4.01% to 4.21 % and the percentage of moderate distress could range from 24.24% to 24.91%, as evaluated by the K6 (Nishi et al., 2018). Compared to these previous findings, this study's results suggest that the prolonged COVID-19 pandemic has serious consequences on the mental health of Japanese university students, regardless of their year of study. The present study confirmed that the mean score of loneliness among first-year students was significantly higher than the mean score among students in the higher academic classes. The mean scores of sense of university belongingness and satisfaction with student life among first-year students were both lower than the scores of students in higher academic classes. These results support the Hypothesis 1b.

This study showed that the percentage of serious psychological distress is higher among women than men. The results supported the Hypothesis 2a and were consistent with previous studies (Qiu et al., 2020; Wang et al., 2020). Such high levels of psychological distress under a prolonged pandemic may contribute to the increase in suicides among Japanese women. Although the level of loneliness and a sense of university belongingness were not significantly different across genders, satisfaction with student life for women was higher than men. These results did not support the Hypothesis 2b. As of May 2020, 90% of lectures at Japanese universities were conducted via online classes only; thus, most students did not have the opportunity to attend face-to-face classes (Ministry of Education, Culture, Sports, Science and Technology, 2021a). Whereas, when this study was conducted in December 2020, online classes dropped to 0.6% in Japanese universities, and about 80% of lectures were delivered through a combination of online and face-to-face classes (Ministry of Education, Culture, Sports, Science and Technology, 2021b). Such changes in the delivery of classes under the prolonged COVID-19 pandemic may have led to a reduction in loneliness and an increased sense of university belongingness, especially among female students. As a result, it is possible that there were no significant differences in these scores between

genders.

Correlation analysis revealed a significant positive relationship between psychological distress and loneliness. A hierarchical multiple regression analysis also revealed a significant positive association between the two variables. These findings support Hypothesis 3. A previous study reported that lonely young adults were more inclined to experience mental health problems, adopt physical-health risk behaviors, and employ negative strategies to cope with stress (Matthews et al., 2019). Loneliness has also been linked to less involvement in COVID-19 preventive behaviors (Stickley et al., 2021). The findings of these prior studies, as well as the current study results, suggest that university students need greater support to reduce loneliness in order to counter health concerns and to enhance COVID-19 prevention behaviors.

The current study confirmed significant negative correlations between psychological distress and both sense of university belongingness and satisfaction with student life. Hierarchical multiple regression analyses revealed that there were significant negative associations between psychological distress and both sense of university belongingness and satisfaction with student life. These results support Hypothesis 4. A prior study revealed that low satisfaction with the university's response during the lockdown condition was associated with depression and anxiety (Sazakli et al., 2021). In order to elevate sense of university belongingness and satisfaction with student life during the pandemic, university authorities should strive to enhance the online learning environment, provide clear communication on the grading process, offer appropriate counseling services, and establish connections among students through online social media platforms (Sahu, 2020).

The strength of this study is the identification of the psychological characteristics of university students under the prolonged COVID-19 pandemic, in contrast to and augmenting previous studies that researched only the short-term impact of the pandemic. However, the study had some limitations. First, the research design was a cross-sectional study. Therefore, it was not possible to determine causal relationships among the variables assessed in the study. In the future, the causal relationships among variables should be verified through longitudinal studies. Second, the study had a sufficient sample size of more than 1,000 students; however, caution should be exercised while generalizing findings as the research was conducted at a single university. A multi-site, international collaborative study is required in the future. Third, since sense of university belongingness and satisfaction with student life were assessed as a single item, it is necessary to evaluate these two variables from a multidimensional perspective. Fourth, since the results of this study exclusively relied on self-report measures, it is recommended that future studies also examine psychological impact using physiological variables such as cortisol levels.

5. Conclusion

This study's exploration of the psychological impact of the prolonged COVID-19 pandemic on Japanese undergraduates showed that the prolonged pandemic increased psychological distress, regardless of university students' academic year. Women experienced more psychological distress than men. Psychological distress was found to be influenced by loneliness, sense of university belongingness, and student life satisfaction. With the changing conditions of the COVID-19 pandemic, university authorities need to support the social connections among students by providing opportunities for combined face-to-face and online interactions.

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