



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Mental health status among university students during COVID-19 pandemic in Japan: A longitudinal study with one year interval

ARTICLE INFO

Keywords

COVID-19
Possible severe mental illness
Kessler
University students
Japan

We report about a longitudinal study on mental health status among university students in Japan during the COVID-19 pandemic with one-year interval. We previously reported that the level of anxiety and depression among university students in Japan did not appear to be serious during the early phase of the pandemic in May 2020 (Fuse-Nagase et al., 2020). However, as the pandemic has continued much longer than many people expected, its prolonged effect became of another concern. We conducted additional survey targeting the second-year students and the results of the K6 scores of freshmen in May 2020 were compared with those of the same students attending as sophomores in May 2021.

The second-year students who enrolled in the university in April 2021 were asked to answer the Japanese version (Furukawa et al., 2008) of the K6 survey (Kessler et al., 2003) online in May 2021. K6 is a screening tool for anxiety and depression. It consists of six items answered on a 5-point scale (0–4). The total score is used as an indication of severe mental illness. The cut point set by Kessler that is used to identify a high possibility of serious mental illness (SMI) is 12/13. We announced that data obtained from those who did not agree to participate in this study would be excluded from the analyses. This study was approved by the ethics committee of Ibaraki University (N. 200301). The Wilcoxon signed-rank test and McNemar's test were used to compare matched samples (longitudinal data of the participants who joined the survey both in 2020 as a freshman and in 2021 as a sophomore). Statistical Package for Social Science version 28 was used for statistical analyses; $P < 0.01$ was considered to be statistically significant.

A total of 608 freshmen in 2020 also participated in the study in 2021 as sophomore students. The mode of their K6 scores in May 2020 was 0; the median was 1; (Q1–Q3) was 0–3; and the average was 2.2 in 2020. These values were 0, 1, 0, 5, and 3.0, respectively, in May 2021. Eighteen (3.0%) participants scored 13 or higher in May 2021 but scored lower than 13 in May 2020; and 5 (0.8%) participants scored 13 or higher in May 2020 but scored lower than 13 in May 2021. A significant increase was indicated in the total K6 score from May 2020 to May 2021 ($Z = 8.08$, $p < 0.01$, $\gamma = 0.33$), and higher rate of participants scored 13 or higher ($\chi^2 = 6.26$, $p = 0.01$, odds ratio [OR] = 3.60). Fig. 1 shows the

distribution of difference between the K6 score in May 2021 and that in May 2020 (K6 score in 2021 minus K6 score in 2020). Of the participants, 228 (61.5%) had a lower or same K6 score in May 2021 than in May 2020, whereas 111 (18.3%) scored 1 or 2 points higher and 50 (8.2%) scored > 5 points higher in May 2021.

In May 2021, during the prolonged phase of the COVID-19 pandemic, second-year students had a higher level of anxiety and depression as well as a higher rate of students with possible SMI compared with the population of students as freshmen in May 2020, 2 months after the World Health Organization declared a pandemic. These results suggest that the prolongation of the COVID-19 pandemic affected their mental health negatively. A distribution of the difference in K6 scores from the survey conducted in May 2020 and those conducted in May 2021 revealed students were not equally affected and only a limited number of people were strongly affected by the pandemic. Thus, it would not be practical to provide equal support to all students; however, it would be practical to support those who are at a high risk of mental illness and are in need of help. Previous studies showed that women (Nomura et al., 2021; Patsali et al., 2020; Wathélet et al., 2020), who had lower social support or were isolated (Kohls et al., 2021; Elmer et al., 2020), with lower self-efficacy (Kohls et al., 2021; von Keyserlingk et al., 2021), and having a mental disorder or suicidal behavior (López Steinmetz et al., 2021b), had a higher risk of psychological distress.

A strength of this study is that we were able to compare the level of psychological distress and rate of possible SMI among university students between the early phase and prolonged phase of the COVID-19 pandemic with a long interval of 1 year. A limitation of this study is that it was based on a survey that was conducted at a single national university, so the participants of this study might not be representative of all university students in Japan. Another limitation is that K6 does not provide a comprehensive measure of the participants' condition although it is a good screening tool for mental health assessment.

Funding source

None.

<https://doi.org/10.1016/j.ajp.2021.102973>

Received 21 November 2021; Accepted 16 December 2021

Available online 18 December 2021

1876-2018/© 2021 Elsevier B.V. All rights reserved.

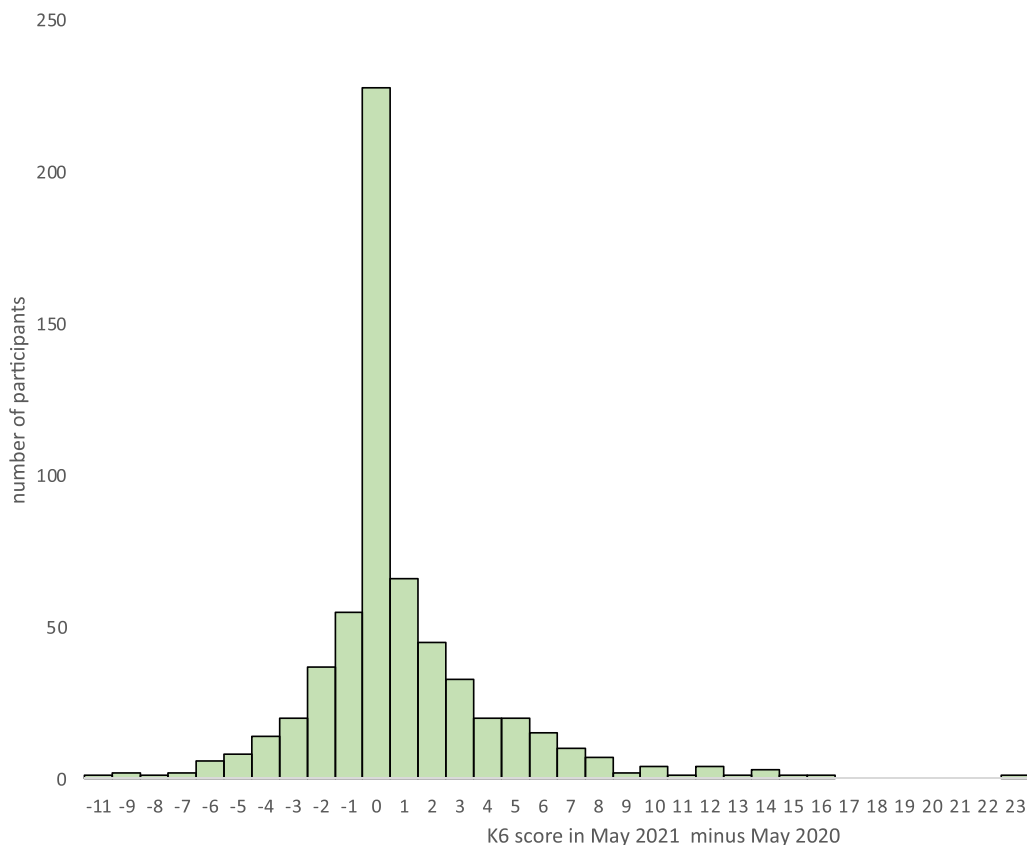


Fig. 1. Distribution of the difference between K6 scores in May 2021 and that in May 2020 (K6 score in 2021 minus K6 score in 2020) among 608 participants. A significant increase was indicated in the total K6 score from May 2020 to May 2021 ($Z = 8.08$, $p < 0.01$, $\gamma = 0.33$), and a higher rate of participants scored 13 or higher ($\chi^2 = 6.26$, $p = 0.01$, $OR = 3.60$); 228 (61.5%) participants had a lower or same K6 score in May 2021 compared with May 2020; 111 (18.3%) scored 1 or 2 points higher in May 2021 and 50 (8.2%) scored > 5 points higher.

CRediT authorship contribution statement

Y.F. organized the study, analyzed the data and drafted the manuscript.

Acknowledgments

We wish to thank the staff of University Health Center, Ibaraki University for their assistance with the survey.

Conflict of interests

None.

References

- Elmer, T., Mephram, K., Stadtfeld, C., 2020. Students under lockdown: comparisons of students' social networks and mental health before and during the COVID-19 crisis in Switzerland. *PLoS One* 15, e0236337. <https://doi.org/10.1371/journal.pone.0236337>.
- Furukawa, T.A., Kawakami, N., Saitoh, M., Ono, Y., Nakane, Y., Nakamura, Y., Tachimori, H., Iwata, N., Uda, H., Nakane, H., Watanabe, M., Naganuma, Y., Hata, Y., Kobayashi, M., Miyake, Y., Takeshima, T., Kikkawa, T., 2008. The performance of the Japanese version of the K6 and K10 in the World Mental Health Survey Japan. *Int. J. Methods Psychiatr. Res.* 17, 152–158.
- Fuse-Nagase, Y., Kuroda, T., Watanabe, J., 2020. Mental health of university freshmen in Japan during the COVID-19 pandemic: Screening with Kessler psychological distress scale (K6). *Asian J. Psychiatr.* 54, 102407. <https://doi.org/10.1016/j.ajp.2020.102407>.
- Kessler, R.C., Barker, P.R., Colpe, L.J., Epstein, J.F., Gfroerer, J.C., Hiripi, E., Howes, M. J., Normand, S.T., Manderscheid, R.W., Walters, E.E., Zaslavsky, A.M., 2003.

Screening for serious mental illness in the general population. *Arch. Gen. Psychiatry* 60, 184–189.

- Kohls, E., Baldofski, S., Moeller, R., Klemm, S.L., Rummel-Kluge, C., 2021. Mental health, social and emotional well-being, and perceived burdens of university students during COVID-19 pandemic lockdown in Germany. *Front. Psychiatry* 12, 643957. <https://doi.org/10.3389/fpsy.2021.643957>.
- López Steinmetz, L.C., Godoy, J.C., Fong, S.B., 2021b. A longitudinal study on depression and anxiety in college students during the first 106-days of the lengthy Argentinean quarantine for the COVID-19 pandemic. *J. Ment. Health* 24, 1–10. <https://doi.org/10.1080/09638237.2021.1952952>.
- Nomura, K., Minamizono, S., Maeda, E., Kim, R., Iwata, T., Hirayama, J., Ono, K., Fushimi, M., Goto, T., Mishima, K., Yamamoto, F., 2021. Cross-sectional survey of depressive symptoms and suicide-related ideation at a Japanese national university during the COVID-19 stay-home order. *Environ. Health Prev. Med.* 26, 30. <https://doi.org/10.1186/s12199-021-00953-1>.
- Patsali, M.E., Mousa, D.V., Papadopoulou, E.V.K., Papadopoulou, K.K.K., Kaparounaki, C.K., Diakogiannis, I., Fountoulakis, K.N., 2020. University students' changes in mental health status and determinants of behavior during the COVID-19 lockdown in Greece. *Psychiatry Res.* 292, 113298. <https://doi.org/10.1016/j.psychres.2020.113298>.
- von Keyserlingk, L., Yamaguchi-Pedroza, K., Arum, R., Eccles, J.S., 2021. Stress of university students before and after campus closure in response to COVID-19. *J. Community Psychol.* <https://doi.org/10.1002/jcop.22561>.
- Wathelet, M., Duhem, S., Vaiva, G., Baubet, T., Habran, E., Veerapa, E., Debien, C., Molenda, S., Horn, M., Grandgenèvre, P., Notredame, C.E., D'Hondt, F., 2020. Factors associated with mental health disorders among university students in France confined during the COVID-19 pandemic. *JAMA Netw. Open* 3, e2025591. <https://doi.org/10.1001/jamanetworkopen.2020.25591>.

Yasuko Fuse-Nagase
 University Health Center, Ibaraki University, 2-1-1 Bunkyo, Mito 310-8512,
 Japan
 E-mail address: yasuko.fuse.uhc@vc.ibaraki.ac.jp.