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CASE REPORT

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How university students changed their habits and developed mental disorders in the context of the coronavirus disease 2019 (COVID-19) pandemic in Japan: Three case reports

Maiko Nagaoka MD, MPH | Hiroe Kubo BA | Kuniko Tashiro AD | Maiko Kinoshita BA | Hiroko Inoue MA | Hirofumi Soejima MD, PhD | Noboru Fujise MD, PhD

Health Care Center, Kumamoto University, Kumamoto, Japan

Correspondence
Noboru Fujise, MD, PhD, Kumamoto University Health Care Center, 2-40-1, Kurokami, Chuo-ku, Kumamoto 860-8555, Japan.
Email: nfujise@kumamoto-u.ac.jp

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Abstract

Background: Since the COVID-19 pandemic reached Japan in 2020, the country has faced an unprecedented increase in suicide rate and school refusal among adolescents, as well as increased rates of depression and anxiety among young people. However, the effects of the COVID-19 pandemic on adolescents in terms of changes in habits, the development of mental disorders, social isolation, and suicidal ideation remain largely unclear.

Case Presentation: We examined three cases of university students who changed their habits during the COVID-19 pandemic and developed mental disorders. All three cases had similar habitual changes, experienced loneliness, and developed depression and circadian rhythm sleep–wake disorder. Their habitual changes were delayed sleep and wake times, delayed first mealtime, a tendency to eat before sleeping, decreased social contact, increased digital media usage, and a tendency to use digital media before going to bed. We established a model of increasing mental health difficulties, school refusal, and suicidal ideation during the COVID-19 pandemic.

Conclusion: This report suggests possible approaches for preventing a decline in mental health during the COVID-19 pandemic among university students.

KEYWORDS
COVID-19, habitual change, mental disorders, suicidal ideation, university students

BACKGROUND

In Japan, the first case of COVID-19 was confirmed on January 15, 2020, a state of emergency was declared several times,[1] and the governors of each prefecture instructed residents to stay at home in self-quarantine.

Universities implemented online teaching and closure of laboratories, libraries, and gyms. Consequently, students lost opportunities to meet peers, teachers, and their families; they also missed out on club activities and their incomes from part-time jobs were reduced due to a request from the government for businesses to shorten their opening hours.[1]

Japan has been facing an unprecedented increase in mental health consultation[2] and suicide rate[3] among national university students, as well as school refusal in adolescents.[4] The prevalence of major depressive disorder and anxiety disorders has been reported to increase as a result of the COVID-19 pandemic,[5] particularly among younger people.[6] However, there is currently insufficient evidence regarding the ways in which adolescents' lives have been affected in terms of depression, isolation, and suicidal ideation during the COVID-19 pandemic.

The current results revealed how COVID-19 restrictions have changed university students' habits and exacerbated their mental health difficulties. We describe three cases who exhibited changes in sleep time, eating time, time spent using digital media, social isolation, depressive mood, and suicidal ideation.

Case presentation

Case 1 was a male student in his 20s who lived alone. In 2021, during the COVID-19 pandemic, Case 1's classes changed to online teaching. Case 1 spent most of his time using digital media alone, and skipped breakfast (Figure 1), stopped meeting with people, and lost his part-time job. He visited our clinic to meet with a psychiatrist in July 2021. He was anxious at night, saying: "I don't know if I can be a member of this society, I have no motivation." He exhibited depressive mood, hopelessness and suicidal ideation. Initial examination revealed a body mass index (BMI) value of 20.8, a Kessler 6 Scale score of 8[7,8] and a score of 47 on the Japanese version of the UCLA Loneliness Scale Version 3 (UCLA-LS3-J).[9,10]

In October 2021, Case 1 was diagnosed with circadian rhythm sleep–wake disorder and major depression and began antidepressant treatment with sulpiride (50 mg after every meal), insomnia–cognitive behavioral treatment (i-CBT), and support for circadian rhythm correction. Case 1's circadian rhythm improved in 3 weeks, and his depressed mood improved after that.

In January 2022, all of Case 1's depressive symptoms recovered, his psychiatrist stopped the antidepressant treatment, and he returned to university to finish his dissertation.

Case 2 was a male student in his 20s who lived alone. In April 2021, Case 2's school was closed, and he lost his part-time job and the opportunity to become close with his lab-mates and supervisors, which made him feel isolated. He failed to achieve his class credits. He began to spend most of the day watching Social Networking Services (Figure 2). In December 2021, Case 2 attended our clinic with helplessness and decreased motivation, saying "COVID-19 is one of the main reasons I cannot manage myself." His psychiatrist recognized his depressive mood, anxiety, circadian rhythm sleep–wake disorder (delayed sleep phase type), and extended digital media use (Figure 2). At his first visit, Case 2 had a Kessler 6 Scale score of 17 and a score of 60 on the UCLA-LS3-J. Case 2's psychiatrist prescribed anxiolytics for severe anxiety at night and conducted i-CBT. Case 2 continues to attend our clinic for treatment.

Case 3 was a teenage male student who lived alone. During COVID-19 quarantine measures in April 2021, Case 3 felt agitated, was unable to complete his assignments by the due dates, and experienced depressive mood and dysregulated sleep/eating times. Case 3 slept from 4 a.m. to 2 p.m., ate his first meal at 3 p.m., and watched digital media from 12 a.m. to 4 a.m. (Figure 3). Case 3 failed to achieve class credits. He visited our clinic to meet with a psychiatrist in December 2021, and said "I cannot concentrate in a Zoom class. I touch things on my desk, and my mood is unstable." His psychiatrist diagnosed him with depressive mood and circadian rhythm sleep–wake disorder (delayed sleep phase type), as well as noting that he was skipping breakfast and exhibited increased digital media use (Figure 3). At his first visit, Case 3 had a BMI value of 16.0, a Kessler 6 Scale score of 13, and a score of 54 on the UCLA-LS3-J. Case 3's psychiatrist treated him using i-CBT and circadian rhythm correction. Case 3 continues to attend our clinic.

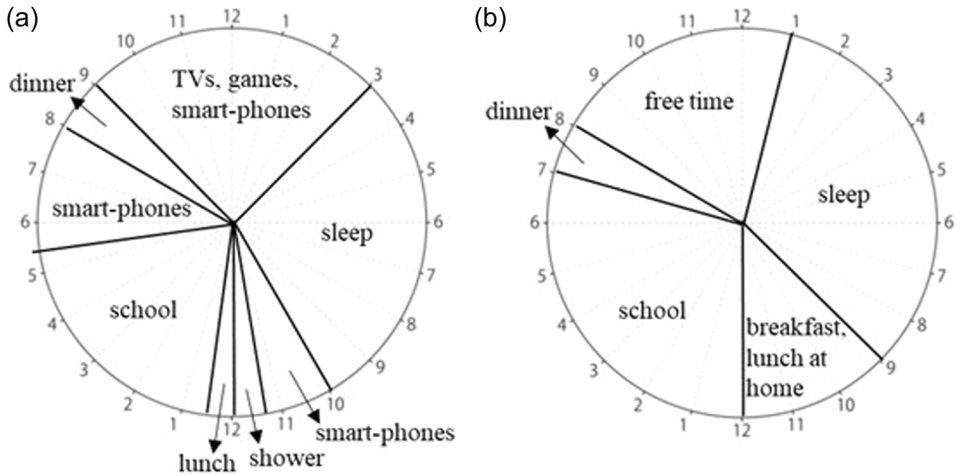

FIGURE 1 Case 1's routine. (a) During the COVID-19 quarantine period. (b) After recovery.

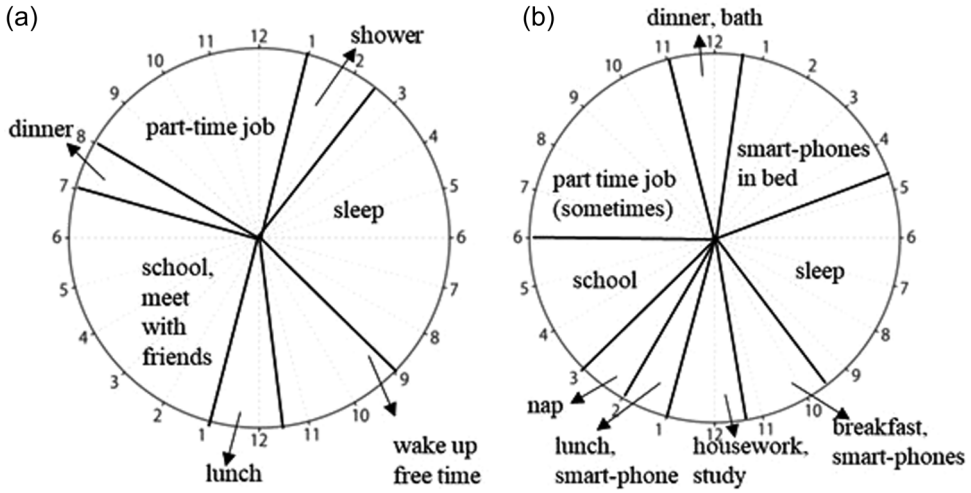

FIGURE 2 Case 2's routine. (a) Before the COVID-19 pandemic. (b) During the COVID-19 quarantine period.

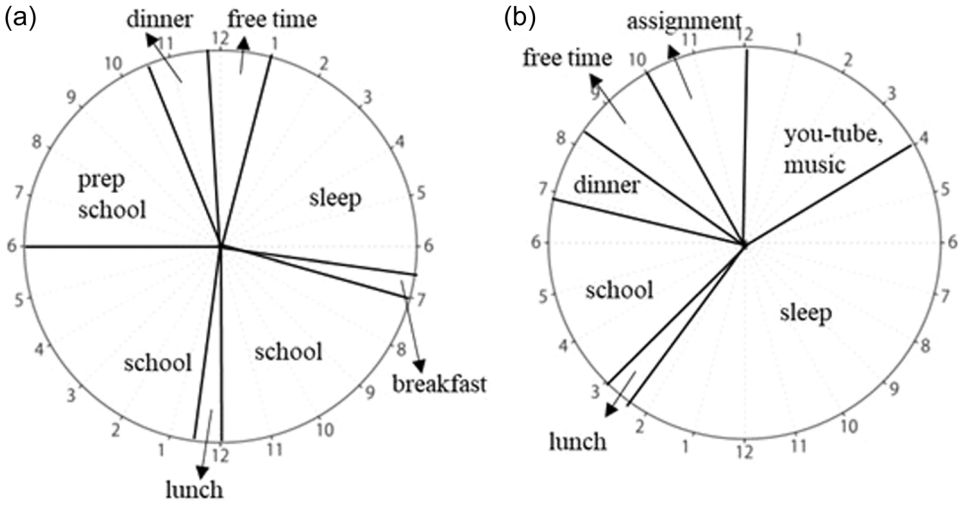

FIGURE 3 Case 3's routine. (a) Before the COVID-19 pandemic. (b) During the COVID-19 quarantine period.

DISCUSSION

We reported three cases of new-onset mental disorders, including depression, anxiety, isolation, and circadian rhythm sleep–wake disorder related to the COVID-19 pandemic. All three cases exhibited common features: delayed sleep and wake times, delayed first meal times, decreased social contact, increased digital media usage, and a tendency to eat and use digital media before going to bed (Figures 1–3). Living alone may be related to these changes in habits. Before COVID-19, previous studies described similar features that related to increased delayed sleep and digital media usage, as well as isolation in youth. This study reports that the COVID-19 pandemic exacerbated all these features at the same time. Social coping against COVID-19, such as reducing social contact, was repeatedly addressed under the restriction of the COVID-19 pandemic. Based on the current findings, we developed a model of how the COVID-19 pandemic changed adolescents' habits, and how "new habits" negatively affect mental health (Figure 4). None of the three cases had a history of mental health problems before the COVID-19 pandemic. Diagnosis was based on the *Diagnostic and Statistical Manual of Mental Disorders*, 5th ed. criteria. For Case 1, the life rhythm chart was obtained twice, once during the COVID-19 pandemic, and once after his recovery. For Cases 2 and 3, the life rhythm chart was obtained before the COVID-19 pandemic and in the middle of the pandemic.

Sleep

All three cases exhibited a 2- or 3-h delay in the timing of going to bed and waking up (Figures 1–3, Table 1). Previous studies reported that sleep patterns changed during COVID-19 pandemic with delays in the timing of going to bed and waking up,[11] in addition to lower sleep quality.[12,13]

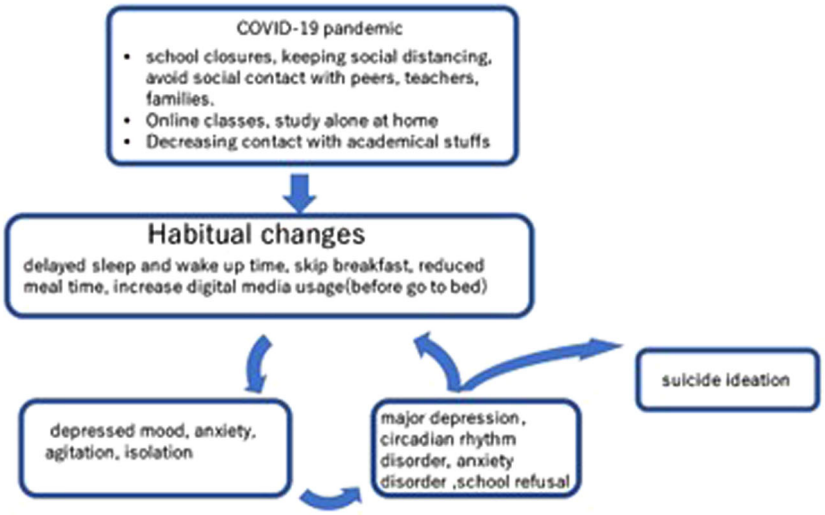

FIGURE 4 Model of habitual changes and development of mental health difficulties among university students during the COVID-19 pandemic.

TABLE 1 Delayed and increased time in sleep, waking up, and digital media usage during the COVID-19 pandemic

	Case 1	Case 2	Case3
Delayed sleep time (h)	2	2	3
Delayed wake up time (h)	1	0	7.5
Increased digital media usage (h)	10	6.5	4

Delayed sleep and wake times may have caused a delay in the timing of the first meal (Figures 1–3). These changes in sleep and eating patterns could potentially affect the circadian rhythm. Tao et al.[14] reported that circadian rhythm abnormalities were positively associated with mental health difficulties among university studies.

Relationships between digital media usage and sleep/mental health problems

In all three cases, digital media usage primarily comprised social networking sites, videogames, surfing the Internet, and watching TV/DVDs (Figures 1–3) and digital media usage was most often before bedtime for a total of 4–6 h. Previous studies have focused on the relationships between digital media usage and mental health problems.[15,16] In addition, several studies have reported that digital media usage can worsen the quality of sleep.[12,17,18]

Loneliness/isolation

Containment of the spread of COVID-19 has necessitated widespread social isolation. Social isolation and loneliness have increased the risk of depression, and possibly anxiety.[19] All three of the current cases exhibited relatively high UCLA-LS3-J scores, indicating that they felt a high level of loneliness.

A previous study reported that 87% of youth survey respondents agreed that they felt lonely or isolated during lockdown.[20]

Social isolation was reported to be associated with an increased risk of depressive symptoms and suicide attempts[21,22] and was found to be an important factor in overall suicide risk in young people.[23] Adolescents were found to experience high rates of depression and anxiety during forced isolation in the COVID-19 pandemic.[19,24]

A model of habitual change in university students during the COVID-19 pandemic

Figure 4 shows how the three university students changed their habits during the COVID-19 pandemic. First, the students' circumstances changed, including school closures, social distancing, as well as decreased social contact with peers, teachers, and family. Second, students' daily schedules changed during the COVID-19 pandemic, such as an increased tendency to skip breakfast, eat before going to bed, and an increase in digital media usage, especially before going to bed. Table 1 shows delayed and increased time in sleep, waking up and digital media usage during the COVID-19 pandemic. These new habits increased anxiety, depressive mood, circadian rhythm sleep–wake disorder, school refusal and suicidal ideation. Moreover, these negative cycles might repeat as the delayed sleep enhances these habitual changes (Figure 4).

Limitations

This model based on the three cases might not be appropriate to generalize the characteristics of all university students.

Previous reports indicate that women are more affected than men in loneliness[25,26] and in depression,[27] whereas these three cases are all men. Further research is needed to clarify sex differences.

CONCLUSION

We examined three cases of university students who changed their habits during the COVID-19 pandemic and developed mental disorders. First, the students' habits changed, and mental disorders subsequently emerged. The habitual changes in all three cases were similar: delayed sleep and wake times, delayed first mealtime, a tendency to eat before sleeping, decreased social contact, increased digital media usage, and a tendency to use digital media before going to bed. This model may be useful for informing the development of prevention strategies if these cycles are blocked to maintain university students' mental health in the context of the COVID-19 pandemic.

AUTHOR CONTRIBUTIONS

Noboru Fujise and Hirofumi Soejima drafted the manuscript and figures. Hiroe Kubo, Kuniko Tashiro, Maiko Kinoshita, and Hiroko Inoue contributed to support correcting circadian rhythm for students.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT

Not applicable.

ETHICS APPROVAL STATEMENT

Ethical approval was not required as this is a Case Report. Privacy was protected and individuals were not identified. Written consent was obtained from all participants before the experiment.

ORCID

Maiko Nagaoka http://orcid.org/0000-0001-6246-6154

REFERENCES

1. Cabinet Secretariat. (2011). Response based on the Basic Coping Policies. (n.d.) [cited 2022 May 2]. Available from: https://corona.go.jp/emergency/
2. Fushimi M. Student mental health consultations at a Japanese university and the current state of affairs on the increase in suicide victims in Japan during the COVID-19 pandemic. *Psychol Med*. 2021; 1–2. https://doi.org/10.1017/S0033291721001240
3. Fuse-Nagase Y, Marutani T, Tachikawa H, Iwami T, Yamamoto Y, Moriyama T, et al. Increase in suicide rates among undergraduate students in Japanese national universities during the COVID-19 pandemic. Psychiatry Clin Neurosci. 2021;75(11):351–2. https://doi.org/10.1111/pcn.13293
4. Ministry of Education, c., sports, science and Technology-JAPAN. Summary of survey results on problematic behavior. Truancy, and other issues in student guidance in 2020. 2021. https://www.mext.go.jp/content/20201015-mext_jidou02-100002753_01.pdf
5. Coughenour C, Gakh M, Pharr JR, Bungum T, Jalene S. Changes in depression and physical activity among college students on a diverse campus after a COVID-19 stay-at-home order. J Community Health. 2021;46(4):758–66. https://doi.org/10.1007/s10900-020-00918-5
6. Santomauro DF, Shadid MHAM, Zheng J, Ashbaugh P, Pigott C, Abbafati DM, et al. Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. Lancet. 2021;398(10312):1700–12. https://doi.org/10.1016/S0140-6736(21)02143-7
7. Kessler RC, Barker PR, Colpe LJ, Epstein JF, Gfroerer JC, Hiripi E, et al. Screening for serious mental illness in the general population. Arch Gen Psychiatry. 2003;60(2):184–9. https://doi.org/10.1001/archpsyc.60.2.184
8. Furukawa TA, Kawakami N, Saitoh M, Ono Y, Nakane Y, Nakamura Y, et al. The performance of the Japanese version of the K6 and K10 in the World Mental Health Survey Japan. Int J Methods Psychiatr Res. 2008;17(3):152–8. https://doi.org/10.1002/mpr.257
9. Russell DW. UCLA Loneliness Scale (Version 3): reliability, validity, and factor structure. J Pers Assess. 1996;66(1):20–40. https://doi.org/10.1207/s15327752jpa6601_2
10. Arimoto A, Tadaka E. Reliability and validity of Japanese versions of the UCLA loneliness scale version 3 for use among mothers with infants and toddlers: a cross-sectional study. BMC Womens Health. 2019;19(1):105. https://doi.org/10.1186/s12905-019-0792-4
11. Bruni O, Malorgio E, Doria M, Finotti E, Spruyt K, Melegari MG, et al. Changes in sleep patterns and disturbances in children and adolescents in Italy during the Covid-19 outbreak. *Sleep Med*. 2021. https://doi.org/10.1016/j.sleep.2021.02.003
12. Cellini N, Canale N, Mioni G, Costa S. Changes in sleep pattern, sense of time and digital media use during COVID-19 lockdown in Italy. J Sleep Res. 2020;29(4):e13074. https://doi.org/10.1111/jsr.13074
13. Petrov ME, Pituch KA, Kasraeian K, Jiao N, Mattingly J, Hasanaj K, et al. Impact of the COVID-19 pandemic on change in sleep patterns in an exploratory, cross-sectional online sample of 79 countries. Sleep Health. 2021;7(4):451–8. https://doi.org/10.1016/j.sleh.2021.05.007
14. Tao S, Wu X, Li S, Ma L, Yu Y, Sun G, et al. Circadian rhythm abnormalities during the COVID-19 outbreak related to mental health in China: a nationwide university-based survey. Sleep Med. 2021;84:165–72. https://doi.org/10.1016/j.sleep.2021.05.028
15. Woods HC, Scott H. #Sleepyteens: social media use in adolescence is associated with poor sleep quality, anxiety, depression and low self-esteem. J Adolesc. 2016;51:41–9. https://doi.org/10.1016/j.adolescence.2016.05.008
16. Guerrero MD, Barnes JD, Chaput JP, Tremblay MS. Screen time and problem behaviors in children: exploring the mediating role of sleep duration. Int J Behav Nutr Phys Act. 2019;16(1):105. https://doi.org/10.1186/s12966-019-0862-x
17. Scott H, Biello SM, Woods HC. Social media use and adolescent sleep patterns: cross-sectional findings from the UK millennium cohort study. BMJ Open. 2019;9(9):e031161. https://doi.org/10.1136/bmjopen-2019-031161
18. Pirdehghan A, Khezmeh E, Panahi S. Social media use and sleep disturbance among adolescents: a cross-sectional study. Iran J Psychiatry. 2021;16(2):137–45. https://doi.org/10.18502/ijps.v16i2.5814
19. Loades ME, Chatburn E, Higson-Sweeney N, Reynolds S, Shafran R, Brigden A, et al. Rapid systematic review: the impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19. J Am Acad Child Adolesc Psychiatry. 2020;59(11):1218–1239.e1213. https://doi.org/10.1016/j.jaac.2020.05.009

20. Young Minds. (2020). Coronavirus: impact on young people with mental health needs Survey 2: summer 2020. [cited 2022 May 2]. Available from: https://www.youngminds.org.uk/media/355gyqcd/coronavirus-report-summer-2020-final.pdf
21. Hall-Lande JA, Eisenberg ME, Christenson SL, Neumark-Sztainer D. Social isolation, psychological health, and protective factors in adolescence. Adolescence. 2007;42(166):265–86.
22. Endo K, Ando S, Shimodera S, Yamasaki S, Usami S, Okazaki Y, et al. Preference for solitude, social isolation, suicidal ideation, and self-harm in adolescents. J Adolesc Health. 2017;61(2):187–91. https://doi.org/10.1016/j.jadohealth.2017.02.018
23. Rutter PA, Behrendt AE. Adolescent suicide risk: four psychosocial factors. Adolescence. 2004;39(154):295–302.
24. Noda T, Nagaura H, Tsutsumi T, Fujita Y, Asao Y, Matsuda A, et al. A cross-sectional study of the psychological impact of the COVID-19 pandemic on undergraduate and graduate students in Japan. J Affect Disord Rep. 2021;6:100282. https://doi.org/10.1016/j.jadr.2021.100282
25. Pagan R. Gender and age differences in loneliness: evidence for people without and with disabilities. Int J Environ Res Public Health. 2020;17(24):9176. https://doi.org/10.3390/ijerph17249176
26. Wickens CM, McDonald AJ, Elton-Marshall T, Wells S, Nigatu YT, Jankowicz D, et al. Loneliness in the COVID-19 pandemic: associations with age, gender and their interaction. J Psychiatr Res. 2021;136:103–8. https://doi.org/10.1016/j.jpsychires.2021.01.047
27. Nomura K, Minamizono S, Maeda E, Kim R, Iwata T, Hirayama J, et al. 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. 2021;26(1):30. https://doi.org/10.1186/s12199-021-00953-1

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