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Stressors during the COVID-19 pandemic in international students: a qualitative study

Jingru Ma¹, Kazuya Saita¹, Fumiko Kaneko¹ and Hitoshi Okamura^{1*} 

Abstract

Background The coronavirus disease 2019 (COVID-19) pandemic has exacerbated mental health problems worldwide; however, research on the stressors experienced by international students during the COVID-19 pandemic remains limited.

Methods Semi-structured interviews were conducted with 20 international students (male, 8; female, 12; average age, 31.5 years) at Hiroshima University, Japan. Inductive thematic analysis was performed using NVivo software to identify how international students (1) perceived and experienced stress and (2) describe the specific stressors they faced during the COVID-19 pandemic.

Results The findings revealed that international students experienced multiple stressors during the COVID-19 pandemic, including extrapersonal (e.g., financial pressure), interpersonal (e.g., social commentary and perceived xenophobia against foreigners), and intrapersonal (e.g., fear of infection) stressors.

Conclusions Results revealed that during the COVID-19 pandemic, foreign students experienced stress from various sources. Although this global pandemic has ended, similar public health crises may occur in the future. Examination of the sources of stress faced by international students during the pandemic can help us obtain valuable lessons for responding to future global crises. These findings can provide better policy support, resource allocation, and mental health assistance for the international student community during future crises.

Keywords COVID-19, International students, Stressor, Public mental health, Diversity, equity and inclusion (DEI)

Background

The COVID-19 pandemic has exacerbated people's mental health problems worldwide [1], and its prolonged duration and onerous measures, such as lockdowns and home isolation orders, have had a negative impact on higher education [2]. According to two prior studies, college students in China and the United States of America reported increased stress/anxiety levels during the

pandemic [3, 4]. Another research, now on the impact of the repeated mild lockdowns between the two emergency declarations in Japan, suggested that repeated lockdowns have a cumulative negative impact on social isolation and loneliness [5]; these findings were especially applicable to young people and people with high levels of loneliness, which are considered vulnerable populations that require special consideration under the context of repeated lockdowns. Other researchers have shown that physical isolation (e.g., living alone) may cause loneliness and stress [6]. Many international students live alone and are between the ages of 20 and 35 years. Thus, we considered that most international students studying abroad fit the characteristics of vulnerable groups, that some of

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them can be considered as being in the young population, and that they need special considerations.

Based on the history of international responses to epidemic events, these outbreaks are often accompanied by xenophobia [7], with a study reporting on xenophobic responses to the COVID-19 pandemic through verbal and physical attacks toward Asians and descriptions of the disease by some people as the “Chinese virus” [8]. Indeed, not only have Asians been discriminated against but also a study in South Korea showed that immigrants suffered from severe anxiety and stress during the COVID-19 pandemic [9]. The social and cultural environments are particularly important to emotions [10], and a positive societal emotional environment has been shown to help people maintain higher societal life satisfaction [11].

The pieces of evidence in the prior paragraph provide some hints that international students may be likely to experience a relatively high level of mental pressure during a pandemic. Still, it remains that researchers have placed great focus on examining COVID-19 and its impact on students in school settings in recent years [12, 13], while generally overlooking international students in this context. In Japan, under the context of the entry-and-exit restrictions worldwide due to the COVID-19 pandemic, international students may have faced long-term hinderances to their international mobility, as well as academic, economic, and life pressures. However, there are no studies dedicated to examining the mental health of international students in Japan during the COVID-19 pandemic—and exploring these topics holds great potential in advancing current related research. Although the global pandemic has ended, similar public health crises may occur in the future. Examining the various stressors faced by international students during the pandemic can help us gain valuable insights for responding to future crises and provide further effective support and assistance to this community. There is thus the need to explore stress associated with COVID-19 among international students.

This study aimed to identify stressors experienced by international students at Hiroshima University in Hiroshima Prefecture, Japan, during the COVID-19 pandemic using semi-structured interviews.

Methods

This qualitative study used semi-structured interviews to gain insight into the stressors experienced by international students at Hiroshima University during the COVID-19 pandemic. Induction and thematic analysis methods were used to determine content themes. This method was employed as inductive thematic analysis did not rely on pre-existing theoretical frameworks or hypotheses; instead, it began with the data itself and

gradually and inductively identified the themes and patterns [14, 15]. The approach was selected given the unprecedented pandemic situation and lack of relevant theories, which ensured that the identified themes were data-driven and less influenced by researchers’ preconceived notions. The first author designed a guideline based on previous research on stressors during the COVID-19 pandemic [16, 17], which was then revised and improved by other authors (one psychiatrist and two medical university professors), pretested on one participant, and subsequently revised accordingly. After further improvement, it was put into use in the study interviews, which were conducted using this guideline and open-ended questions.

The interview guide comprised four parts: Opening, Main, Probing, and Closing Questions. In total, it included 18 questions. Opening questions primarily focused on asking the interviewee to introduce themselves, with the aim to establish rapport, build trust, and help the interviewee relax and ease into the interview. Main questions inquired the sources of stress and related experiences that international students experienced during the COVID-19 pandemic (for example, “Do you feel the increased stress and anxiety due to the COVID-19 outbreak?”). Probing questions helped researchers delve deeper into the interviewee’s specific experiences and feelings (for example, “Please describe in detail the stress of the COVID-19 pandemic on you with specific examples.”). Finally, closing questions helped summarize the interviewee’s viewpoints (for example, “Compared with the period before the COVID-19 pandemic, is there any difference in the pressure you feel?”).

The topic guideline allowed for the researcher to ensure more systematic interview procedures for participants and to concomitantly explore new areas of dialogue [18].

Participants

As this research aimed to clarify international students’ stressors during the pandemic, we used snowball sampling. Specifically, researchers invited potential participants by sending invitations to a chat group of international students, and it was expected that participants who accepted the invitation could recommend other eligible participants. The first author, an international student at Hiroshima University, knew the relevant personnel of the International Student Organization of Hiroshima University. An invitation letter was sent to the International Student Chat Group of Hiroshima University with the help of a Bangladeshi and a Chinese student who knew the first author. Participants interested in the study were encouraged to contact the first author by phone or email via the contact information provided in the invitation letter. Snowball sampling method was used, and the researchers also requested the interviewees’

assistance in inviting other potential participants who belonged to the overall targeted research population. To ensure the rigor of the study, the research team reviewed a large amount of literature related to qualitative research to determine the sample size. According to a previous study [19], sample sizes ranging from 6 to 8 participants are optimal for ensuring sample homogeneity, whereas sample sizes ranging from 12 to 20 persons may be optimal for ensuring heterogeneity. Since this study focused on a group of international students in Japan, did not wish to limit the examinations to a specific demographic characteristic (e.g., specific marital status, gender, or age), and could benefit from the richness of heterogeneous data, 20 international students at Hiroshima University were recruited (Chinese students, $n=12$ participants; Bangladeshi students, $n=8$ participants).

Interviews

All international student participants ($N=20$ participants) partook in face-to-face semi-structured individual interviews at Hiroshima University between April and June 2023, except for one student who gave birth during/ the study period and preferred to undergo the interview through telephone. All interviews were conducted by the first author and audio-recorded with the participants' consent. Chinese participants were interviewed in Chinese, and the remaining participants were interviewed in English. Because international students at Hiroshima University need to provide proof of English proficiency in order to be admitted, all participants were able to communicate in English to some degree. The first author has a background and experience in translation studies (undergraduate in Japanese translation, second language in English), is proficient in three languages (i.e., Chinese, Japanese, and English), and could hence communicate with the interviewees without major language barriers. Furthermore, since the first author is Chinese, Chinese participants were interviewed in Chinese in order to create a more relaxed interview atmosphere and obtain more intuitive answers.

Data analysis

The speech-to-text feature of Microsoft Word was used to convert interview recordings into text. Respondents' textual interview contents were then sorted numerically

to ensure data anonymity. The transcribed text was subsequently reviewed and corrected to address any inaccuracies in the software's recognition. After correcting for inaccuracies, the first author translated the Chinese interview content into English. After the interview contents were translated, the first and senior authors read through the transcripts line-by-line. Subsequently, a meeting was held where they developed consensus definitions for each code. To reduce subjectivity and bias, two other researchers also discussed the code, revising and improving code definition as needed until a team consensus was reached. Once consensus was reached on the revised coding definitions, the first and senior authors re-coded the transcripts. Coded sections related to the research questions were reviewed by the research team to identify key themes. Inductive thematic analysis was applied to identify the content themes. This method was used as it was excellent for investigating people's opinions, experiences, and values in transcript data [20]. After the key themes were identified, the research team employed triangulation of themes and data to ensure the robustness and validity of the findings. Subsequently, the de-identified data was imported into NVivo QSR Version 14, a professional data analysis software designed for qualitative research, which facilitated rapid and efficient manual data coding and categorization.

The research team analyzing these data consisted of a doctoral supervisor with extensive experience in qualitative research and qualifications as a psychiatrist, two medical university professors, and a healthcare doctoral student with a translation background (undergraduate in Japanese translation, second language in English).

Ethical considerations

This study was approved by the Epidemiology Research Ethics Review Committee of Hiroshima University (approval number: E2022-0276), and the participants were informed of their right to withdraw from the study at any stage. All study participants provided both written and verbal informed consent for participation prior to study onset.

Results

Subjects' characteristics

Table 1 Shows sample characteristics' details. During the COVID-19 pandemic, many countries adopted restrictive entry/exit policies. In our sample, 11 participants have been in Japan since the beginning of the pandemic, and 9 participants were unable to enter Japan because of the lockdown.

Stressors during COVID-19

Participants experienced multiple sources of stress during the COVID-19 pandemic. Based on the key themes

Table 1 Participants' characteristics

		N or Mean (SD)
Gender	Nationality	
	Bangladesh	5
Male	China	3
	Bangladesh	3
	China	9
Age (years)		31.5 (6.45)

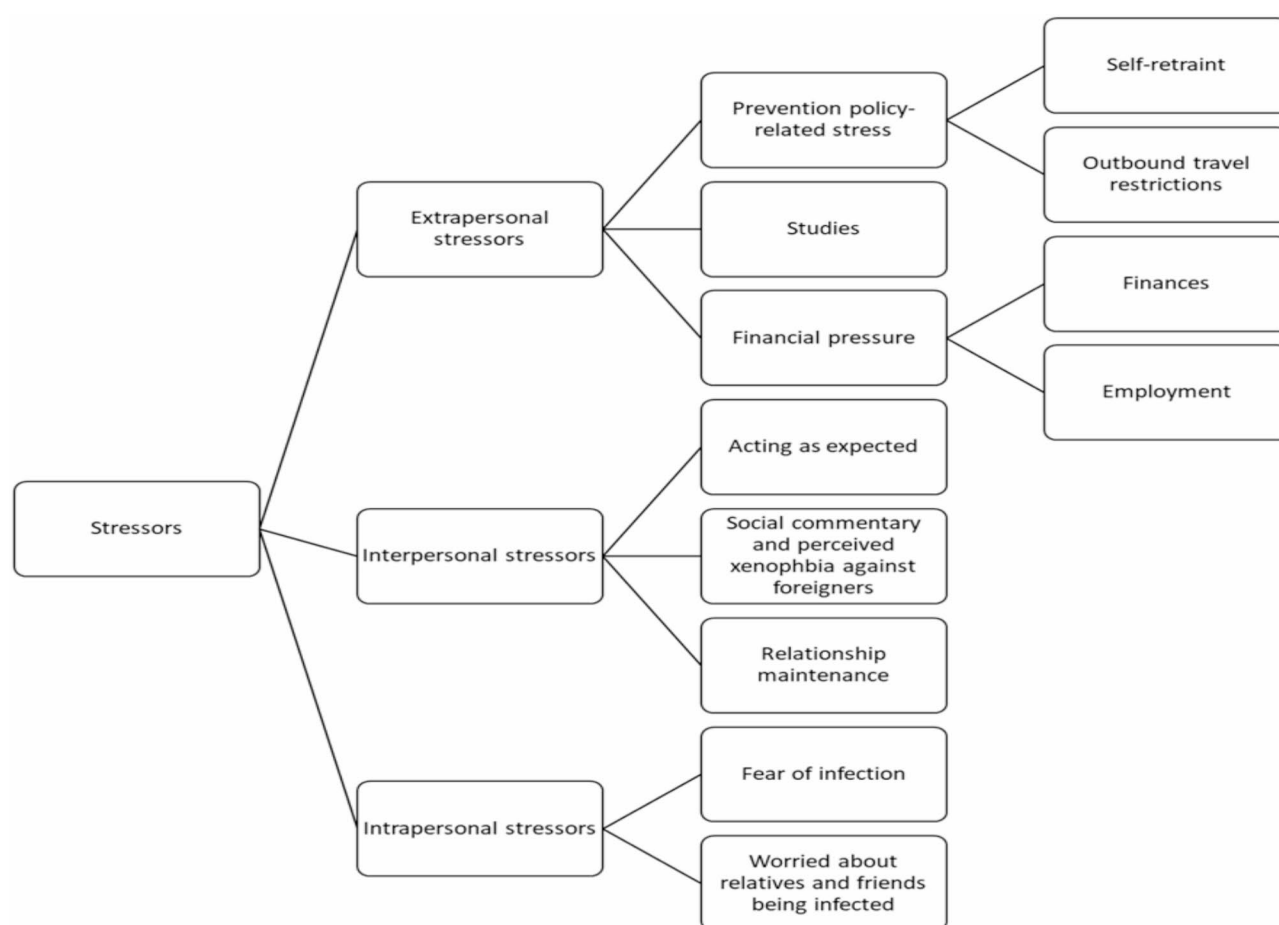


Fig. 1 Stressors perceived and experienced by participants

Table 2 Code definitions

Code	Definition
Prevention policy-related stress	Any reference to experiencing direct stress from the COVID-19-related policy restrictions
Studies	Any reference to academic pressure
Financial pressure	Any reference to financial pressure
Acting as expected	Any reference to caring about what other people thought of oneself and trying to change oneself and behaving according to others' expectations.
Social commentary and perceived xenophobia against foreigners	Any reference to unfriendly and xenophobic social comments
Relationship maintenance	Any reference to relationship maintenance
Fear of infection	Any reference to being stressed because of a fear of infection
Worried about relatives and friends being infected	Any reference to being stressed because of worries about relatives and friends being infected

that emerged from the interviews, these stressors were categorized into three main stressors: extrapersonal, interpersonal, and intrapersonal stressors.

Extrapersonal stressors referred to external stressors that affected the individual and included three themes: prevention policy-related stress, studies, and financial pressure.

Interpersonal stressors arose from social relationships and conflicts and included three themes: acting as

expected, social commentary and perceived xenophobia against foreigners, and relationship maintenance.

Intrapersonal stressors originated within the individual's internal environment and included two themes: fear of infection and worried about relatives and friends being infected. Figure 1 illustrates how codes are abstracted into themes and displays the key themes and sub-themes that emerged from participants' interviews.

Table 2 provides detailed definitions of the codes.

Extrapolational stressors

During the COVID-19 pandemic, the participants identified and described several sources of extrapolational stress. Three related themes were identified from the data, namely prevention policy-related stress, studies, and financial pressure.

Prevention policy-related stress. Eighteen ($n=18$, 90%) participants expressed feeling stress owing to the prevention policies, particularly those that directly impacted their daily lives and routines. Any statements that referred to experiencing direct stress from the COVID-19-related policy restrictions were categorized under the theme of prevention policy-related stress. In Japan, the government implemented non-coercive (mild) lockdown measures; for example, to address the rapid spread of the virus, a monthlong state of emergency was declared on 7 April 2020, asking residents to refrain from going out unless necessary to maintain their daily lives and cooperate with infection prevention measures [21]. At that time, many participants chose to follow the requests of the government to avoid infection and self-isolated by not going out as much as possible. Thus, among the many pandemic prevention measures, self-restraint and outbound travel restrictions were prominent factors that put participants under pressure. Therefore, self-restraint and outbound travel restrictions were categorized as sub-themes under preventive policy-related stress.

Self-restraint. Sixteen participants ($n=16$, 80%) mentioned that the self-restraint policy caused stress. Stress was related to four different impacts of the policy: movement restrictions, a feeling of being at loose ends, weight gain, and loneliness.

Furthermore, thirteen participants ($n=13$, 65%) reported that the movement restrictions implemented during the COVID-19 pandemic caused them significant stress, particularly owing to the disruption of their daily lives and limitations on their mobility. The inability to move freely due to the prevention policies created a sense of confinement, which hindered their ability to maintain a normal routine. A participant who had found a job outside Hiroshima Prefecture and was concomitantly studying and working described the following: *"In Hiroshima, if you went outside the prefecture during the COVID-19 restrictions, you were required to be quarantined for seven days. Your daily rhythm was disrupted."* (Participant 9, male, 32 years old, China).

Five participants ($n=5$, 25%) mentioned feeling "at loose ends," which was described as a sense of confusion or aimlessness due to the prolonged quarantine or self-isolation imposed by the self-restraint policy. This contributed to increased stress. For many participants, the sudden shift to staying at home for extended periods led to feelings of boredom, disorientation, and lack

of purpose. This self-restraint policy, which forced participants to limit their outdoor activities and disrupted the usual structure and rhythm of their daily lives, created a sense of aimlessness. Without the usual academic, social, or recreational activities, many participants struggled to fill their time meaningfully. A student who was self-isolated at home because of school closure said the following:

"Because of the self-restraint policy, I stayed at home every day and felt very bored. During that time, I felt that I had nothing to do, and I didn't know what to do either. I felt like I was wasting my time doing nothing during my period as a research student at Hiroshima University, and I also felt anxious about my state." (Participant 18, female, 26 years old, China).

Regarding weight gain, six participants ($n=6$, 30%) reported that the self-restraint policy reduced their frequency of going out and resulted in a lack of exercise, which made them gain weight. One female participant stated that she felt anxious because of her weight gains: *"After being isolated at home, I rapidly gained body weight."* (Participant 17, female, 34 years old, China). Pertaining to loneliness, the long-term self-restraint measure had a significant emotional impact, which caused some students ($n=6$, 30%) to feel lonely.

Outbound travel restrictions. From March 2020, Japan enacted strict border measures for individuals entering or leaving the country, which were only fully lifted by the end of April 2023. During this period, many ($n=16$, 80%) international students found themselves stranded in Japan, unable to return home or reunite with their families, which created a profound sense of uncertainty and stress. Simultaneously, students who were eager to study in Japan experienced significant delays in entry and were unable to begin their academic journeys as planned. No wonder seven study participants ($n=7$, 35%) reported having been stranded in Japan and experiencing stress related to these outbound travel restrictions; see an example on this: *"I didn't know when I would be able to return to China, and my grandparents were getting older. Then, I didn't know whether I would have the chance to meet them again in this life."* (Participant 10, male, 27 years old, China).

In addition to the stress of being separated from their family, international students who had been accepted to study in Japan but were unable to enter due to the border measures also experienced heightened anxiety. Nine participants ($n=9$, 45%) reported feeling a significant sense of frustration and uncertainty as they faced delays in starting their studies. One participant from Bangladesh

recalled the uncertainty and anxiety surrounding her delayed enrollment:

"Many times, the Hiroshima University International Office told me, 'Please, get ready to come.' But when I got ready—everything was ready, my luggage, my family, all things—I still could not come here because of COVID-19. That was, you know, a very, very anxious time for me." (Participant 1, female, 33 years old, Bangladesh).

These descriptions showcase that the long-term entry-and-exit restrictions made it difficult for many participants to return to their home country to meet their loved ones, and for many others to enter Japan to start their studies, and these processes were reportedly very stressful for participants.

Studies. For most participants, studies ($n=17$, 85%) became a significant stressor during the pandemic. Widespread school closures and transition to remote learning had a profound impact on their academic progress, which triggered a chain reaction of anxiety, frustration, and uncertainty. In particular, delays in research became an urgent issue for many participants, especially those involved in projects that required data collection or face-to-face interactions. A participant whose research progress was delayed owing to the school closure measures during the pandemic said as described herein, *"My research objects are students, and schools were closed during COVID-19. We had to spend more time visiting their homes one by one to collect data."* (Participant 2, female, 28 years old, Bangladesh).

Financial pressure. Financial pressure emerged as a key theme throughout most interviews, and 10 participants ($n=10$, 50%) mentioned financial pressure. Two sub-themes were identified under financial pressure. Furthermore, eight participants ($n=8$, 40%) reported experiencing stress and anxiety related to their finances, while four ($n=4$, 20%) cited challenges related to employment during the pandemic. Two ($n=2$, 10%) of the participants experienced both types of stress. These financial strains were tied to uncertainty, loss of income, and disrupted career plans, all of which contributed to heightened stress during an already difficult time. A privately-funded international student who delayed his study-abroad process because of the lockdown shared the following in the interview (information within square brackets is provided by the author for clarity):

"I also felt depressed at that time, as I had already lost my job; actually, not 'lost.' I resigned from my job because I would come to Japan to study. After I resigned, the COVID lockdown started. Everything was closed. Airplane [travel] was restricted. The

embassy was closed. There was no bus; no train at that time. For the last seven to eight months, I stayed in my village; stayed in my home." (Participant 4, male, 39 years old, Bangladesh).

Furthermore, one participant who was about to graduate and subsequently start looking for jobs showed great concerns about his future: *"The epidemic has led to a bad economy, so employment prospects are not very good. It will be more difficult to find employment after graduation."* (Participant 11, male, 28 years old, China). Financial pressure described by participants reflected a broader sense of economic uncertainty that permeated many aspects of their lives during the pandemic.

Interpersonal stressors

Participants identified three interpersonal relationship-related key themes, which were labeled in this study as interpersonal stressors. These factors included attention to the pandemic prevention-related behaviors of foreigners, and comments on the Internet and real-life behaviors that expressed xenophobic sentiments toward foreigners because of the pandemic. In addition, the long-term lockdown policy led to restraints regarding meeting others regularly, making it difficult for participants to maintain important relationships.

Acting as expected. During the interview, three ($n=3$, 15%) participants mentioned that they cared about what other people thought of them and tried to change themselves and behave according to others' expectations. One participant from Bangladesh stated that because of his appearance, it was immediately obvious for others that he was a foreigner, and he always felt that people kept on staring at him whenever he went to public places during the pandemic:

"I think, like... so many people, they had, like, normal cough and other things. If [domestic] people coughed, nobody cared. But if a foreigner coughed, they thought that 'maybe there is something wrong with that person' [foreigner]. We [foreigners] always had to keep ourselves very conscious about these things, so we tried to keep our distance from others and tried to comply with the rules, regulations, and prevention measures during COVID-19." (Participant 5, male, 53 years old, Bangladesh).

Participants expressed that, as foreigners, they were required to make an effort to conform to social expectations and adjust their behavior to avoid drawing negative attention to themselves. This feeling of constant need to pay attention to others' reactions made some participants feel very stressed out.

Social commentary and perceived xenophobia against foreigners. Six participants ($n=6$, 30%) said that some unfriendly social comments and xenophobic behaviors toward foreigners during the pandemic also caused them stress. Some remarks and behaviors came from the Internet, while others came from real-life situations. Specifically, negative comments on the Internet put pressure on some participants, with one even mentioning that she would try to avoid surfing the Internet during the pandemic. Another participant from China said that when browsing the web for information about the pandemic, she frequently saw unfriendly comments about China. In real life, she was also asked by others about stigmatizing topics (e.g., “Did the coronavirus come from China?”), and talking about these topics made her feel unhappy. Another participant from China talked about her lived experiences of being stigmatized during the COVID-19 pandemic:

“A professor from Hiroshima University, when he was teaching, used the name ‘Wuhan pneumonia.’ I thought this was very disrespectful to the Chinese people. As a professor, you should use the official name COVID-19, not ‘Wuhan pneumonia,’ when teaching. I felt like I had been discriminated against.” (Participant 16, female, 30 years old, China).

These negative experiences stemmed from both online interactions and real-life encounters. The remarks, often fueled by fear and misinformation surrounding the virus, contributed to feelings of isolation and discrimination.

Relationship maintenance. Two participants ($n=2$, 10%) mentioned breaking up with their lovers during the pandemic. They reported that the long-term movement restrictions prevented them from seeing their lovers often, which led to their breakup. One participant said: *“I think the most important thing in a relationship is companionship. Because of the COVID-19 lockdown, we [the couple] were in different places. He was in China, and I was in Japan, so we broke up. In fact, we had been together for a long time.”* (Participant 14, female, 27 years old, China).

In such a challenging and uncertain time, being far from home and lack of regular physical interaction with family and loved ones made it more difficult for many international students to maintain close personal relationships.

Intrapersonal stressors

In the context of the COVID-19 pandemic, most intrapersonal stress experienced by international students was rooted in health-related concerns. The two key themes that emerged regarding intrapersonal stress were fear of infection and worried about relatives and friends being

infected. Most participants were reportedly worried about themselves, as well as their relatives and friends, being infected with COVID-19.

Fear of infection. Most participants ($n=18$, 90%) said that they were extremely afraid of being infected during the early onset of the COVID-19 pandemic. One participant said the following on this matter: *“I was very scared at the beginning of the outbreak in 2020. Because no vaccine had been developed, many things about the virus were unknown, so I was afraid that I would be infected.”* (Participant 12, female, 28 years old, China). Because most participants lived alone, once infected, they could suffer from some form of neglect because they generally had no one to look after them, making them very worrisome about being infected.

Worried about relatives and friends being infected. Owing to the lockdown policies, international students who were unable to return home expressed being extremely worried about their relatives and friends ($n=11$, 55%). A participant expressed great worry about whether her parents had done a good job regarding their protection, as follows: *“I asked them to pay attention to protection, but they said ‘COVID-19 is not a big problem,’ and they hadn’t done a good job in terms of masks or disinfection, which made me feel very stressed.”* (Participant 19, female, 30 years old, China). Many participants expressed that because of the fierce outbreak of infections in the early stages of the pandemic, they feared that their relatives and friends could be infected while they were abroad, making them anxious about the possibility of losing an important other while they were absent.

Discussion

The COVID-19 pandemic exacerbated the already-high levels of stress experienced by post-secondary students [22–24], and people experienced various types of stress during the pandemic, including stress related to financial hardships, fear of infection, and racial injustice [25, 26]. Based on these findings in the literature and our data, we divided the stressors experienced by international students in our sample during COVID-19 into three categories, namely extrapersonal (e.g., financial pressure), interpersonal (e.g., social commentary and perceived xenophobia against foreigners), and intrapersonal (e.g., fear of infection) stressors.

People’s economic situation has often come up as a significant stressor in studies examining stressors during COVID-19 among the general population [27–29]. In studies focusing on college students, academic pressure, employment pressure, and fear of infection have been commonly reported as stressors [30–32]. In studies targeting foreigners, there are pieces of evidence showing xenophobia and racial discrimination situations during the COVID-19 pandemic [33, 34]. In the current study,

the stressors identified in our sample of international students included stressors that appeared in studies conducted with the general population and those conducted with college students and foreigners. Specifically, students in our sample suffered, during the pandemic, from stressors stemming not only from academic pressure (i.e., unique to students in the past studies above) but also from the pressure of discrimination (i.e., unique to foreigners in the past studies above). Self-financed international students in our sample also faced financial pressures, which have been commonly described in past studies conducted with the general population, and less so in survey-based research conducted with college students.

In our sample, 90% of the participants were reportedly concerned about the physical health of their family and friends during the pandemic, a topic that has rarely been addressed in studies related to international students. This stressor may be related to the facts that international students mostly study alone, are away from their homes, and that the suddenness of the pandemic potentially made them more aware of the importance of their family and friends. Indeed, separation and isolation from the family can exacerbate emotions in many populations [35]. Moreover, the presence of family members can help people cope with ever-changing and unpredictable circumstances surrounding illnesses and care [36].

This study reveals the multiple stressors faced by international students during the pandemic. However, research specifically addressing COVID-19-related stressors among international students remains limited. These discussions highlight the need for greater attention to international students' mental health. Although the pandemic is largely over, similar public health crises may arise in the future. Hence, understanding the stressors experienced by international students will enable us to better address their health needs. We hope this study provides valuable insights for universities and enables them to strengthen support services for international students from multiple dimensions. Additionally, we expect these findings to serve as a reference for public health policymakers and aid in the development of further effective policy support, resource allocation, and mental health assistance for international students during future crises.

Despite the insights gained provided by this study, some its limitations should be acknowledged. Inductive thematic analysis only focuses on themes that emerge from the data, which may limit the completeness and accuracy of the conclusions. Thus, scholars are urged to conduct mixed-method research in the future to deal with these shortcomings. The current study was conducted from April to June 2023, the period of the ending of the COVID-19 pandemic, and participants may not

necessarily have been able to fully describe all the stressors they experienced during the pandemic. Moreover, all participants in the sample were from China and Bangladesh, and thus the study cannot exclude sample bias. Additional studies with larger sample sizes are required to ensure the generalizability of our findings.

Conclusion

This study focused on the stressors experienced by international students during the COVID-19 pandemic. The findings revealed that international students experienced multiple stressors, which included extrapersonal, interpersonal, and intrapersonal stressors. Although the pandemic is largely over, similar public health crises may arise in the future. Understanding the stressors experienced by international students will help better address their health needs. Simultaneously, it provides valuable insights for universities and enables them to strengthen support services for international students from multiple dimensions. Furthermore, these findings offer important references for policymakers and help them develop effective policies and improve the well-being of international students during future crises.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12889-025-22380-5>.

Supplementary Material 1

Supplementary Material 2

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Author contributions

J.M.: Conceptualization, Methodology, Data curation, Writing- Original draft preparation. K.S. and F.K.: Conceptualization, Supervision. H.O.: Conceptualization, Methodology, Writing- Reviewing and Editing. All authors contributed to manuscript revision, read the manuscript, and approved the submitted version.

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Data availability

The datasets generated during and analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

This study was approved by the Epidemiology Research Ethics Review Committee of Hiroshima University (approval number: E2022-0276), and the participants were informed of their right to withdraw from the study at any stage. All study participants provided both written and verbal informed consent for participation prior to study onset.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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