

COVID-19-Related Variables and Its Association with Anxiety and Suicidal Ideation: Differences Between International and Local University Students in Taiwan

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Purpose: The present study examined the differences between international and local university students in Taiwan regarding COVID-19-related variables, anxiety, and suicidal ideation.

Participants and Methods: An online cross-sectional survey (sent via an online link in an email) was carried out comprising university students (n=529). The students were assessed on measures (including validated psychometric instruments) of perceived susceptibility to COVID-19, perceived sufficiency of resources, sources of COVID-19 information, perceived satisfaction with support, anxiety and suicidal ideation.

Results: Local students had higher susceptibility to COVID-19 ($p<0.001$) but decreased sufficiency with resources ($p<0.001$) and anxiety ($p<0.001$) compared with international students. Staying with family members, satisfaction with support, and information seeking were the factors that predicted anxiety among international students (all p -values <0.05), while information seeking predicted local students' anxiety ($p<0.001$). Furthermore, staying with family members, susceptibility to COVID-19, and sufficiency with resources were the factors that predicted suicidal ideation among international students (all p -values <0.05), while being a male and satisfaction with support predicted suicidal ideation among local students (all p -values <0.05).

Conclusion: International students displayed different COVID-19-related challenges compared with local students. More specifically, international students as compared with local students had lower susceptibility to COVID-19 and higher anxiety. Therefore, healthcare providers should pay more attention to international students' psychological health and awareness regarding impacts of COVID-19 on health.

Keywords: anxiety, COVID-19, university students, suicidal ideation, Taiwan

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Plain Language Summary

The present study was carried out in order to examine the differences of COVID-19-related issues (including psychological distress such as anxiety and suicidal ideation) between international and local university students who were studying in Taiwan during the COVID-19 pandemic. The study recruited 529 university students and they responded to questions concerning perceived susceptibility to COVID-19, perceived sufficiency of resources, sources of COVID-19 information, perceived satisfaction with support, anxiety, and suicidal thoughts. The results indicated that:

1. Local students had higher levels of susceptibility to COVID-19 but decreased sufficiency with resources and anxiety compared with international students.

2. Staying with family members, satisfaction with support, and information seeking were the factors that predicted anxiety among international students while information seeking predicted local students' anxiety.
3. Staying with family members, susceptibility to COVID-19, and sufficiency with resources were the factors that predicted suicidal ideation among international students while being a male and satisfaction with support predicted suicidal ideation among local students.

Overall, international students displayed different COVID-19-related challenges compared with local students.

Introduction

The coronavirus disease 2019 (COVID-19) continues to ravage the world with significant adverse effects on human life. There were over 231 million cases of COVID-19 infection and over 4.7 million deaths worldwide as of September 24, 2021.¹ This pandemic has negatively affected individuals' way of life causing serious economic,²⁻⁴ social,^{5,6} and health⁷⁻¹² challenges worldwide. Several notable mandatory short-term measures such as physical distancing, lockdowns, use of face masks, and washing of hands have been used by different countries to mitigate the spread of COVID-19.^{13,14} These measures are still being used even though some vaccines have been approved to help mitigate the spread of COVID-19 infection. These short-term measures (eg, lockdowns, physical distancing, and quarantining) have markedly affected the health and activities of individuals,^{8,15,16} and especially students.^{11,17,18}

The volatile nature of the disease has led to rapidly evolving change of information and policies concerning COVID-19. This has sensitized many individuals to diligently follow and be updated on COVID-19-related issues especially among those susceptible to COVID-19 or those significantly affected by the COVID-19 pandemic such as students. Those who are perceived as being susceptible to COVID-19 are individuals that have higher likelihoods of contracting COVID-19. Therefore, providing accurate information regularly, and having robust and reassuring policies helps to allay fears among these individuals. Consequently, the source of COVID-19 information must be credible, of good quality, and be from a trusted source in order to help overcome COVID-19.¹⁹⁻²² It has been reported that poorly managed communication may lead to social withdrawal, hysteria, individual violence, and collective violence.²³ Therefore, experience in handling

pandemic information is key to appropriately deal with the pandemic. Younger or inexperienced individuals have been found to poorly manage information or cope with challenging situations and as a result, have mental health challenges.^{17,24,25}

Furthermore, young individuals (who are mostly students and specifically university students) have been reported to have added pressure of dealing with academic challenges and future job prospects/internships during the COVID-19 pandemic.^{17,26} Consequently, university students have been found to have severe mental health disorders (eg, fear, stress, anxiety, depression), poorer physical fitness, and poorer academic performance during the pandemic.^{11,17,18} Furthermore, studies have highlighted strong associations between COVID-19-related variables such as fear of COVID-19 and anxiety, depression, and self-esteem.^{27,28} This is important to note because depression, stress, and self-esteem are strongly associated with suicidal ideation among students²⁴ especially when ineffective or maladaptive coping strategies are used.²⁸ Anxiety, as used in the present study, involves how worried or nervous individuals are toward COVID-19 while suicidal ideation refers to thoughts regarding suicide among individuals.²⁹ As a result of these challenges, most of these students depend on their close families, friends, and faculty for support in dealing with COVID-19. The support may include personal protective equipment (PPE), information, money, medical resources, and psychological support. Therefore, satisfaction with the support and the sufficiency of these resources in combating COVID-19 may help in reducing students' fear and frustration, ultimately improving their mental health.¹⁹

The impact of COVID-19 is not very different in Taiwan (where the present study was carried out) although there have been comparatively fewer cases and fatalities reported. As of September 24, 2021, over 16,000 COVID-19 cases and over 840 fatalities had been recorded.³⁰ To date, the success of managing and containing the virus has been attributed to a combination of two agents, the government and the citizens. More specifically, this involved the government's swift activation of the Central Epidemics Command Center, transparent and open communication regarding COVID-19, short-term measures taken to curtail the spread, and measures introduced to lessen the challenges its citizens may go through.³¹ Therefore, Taiwanese citizens did not just receive correct and timely information but also received supportive and encouraging messages, substantially lessening their fear and anxiety. In return,

Taiwanese citizens understood the need to accommodate these difficult changes and complied with the COVID-19 policies resulting in comparatively lower cases than other countries.^{22,32} Nonetheless, lockdowns, physical distancing, and quarantining have been reported to be associated with poor health and quality of life^{16,33,34} and students in Taiwan are not exempt from these challenges.^{20,35} However, compared to other countries, Taiwanese students have been found to have the lowest levels of mental health issues (eg, anxiety, suicidal ideation)^{19,36} which is assumed to be due to the early reaction by the Taiwan government to control the spread of COVID-19.²²

Because there are heterogeneous groups of university students (eg, international vs. local students), it is appropriate that their perception concerning factors related to COVID-19 are thoroughly examined in order to understand and offer tailored help during COVID-19 pandemic. This is more important because Taiwan has different policies in combating the spread of COVID-19 and has been successful so far. However, given that these policies significantly change individuals' way of life in order to manage the COVID-19 pandemic, there is a need to both ascertain and understand the consequences of these abrupt changes in order to provide appropriate recommendations to the relevant authorities. Therefore, the present study examined the differences between international and local students residing in Taiwan on issues related to perceived susceptibility to COVID-19, sufficiency of resources, information seeking, satisfaction with support, and mental health (ie, anxiety and suicidal ideation) during COVID-19 outbreak period.

Methods

Participants and Procedure

A convenience sample of 529 university students were recruited for a cross-sectional survey study in Taiwan. The sample comprised international and local students. The recruitment of the participants was carried out online via students' university email addresses from April to June 2020. The participants were eligible for the present study if they were ≥ 20 years old and studied at university in Taiwan. The participants were asked to login through their personal email before completing the questionnaire.

Ethical approval was obtained from the Institute of Review Board from National Cheng Kung University Hospital (A-EX-109-019) prior to data collection. Participation was voluntary and survey responses were

anonymous; therefore, the Research Ethics Committee ruled that this study did not require informed consent. The following details were provided in on the online form: the name of the investigator, the study purpose, and the privacy rights of the participants. Study participants were given no incentives for participation. Those who agreed to participate in the study completed the survey in English (for international students) or Chinese languages (for local students). The survey was first developed in English with guidance from the extant literature. Following this, a bilingual translator whose mother tongue was Chinese translated the English survey into Chinese. The two language versions of the online survey were hosted on Google Forms. Therefore, different links were sent out for the two target populations. More specifically, the international students received a link to the English online survey and the local students received a link to the Chinese online survey. However, both surveys consisted of the same psychometric scales, measures and questions.

Information regarding the students' university email addresses and whether the students were local students or international students were obtained from the university. Emails containing the link to the online survey were then sent according to the student status (ie, local or international student). Students were explicitly asked to complete the survey once. The present study was conducted in accordance with the Declaration of Helsinki.

Measures

The online survey comprised four measures as the independent variables (perceived susceptibility to COVID-19, perceived sufficiency of resources, source of COVID-19 information, and perceived satisfaction of support) and two measures as the dependent variables (anxiety and suicidal ideation). The survey began with a set of demographic questions, followed by the core items of the survey. At the end of the survey, the participants were given the unique link containing professional advice on epidemic prevention provided by professional medical institutions.

Demographic Characteristics

Demographic data including age, gender, type of student (international or local), and education level were collected using a background information sheet.

Perceived Susceptibility to COVID-19

The Perceived Susceptibility to COVID-19 Scale³⁷ was used to assess the absolute and relative susceptibility to

COVID-19. Participants are asked to estimate their personal likelihood of contracting COVID-19 in the coming months. The two-item scale is rated on a 7-point scale from 1 (“not at all susceptible”) to 7 (“very susceptible”). It has been used among university students in Taiwan with acceptable psychometric properties.¹⁹ It had adequate internal reliability in the present study (Cronbach’s alpha [α]=0.61).

Perceived Sufficiency of Resources

The Perceived Sufficiency of Resources Scale¹⁹ was used to assess the resources needed for preventing COVID-19. Its items include perceived sufficiency of personal protective equipment (PPE), information, money, medical resource, and psychological support. The five-item scale is rated on a 3-point scale from 1 (“insufficient”) to 3 (“sufficient”). It has been used among university students in Taiwan with acceptable psychometric properties.¹⁹ It had acceptable internal reliability in the present study ($\alpha=0.76$).

Sources of COVID-19 Information

The Sources of COVID-19 Information Scale¹⁹ was used to assess various sources from which individuals can access information concerning COVID-19. Its items include seeking information from the internet, friends, news media, academic training, medical staff, faculty/university, and family. The seven-item scale is rated on a 3-point scale from 1 (“never”) to 3 (“always”). The scale has been used among university students in Taiwan with acceptable psychometric properties.¹⁹ It had acceptable internal reliability in the present study ($\alpha=0.67$).

Perceived Satisfaction with Support

The Perceived Satisfaction with Support Scale¹⁹ was used to assess how satisfied individuals are with the various types of support received. Its items include support from families, friends, and faculty. The three-item scale is rated on a 5-point scale from 1 (“not satisfied at all”) to 5 (“very satisfied”). This scale has been used among university students in Taiwan with acceptable psychometric properties.^{19,38} It had acceptable internal reliability in the present study ($\alpha=0.70$).

Anxiety

Participants’ level of anxiety towards the COVID-19 pandemic was assessed using the State-Trait Anxiety Inventory.³⁹ Items include feeling “rested,” “content,”

“comfortable,” “relaxed,” “pleasant,” “anxious,” “nervous,” “jittery,” “high strung,” and “over-excited and rattled.” This 10-item scale is rated on a 4-point scale from 1 (“not at all”) to 4 (“very much”). A lower score on the STAI indicates a lower level of anxiety. This scale has been used among university students in Taiwan with acceptable reliability ($\alpha=0.66$).¹⁹ It had acceptable internal reliability in the present study ($\alpha=0.72$).

Suicidal Ideation

Participants’ level of suicidal ideation in the past week was assessed using one item (ie, “In the past seven days, did you have a suicidal idea”) rated a 5-point scale from 1 (“not at all”) to 5 (“very severe”). A lower score on this scale indicates a lower level of suicidal ideation.¹⁹

Data Analysis

Descriptive analyses including means (and standard deviations) and frequencies (percentages) were used to present the proportions of demographic variables of the participants. The chi-square test and independent *t*-test were used to compare the proportions in categorical and continuous variables, respectively. Also, the independent *t*-test was used to examine the significant between-group difference on perceived susceptibility to COVID-19, perceived satisfaction with support, perceived sufficiency with resources, information seeking, anxiety, and suicidal ideation. Multiple linear regression was used to examine the factors on anxiety and suicidal thoughts separately for international and local students in Taiwan.

Results

A total of 529 participants were used in the present study with a mean age of 25.70 years (SD = 6.00), the majority being females (59.1%), undergraduates (58.4%), not staying with family (86.6%), and medical students (54.4%). Apart from gender, these variables were significantly more than their counterparts (*p*-values<0.001). The participants were made up of international (n=216) and local (Taiwan; n=313) students with their mean ages being 28.45 years (SD=6.41) and 23.85 years (SD=4.91) respectively. Further demographic information is shown in Table 1.

Table 2 shows that the local students (6.95 ± 1.92) had more significant scores than international (5.90 ± 2.16) students on perceived susceptibility to COVID-19 ($t(527) = 5.86, p < 0.001$). However, international students (7.26 ± 2.14) had more significant scores than local students (6.00 ± 1.57) on their perceived sufficiency with resources (*t*

Table 1 Participants' Characteristics

	Total (n=529)	International Students (n=216)	Local Students (n=313)	p
Age; Mean \pm SD	25.70 \pm 6.00	28.45 \pm 6.41	23.85 \pm 4.91	<0.001
Gender; n (%)				0.068
Females	311 (59.1%)	117 (22.2%)	194 (36.9%)	
Males	215 (40.9%)	98 (18.6%)	117 (22.2%)	
Education; n (%)				<0.001
Undergraduates	309 (58.4%)	33 (6.2%)	276 (52.2%)	
Postgraduates	220 (41.6%)	183 (34.6%)	37 (7.0%)	
Residency; n (%)				<0.001
Not with family	458 (86.6%)	211 (39.9%)	247 (46.7%)	
With family	71 (13.4%)	5 (0.9%)	66 (12.5%)	
Student; n (%)				<0.001
Medical	241 (45.6%)	161 (30.4%)	80 (15.1%)	
Non-medical	288 (54.4%)	55 (10.4%)	233 (44.0%)	

(527)=7.80, $p<0.001$). Also, international students (2.24 \pm 0.43) had more significant scores than local students (1.17 \pm 0.52) on anxiety ($t(527)=4.34$, $p<0.001$). However, there was no significant between-group difference on perceived satisfaction with support ($t(527)=0.10$, $p=0.924$), information seeking ($t(527)=0.26$, $p=0.798$), and suicidal ideation ($t(527)=0.50$, $p=0.617$).

After controlling for age and student (medicine), it was found that residence (with family; standardized coefficient [β]=−0.222, $p<0.001$), perceived satisfaction with support ($\beta=0.164$, $p=0.021$), and information seeking ($\beta=0.270$, $p<0.001$) were the significant factors that predicted anxiety among international students in Taiwan. Among the local students in Taiwan, information seeking ($\beta=0.228$, $p<0.001$) was the only significant factor that predicted anxiety after controlling for age and student (medicine).

In total, the factors accounted for 19% and 7.6% of all factors needed for predicting anxiety among the international students [$F(9, 200)=5.204$, $p<0.001$] and local students [$F(6, 300)=2.743$, $p=0.004$] in Taiwan respectively. Further details are shown in Table 3.

Table 4 shows that residence (with family; $\beta=0.173$, $p=0.014$), perceived susceptibility to COVID-19 ($\beta=0.158$, $p=0.020$), and perceived sufficiency with resources ($\beta=0.157$, $p=0.026$) were the significant factors that predicted suicidal ideation among international students after controlling for age and student (medicine). Among the local students in Taiwan, gender (males; ($\beta=-0.122$, $p=0.035$)) and perceived satisfaction with support ($\beta=-0.130$, $p=0.030$) were found to be the significant factors that predicted suicidal ideation after controlling for age and student (medicine). In total, the factors accounted for

Table 2 Summary of Analysis Between International and Local Taiwan Students on Anxiety, Suicidal Ideation, and Other Variables on COVID-19

	International	Local	t	p
	Mean \pm SD	Mean \pm SD		
Perceived susceptibility to COVID-19	5.90 \pm 2.16	6.95 \pm 1.92	5.855	<0.001
Perceived satisfaction with support	11.69 \pm 2.02	11.68 \pm 2.05	0.095	0.924
Perceived sufficiency with resources	7.26 \pm 2.14	6.00 \pm 1.57	7.800	<0.001
Information seeking	15.37 \pm 2.80	15.42 \pm 2.48	0.256	0.798
Anxiety	2.24 \pm 0.43	2.08 \pm 0.42	4.343	<0.001
Suicidal ideation	1.14 \pm 0.49	1.17 \pm 0.52	0.500	0.617

Notes: Perceived susceptibility to COVID-19: the likelihood of contracting COVID-19; Perceived satisfaction with support: satisfaction with various supports received; Perceived sufficiency with resources: resources needed for preventing COVID-19; Information seeking: various sources from which individuals can access information on COVID-19; Anxiety: how worried or nervous individuals are toward COVID-19; Suicidal ideation: thoughts of suicide.

Table 3 Summary of Predictive Factors on Anxiety Between International and Local Students Residing in Taiwan During COVID-19 Outbreak Period

		International				Locals			
		B	SE	B	p	B	SE	B	p
Step 1	Age	0.001	0.005	0.014	0.840	0.000	0.005	0.000	0.995
	Student (medicine)	-0.027	0.071	-0.027	0.702	-0.023	0.056	-0.023	0.684
Step 2	Gender (males)	0.068	0.056	0.080	0.224	0.031	0.050	0.035	0.533
	Education (postgraduates)	-0.041	0.083	-0.034	0.626	0.060	0.087	0.046	0.487
	Residence (with family)	-0.623	0.187	-0.222	0.001	0.059	0.059	0.057	0.316
	Perceived susceptibility to COVID-19	-0.019	0.013	-0.095	0.142	-0.001	0.013	-0.005	0.940
	Perceived satisfaction with support	0.035	0.015	0.164	0.021	0.021	0.012	0.102	0.082
	Perceived sufficiency with resources	0.025	0.013	0.128	0.058	0.022	0.015	0.084	0.146
	Information seeking	0.041	0.010	0.270	<0.001	0.039	0.010	0.228	<0.001
	R² (adjusted R²)	19% (15.3%)				7.6% (4.8%)			
	ΔR²	18.9%				7.5%			
	ΔF	6.664***				3.501**			

Notes: Perceived susceptibility to COVID-19: the likelihood of contracting COVID-19; Perceived satisfaction with support: satisfaction with various supports received; Perceived sufficiency with resources: resources needed for preventing COVID-19; Information seeking: various sources from which individuals can access information on COVID-19; Anxiety: how worried or nervous individuals are toward COVID-19; Suicidal ideation: thoughts of suicide. **p <0.01. ***p <0.001.

11.4% and 5.1% of all factors needed for predicting suicidal ideation among the international students [$F(9, 200) = 2.852, p = 0.003$] and local students [$F(6, 300) = 1.807, p = 0.066$] in Taiwan, respectively.

Discussion

The present study examined the differences between international and local students residing in Taiwan regarding

perceived susceptibility to COVID-19, sufficiency of resources, information seeking, satisfaction with support, and mental health (ie, anxiety and suicidal ideation) as well as the factors that account for anxiety and suicidal ideation separately among international and local students in Taiwan during the COVID-19 outbreak period. The between-group comparison showed that local students had significantly higher scores on perceived susceptibility

Table 4 Summary of Predictive Factors on Suicidal Ideation Between International and Local Students Residing in Taiwan During COVID-19 Outbreak Period

		International Students				Local Students			
		B	SE	B	p	B	SE	B	p
Step 1	Age	-0.007	0.006	-0.084	0.239	-0.003	0.006	-0.030	0.600
	Student (medicine)	-0.071	0.082	-0.061	0.388	-0.025	0.069	-0.021	0.718
Step 2	Gender (males)	0.014	0.069	0.014	0.834	-0.132	0.062	-0.122	0.035
	Education (postgraduates)	-0.007	0.102	-0.005	0.946	-0.002	0.109	-0.001	0.987
	Residence (with family)	0.566	0.229	0.173	0.014	0.089	0.074	0.069	0.232
	Perceived susceptibility to COVID-19	0.037	0.016	0.158	0.020	0.012	0.016	0.043	0.480
	Perceived satisfaction with support	-0.019	0.018	-0.076	0.302	-0.033	0.015	-0.130	0.030
	Perceived sufficiency with resources	0.037	0.016	0.157	0.026	0.025	0.019	0.075	0.199
	Information seeking	0.002	0.013	0.012	0.868	-0.005	0.013	-0.022	0.718
	R² (adjusted R²)	11.4% (7.4%)				5.1% (2.3%)			
	ΔR²	10.1%				5%			
	ΔF	3.240**				2.256*			

Notes: Perceived susceptibility to COVID-19: the likelihood of contracting COVID-19; Perceived satisfaction with support: satisfaction with various supports received; Perceived sufficiency with resources: resources needed for preventing COVID-19; Information seeking: various sources from which individuals can access information on COVID-19; Anxiety: how worried or nervous individuals are toward COVID-19; Suicidal ideation: thoughts of suicide. *p <0.05. **p <0.01.

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to COVID-19 than international students. However, international students were significantly more anxious compared with local students. Both groups were found to be comparable with respect to perceived satisfaction with support, information seeking, and suicidal ideation. Moreover, different factors were found to predict anxiety and suicidal ideation among local and international students in Taiwan.

The findings concerning perceived susceptibility to COVID-19 indicated that the local students in Taiwan perceived being in absolute or relative danger of contracting COVID-19 compared with international students. A possible reason underlying this significant difference is the greater possibility of contact with an individual with COVID-19 as they have their families, friends, and other significant loved ones around them compared to the international students. Another possible reason is the resources available for protecting an individual against COVID-19 which includes personal protective equipment (PPE), information, money, medical resource, and psychological support. Therefore, it was not surprising that there was a significant between-group difference in perceived sufficiency with resources with international students having more scores than local students. Therefore, it can be assumed that international students had the needed resources to make them feel secured from not contracting COVID-19. This is a novel study with novel findings as other known studies compared different students within their respective countries therefore, the findings are in favor of Taiwanese students due to their successful management of COVID-19 reflected in their lower cases. For instance, Taiwanese students, compared to their counterparts, were found to have lower possibility of contact with an individual with COVID-19 and therefore lesser challenges associated with COVID-19.^{19,36} This supports other studies that reported that sufficient resources such as PPEs and psychological support are associated with reasons for increased risk perception.^{40,41}

Moreover, international students' comparatively higher anxiety levels suggest that the resources offered to international students are inadequate in allaying their fears or anxieties concerning COVID-19. In other words, international students may have had adequate material resources (eg, staying in a hostel, available food, adequate protective equipment) but may have lacked quality social interaction apart from online activities due to the COVID-19 restrictions. These restrictions in addition to the added pressure of being an international student as well as indications that the COVID-19 pandemic may continue for some time may

have made them anxious. This is consistent with the diathesis-stress model which postulates that stress in any form has the ability to trigger predisposed illness and (in the present study) anxiety.^{27,42} This is also possible when ineffective or maladaptive coping strategies are used to deal with the stressors according to the transactional model of stress and coping.⁴³

The comparable levels of perceived satisfaction with support, information seeking, and suicidal ideation between the groups indicates that the students were equally satisfied with the support being offered (from the university, families, and friends), and equally informed regarding COVID-19 (from internet, university, friends, and news media) which may have made them feel less suicidal. This is reassuring because it may help reduce frustrations that students may experience.^{22,32} This concurs with the transactional model of stress and coping which asserts that an appropriately adaptive coping strategy has the ability to mitigate stressors/challenges that may have exceeded the personal resources of the individual thereby preventing a mental health disorder,⁴³ and with respect to the present study, suicide. Adequate information concerning COVID-19 has also been associated with better coping strategies which subsequently help the individual's health.²¹ This supports other previous studies which have reported higher association between positive social support/activities and good mental health.^{19,36}

In addition, staying with family members, perceived satisfaction with support, and information seeking were the factors that predicted anxiety among international students. This suggested that staying with family members may help reduce anxiety among international students. Also, adequate support and information are needed to deal with the increasing anxiety of international students. However, information seeking was the only factor that predicted local students' anxiety. This suggests that more information is needed to deal with the increasing anxiety among local students. These findings support a previous study showing that compared with Thai and Indonesian students, Taiwanese university students were more negatively affected by COVID-19 information from the internet and medical staff.¹⁹ This confirms that clear and direct information is needed to allay fear and anxiety among individuals. This is similar to other previous studies that associated these factors with other mental health conditions.^{34,40}

Furthermore, staying with family members, perceived susceptibility to COVID-19, and perceived sufficiency with resources were the factors that predicted suicidal ideation

among international students. These findings suggest that higher perceived susceptibility to COVID-19 was associated with increased suicidal ideation but staying with family members and more resources were needed to deal with increasing suicidal ideation. Social support may be able to mitigate COVID-19 challenges and thereby manage suicidal ideation among international students.⁴³ On the other hand, being a male and perceived satisfaction with support were the factors that predicted suicidal ideation among local students. More specifically, being a male and being satisfied with support was associated with reduced suicidal ideation among local students. Therefore, health experts may apply these findings to help improve the mental health of students. The findings indicated that local and international students had significantly different factors that predicted their suicidal ideation.

Limitations

There are some limitations to the study. First, the present study used university students and therefore the findings may not be generalized to other types of student (eg, primary school children) or individuals who do not receive any formal education. Second, the present study used a cross-sectional design, a design that only provides associations between variables but not causation. Future studies should use a longitudinal study design to strengthen the evidence regarding causal relationships. Third, different countries have different reactions and policies to control COVID-19 infection and so replication may be needed to help understand how the variables used in this present study relate to other countries. Finally, the translation used in the present study was not a standard procedure. Therefore, the linguistic validity between the English and Chinese surveys cannot be guaranteed as being equivalent. Consequently, the internal consistency values found in the present study were somewhat questionable (ie, the highest value was 0.76 and the lowest value was 0.61).

Conclusion

This novel study indicated that local students had higher perceived susceptibility to COVID-19 but decreased perceived sufficiency with resources and anxiety compared with international students in Taiwan. Moreover, the factors that predicted anxiety were different between international and local students in Taiwan. More specifically, staying with family members, perceived satisfaction with support, and information seeking were the factors that predicted anxiety among international students while information seeking was the only factor that predicted local students' anxiety. Furthermore, staying with family members, perceived

susceptibility to COVID-19, and perceived sufficiency with resources were the factors that predicted suicidal ideation among international students while being a male and perceived satisfaction with support were the factors that predicted suicidal ideation among local students. Overall, international students seem to have different needs and psychological states during COVID-19 pandemic compared with local students. Hence, university authorities (and to an extent, healthcare workers and family members) may have to pay attention to the peculiar needs of each of these group of students in order to offer tailored support to them.

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Disclosure

The authors report no conflicts of interest in this work.

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