

Psychological impact of COVID-19 on university students in Oman: an examination of stress, resilience and meaning in life

COVID-19 and
university
students
of Oman

105

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Abstract

Purpose – This cross-sectional online survey in Oman in April 2021 aimed to assess university students' resilience, stress levels and meaning during the COVID-19 pandemic and identify characteristic profiles.

Design/methodology/approach – A cross-sectional survey design was used to collect data from full-time students at one University in Oman. Outcomes included sociodemographic information, the brief resilience scale, the perceived stress scale-4 and the meaning in life questionnaire to explore the students' profiles.

Findings – A total of 964 students participated (response rate = 34.8%), of which 35% had low resilience scores. The average perceived stress, presence of meaning in life and search for meaning in life scores were 7.9 ± 2.3 , 24.2 ± 6.9 and 24.9 ± 7.7 , respectively. Cluster analysis identified three groups: low-risk and fewer impacts (cluster A, $n = 503$, 52.3%), moderate-risk and moderate impacts (cluster B, $n = 160$, 16.6%) and high-risk and more impacts (cluster C, $n = 301$, 31.2%). Cluster C students experienced more psychological problems and were at high risk during the pandemic.

Research limitations/implications – The respondents' honesty is a possible error that could influence the results. Low response rates limit its generalizability, and cause-effect relationships among mental health outcomes cannot be discerned.

Practical implications – This study identified three distinct groups of students, each with different levels of severity in their health problems. There is an increased need for education and counseling to support students during this period, and university management should focus on implementing personal precautionary measures and providing high-tech, user-friendly platforms for students to enhance their learning.

Originality/value – These findings suggest that tailored strategies should be developed to address the unique psychological needs of each group. The study provides important information for university



management to understand the pandemic's psychological impact on students and develop effective interventions to support their well-being.

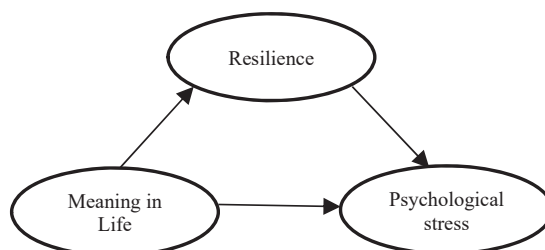
Keywords University students, Resilience, Meaning in life, Stress, COVID-19, Cluster analysis

Paper type Research paper

Introduction

University students worldwide, including Oman, are experiencing stress due to the COVID-19 pandemic. This stress includes social isolation, difficulty with distance learning and virtual classrooms, and increased academic workload (Son *et al.*, 2020; Wang *et al.*, 2020a, b; Keckojevic *et al.*, 2020). Online learning has caused students to feel overwhelmed and stressed (Abdulghani *et al.*, 2020). According to a study by Yildirim *et al.* (2022), individuals with low meaning in life and low resilience are more susceptible to the detrimental effects of pandemic-related stress. The American Psychological Association (APA, 2014) has identified three key elements for maintaining psychological health during a pandemic: enjoying life, being resilient and balancing one's life during times of stress. Satisfaction with one's life can lead to a sense of purpose, optimism and the ability to stay positive in difficult situations. Did university students encounter similar stress levels, resilience and a sense of meaning in life during the pandemic, or did these outcomes vary among them? Additionally, few research studies have explored how the COVID-19 pandemic influenced the resilience, stress levels and sense of purpose in the lives of university students in Oman. This study aims to address the questions mentioned above. In the current study, the above questions will be answered.

Resilience is "the process of adapting well in the face of adversity, trauma, tragedy, threats or even significant stress sources" (APA, 2014). Previous studies agreed that resilience is a dynamic adaptive process to manage stress (Ye *et al.*, 2020; Bacchi and Licinio, 2017; Lin *et al.*, 2019; Brown *et al.*, 2023). Individuals with meaningful life experiences have a negative relationship with stress events (Wang *et al.*, 2020a). Resilient individuals are better equipped to adjust to and handle the rigors of life and prevent psychological stress (Ostafin and Proulx, 2020). Resilience is also linked with high levels of life satisfaction (Brown *et al.*, 2023). Therefore, resilience can also be a mediating factor associated with meaning in life and psychological stress. We believe that resilience mediates the association between meaning in life and psychological stress and the theoretical framework among resilience, meaning in life and stress is shown in Figure 1. The literature generally reported moderate resilience among University students (Al Omari *et al.*, 2020; Jahan *et al.*, 2016; Keckojevic *et al.*, 2020; Labrague *et al.*, 2018). A previous study found a moderate level of resilience among university students in Jordan, with resilience being negatively correlated with depression (Hamdan-Mansour *et al.*, 2014). Another study also found moderate levels but with different correlates of resilience and meaning in life (Al Omari *et al.*, 2023). Other researchers explored the



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Figure 1.
The theoretical framework: resilience mediates the association between meaning in life and psychological stress

relationship between academic achievement and resilience, and they found that students with a higher level of resilience had better academic achievement (Labrague *et al.*, 2018; Laher *et al.*, 2021). This literature review follows this framework's pathways, as shown in Figure 1, linking meaning in life, resilience and psychological stress among university students.

The resilience of university students

Resilience describes how an individual manages stress's negative effects, promotes adaptation and maintains mental well-being despite adversity. Recent literature recognizes resilience as an important attribute (Reyes *et al.*, 2015). According to a study by Williamson *et al.* (2013), resilience is crucial to keeping university students on track for academic success. In previous studies, university students' resilience level was correlated negatively with psychological stress. Furthermore, studies have shown that low resilience is associated with higher levels of perceived stress during the COVID-19 pandemic (Ye *et al.*, 2020; Bacchi and Licinio, 2017; Lin *et al.*, 2019). The academic dropout rate of students with high depressive rumination is related to their pessimistic disposition (Wang *et al.*, 2020a, b). Studies have demonstrated a higher empathy level among students studying healthcare than other undergraduates, in accordance with their professional requirements (Keckojevic *et al.*, 2020; Saraswathi *et al.*, 2020). A previous study also found that female students are more empathetic than male students (Rodriguez-Besteiro *et al.*, 2021). Therefore, it is crucial to investigate how these factors are interconnected and how they affect resilience.

Stress on university students

Recent studies show that anxiety and stress levels among college students have increased significantly following the COVID-19 pandemic compared to before the pandemic (Saraswathi *et al.*, 2020). Stress-affected college students are less likely to exercise regularly, show poor eating habits, and exhibit poor sleep quality than students with low stress levels (Choi, 2020; Alotaibi *et al.*, 2020). Additionally, university students participating in a qualitative interview reported challenges with the transition to online teaching and concerns about their academic performance because of the COVID-19 pandemic (Son *et al.*, 2020). People with greater resilience in the general population and patients with COVID-19 positivity may be less likely to experience stress (Ran *et al.*, 2020; Zhang *et al.*, 2020). Furthermore, resilience has been shown to directly or indirectly promote positive growth for people like those who suffered from COVID-19 (Alotaibi *et al.*, 2020). Studies have demonstrated that coronavirus-related stress negatively impacts one's sense of meaning in life (Yildirim *et al.*, 2022).

Meaning in life for university students

Meaning in life is defined as an individual who sees life as a way to live a healthy and well-adapted life (Steger, 2009). Meaningful living can help one survive much longer in times of difficulty than in a life without purpose. People can still function positively despite various stressors, among which there is currently a pandemic, by looking into the essence of meaning in life (Mohamad *et al.*, 2011). Strong evidence links meaning in life with mental health indicators, such as stress and resilience. A study conducted during the COVID-19 pandemic showed that meaningful living significantly impacts resilience and mental health (Yildirim *et al.*, 2022). The result suggests that meaning in life is a critical element of human functioning. In this respect, promoting meaning in life can affect individuals' overall satisfaction with adversity and mitigate stress caused by a pandemic. Students who actively seek or value meaning in their life will demonstrate greater psychological resilience levels, translating into a lower perception of stress as they face life's challenges and adversities. It is evident that

mindfulness and resilience aid in handling stress; stress increases rumination and concern in women, making them more empathetic than other healthcare students.

University students in Oman

The spread of the COVID-19 pandemic disrupted academic education around the world. In Oman, the government announced the closure of all educational institutions in March 2020. In response to the pandemic, all academic institutions changed to online mode to continue the courses. With many online teaching and learning improvements, university students have started adapting to this new normal. Previous studies reported that a resilient individual has a dynamic adaptive process to manage stress (Al Omari *et al.*, 2023). Resilience is also linked with life satisfaction (Cosco *et al.*, 2016). Resilient students are better equipped to adjust to and handle the rigors of university life and prevent psychological stress. In Oman, a recent study reported that high levels of resilience and having a meaningful objective and perseverance negatively impact stress (Al Omari *et al.*, 2023). Other studies explored the relationship between resilience and psychological well-being in university students and found a positive link between mental health and resilience (Al Omari *et al.*, 2020).

Aim and objective

This study aims to assess the resilience, stress levels and meaning of life experienced by university students in Oman during the COVID-19 pandemic and identify any distinct profiles that may exist among them. Understanding these profiles from an educational and counseling perspective is crucial for addressing the unique needs of students in the post-pandemic period. The study aims to identify and compare these profiles among university students.

Methodology

Design, participants and ethical issues

The study employed a cross-sectional survey design, gathering data from full-time students at one university in Oman. The university's research ethics and bio-safety committee approved the study (#: xxx), and all participants provided online consent. The research team developed an online self-administered questionnaire (Al-Mahrouqi *et al.*, 2021) and made it available to all eligible students from April 7th to 29th, 2021. The survey was sent to all 2,766 registered students at the University, of which 970 responded (response rate = 35.0%). After excluding incomplete data, 964 responses were used for the study.

Study instrument

The instrument consists of 2 sections: [Section 1](#) is the sociodemographic and health outcomes; [Section 2](#) is the psychological outcomes, including resilience, meaning in life and stress.

[Section 1](#). The sociodemographic and health outcomes:

Data include age, gender, program, academic year, living with family, friends or living alone, financial strains and physical or mental illness.

[Section 2](#). Psychological outcomes:

The brief resilience scale (BRS) was used to measure the resilience level of the students (Seyedfatemi *et al.*, 2015). The BRS is a self-reported questionnaire comprising 6 items assessing the unitary construct of resilience. It is a 5-point Likert scale, ranging from 1 = "strongly disagree" to 5 = "strongly agree". The average total scores of all six items were calculated, and scores from 1.00 to 2.99, 3.00 to 4.30 and 4.31 to 5.00 indicate "low", "normal" and "high" resilience, respectively. A systematic review reported that the internal consistency is 0.69 (Seyedfatemi *et al.*, 2015; Reyes *et al.*, 2015). Our study reported that Cronbach's alpha of 0.63 is lower than the previous study.

The Arabic version of the perceived stress scale 4 (PSS-4) was used to measure students' perceived stress (Abdulameer *et al.*, 2019). The PSS-4 consists of 4 self-reported items focused on their perceived stress level within the last one month. It is a 5-point Likert scale, ranging from 0 = "never" to 4 = "very often". It has two negative and two positive items. Positive items must be reverse-coded before all 4 items' scores are summed. The sum of the total scores of the four items was calculated; the higher the scores, the more perceived stress (Abdulameer *et al.*, 2019). A systematic review of 6 studies reported that the internal consistency was 0.60 (Lee, 2012), which was within the recommended acceptable results for reliability (Cronbach, 1951). The current study's internal consistency was 0.62, similar to the systematic review. Another study conducted a qualitative face validity using an extensive translation method, and pilot test results show that the PSS-4 has a good validity level (Sahib, 2018).

The meaning in life questionnaire (MLQ) measured students' meaning in life (Naghiyae *et al.*, 2020). It consists of 10 self-reported items with a 7-point Likert scale, ranging from 1 = "absolutely untrue" to 7 = "absolutely true". It has two aspects: the presence of meaning (5 items) and the search for meaning (5 items). The total score of each aspect ranged from 5 to 35; higher scores correlate with higher levels of presence/search for meaning in the students' lives. In this study, the internal consistency was 0.84 and 0.88 on the presence and search scale, respectively, similar to a previous study (Naghiyae *et al.*, 2020).

Statistical analysis

Using cluster analysis, we can determine whether a cohort of baccalaureate students is homogenous or not. To analyze both categorical (e.g. gender, living alone, having a mental illness) and numerical variables (e.g. age, stress level, the meaning of life) simultaneously, a two-step cluster analysis was deemed most useful. The clusters were evaluated using the silhouette measure (low 0.2, acceptable 0.2–0.4, sufficiently good 0.5–1) to assess their distinction (Chan *et al.*, 2006). Once the clusters were identified within the samples, a cluster comparison was conducted, and each profile cluster was described using descriptive statistics. The Chi-square and Fisher exact tests were utilized to examine associations between clusters for categorical data. In contrast, an analysis of variance (ANOVA) with a post-hoc (Bonferroni) test was used to examine differences between clusters for numerical data. The analysis was conducted using International Business Machines (IBM) Statistical Package for the Social Sciences (SPSS) v27, and the results were considered significant at $p < 0.05$.

Results

Characteristics of the study sample

A total of 964 students participated in this study (response rate = 34.8%). Table 1 shows the sociodemographic characteristics and psychological outcomes of the students. More than eighty-three percent of the students were females ($n = 806$), with an average age of 21.3 ± 3.1 years ranging from 15 to 47. The majority of them are studying engineering (45.6%) and medicine (41.0%) and living with either family or friends (96.6%). Twenty-eight percent ($n = 270$) of the students reported financial difficulties and twelve percent ($n = 123$) reported a chronic physical illness. However, more than sixty percent ($n = 580$) reported close contact with patients with COVID-19 positive. Ten percent ($n = 102$) reported a mental illness among other psychological measures, and thirty-five percent ($n = 342$) had low resilience scores. The average perceived stress, presence of meaning in life and search for meaning in life were 7.9 ± 2.3 , 24.2 ± 6.9 and 24.9 ± 7.7 , respectively.

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110

Characteristics	n (%)
<i>Gender</i>	
Female	806 (83.6)
Male	158 (16.4)
<i>Age (Years)</i>	
Mean \pm SD	21.3 \pm 3.1
Median [range]	21.0 [15.0–47.0]
<i>Study program</i>	
Pharmacy	129 (13.4)
Engineering	440 (45.6)
Medicine	395 (41.0)
<i>Year of study</i>	
1	200 (20.7)
2	199 (20.6)
3	179 (18.6)
4	197 (20.4)
5	113 (11.7)
6	49 (5.1)
7	27 (2.8)
<i>Living alone</i>	
Yes	33 (3.4)
No	931 (96.6)
With family	914 (98.2)
With friends	17 (1.8)
<i>Financial difficulties</i>	
Yes	270 (28.0)
No	694 (72.0)
<i>Close contact with people with Covid-19 positive[^]</i>	
Yes	580 (60.2)
No	384 (39.8)
<i>Chronic physical illness</i>	
Yes	123 (12.8)
No	841 (87.2)
<i>Mental illness</i>	
Yes	102 (10.6)
No	862 (89.4)
<i>Resilience (BRS)</i>	
High (4.31–5.00)	18 (1.9)
Normal (3.00–4.30)	604 (62.7)
Low (1.00–2.99)	342 (35.5)
Mean \pm SD	3.0 \pm 0.5
Median [range]	3.0 [1.0–4.8]
<i>Perceived stress (PSS-4)</i>	
Mean \pm SD	7.9 \pm 2.3
Median [range]	8.0 [0.0–15.0]

Table 1.
Characteristics of the
students (n = 964)

(continued)

Table 1.

Characteristics	n (%)
<i>Meaning in life (MLQ)</i>	
<i>Presence</i>	
Mean ± SD	24.2 ± 6.9
Median [range]	25.0 [5.0–35.0]
<i>Search</i>	
Mean ± SD	24.9 ± 7.7
Median [range]	27.0 [5.0–35.0]
<p>Note(s): ^, 6 missing data; Brief Resilience Scale (BRS): 6 items, score 1–5/item, ranging from 1.00 to 5.00, higher scores meaning high resilience; Perceived Stress Scale-4 (PSS-4): 4 items, score 0–4/item, ranging from 0 to 16, higher score meaning perceived higher stress; Meaning in Life Questionnaire (MLQ): 10 items, score 1–7/item, two subscale: Presence and Search, each scale range 5–35</p> <p>Source(s): Author's own creation/work</p>	

Profiles of different cluster groups

In Table 2, the cluster analysis divided the students into three clusters with an acceptable silhouette (=0.40) measure. Clusters A, B and C contained 503 (52.2%), 160 (16.6%) and 301 (31.2%) university students, respectively. Three clusters were defined based on the sociodemographics and the students' perceived resilience, stress and meaning in life.

Characteristics of students in cluster A. Cluster A was characterized by all female students (100.0%). They are younger (20.8 ± 2.4 years) age and studying medicine (46.7%) in their 1st/2nd year (41.0%). The majority of them had no previous record of financial difficulties (75.1%), chronic physical illness (88.9%) and mental health (92.8%) problems. They reported normal resilience, with below-average stress (7.4 ± 2.1) and the highest life meaning (25.3 ± 6.8).

Characteristics of students in cluster B. Cluster B was the majority of male students (98.8%) and older (23.5 ± 5.3 years). Most students study engineering (75.6%) in their 3rd/4th year (46.3%). There is nine percent ($n = 15$) of them are living alone, with no major issues with chronic physical (85.0%) or mental illness (91.3%). However, there is thirty-three percent ($n = 54$) reported low resilience, with below-average stress (7.8 ± 2.6), moderate presence (24.5 ± 7.0) and search (24.3 ± 7.6) of meaning in life scores.

Characteristics of students in cluster C. All of them are female ($n = 301$) in cluster C with an average age of 20.8 ± 2.4 years. More than forty-three percent ($n = 130$) study medicine in their 1st/2nd year (41.9%). More than seventeen percent ($n = 52$) reported having mental health (92.8%) problems, with ninety-five percent ($n = 288$) reporting a low resilience and presence of meaning in life (22.4 ± 6.8) score. This group of students also reported high average stress (8.7 ± 2.4) and searching for meaning in life (26.0 ± 7.5).

Comparison among three cluster groups. In terms of sociodemographic characteristics, students in cluster B are significantly older ($F = 54.52, p < 0.001$), are males ($\chi^2 = 949.59, p < 0.001$) who are living alone ($\chi^2 = 148.40, p < 0.001$) and study engineering ($\chi^2 = 75.2, p < 0.001$) more than clusters A and C. Their perceived stress, resilience and meaning in life were moderate compared with other clusters. In contrast, clusters A and C students were not significantly different on all sociodemographic variables, except more students in cluster C had mental illness than in clusters A ($p < 0.001$) and B ($p = 0.012$). Students in cluster A have normal resilience, the lowest perceived stress and the search for meaning in life but a higher presence of meaning ($F = 16.70, p < 0.001$) than cluster C. In contrast, students in cluster C had a low resilience ($F = 28.64, p < 0.001$) and search for meaning in life ($F = 4.16, p = 0.016$) but higher perceived stress ($p < 0.001$) and presence of meaning in life ($p < 0.001$) than clusters A and B.

Table 2.
Comparison of students by cluster on the sociodemographic, perception of meaning in life, resilience and stress

Sociodemographic	A (n = 503) n (%)	Cluster B (n = 160) n (%)	C (n = 301) n (%)	Test Statistics	p-value	A vs B	Paired comparison ^a A vs C	B vs C
<i>Gender</i>								
Female	503 (100.0)	2 (1.3)	301 (100.0)	949.59 ^a	<0.001	<0.001 [^]	N/A	<0.001 [^]
Male	0 (0.0)	158 (98.8)	0 (0.0)					
<i>Age (Years)</i>								
Mean ± SD	20.8 ± 2.4	23.5 ± 5.3	20.7 ± 2.1	54.52 ^b	<0.001	<0.001	0.419	<0.001
<i>Study program</i>								
Pharmacy	64 (12.7)	9 (5.6)	56 (18.6)	75.20 ^a	<0.001	<0.001	0.076	<0.001
Engineering	204 (40.6)	121 (75.6)	115 (38.2)					
Medicine	235 (46.7)	30 (18.8)	130 (43.2)					
<i>Year of study</i>								
1-2	206 (41.0)	67 (41.9)	126 (41.9)	8.51 ^a	0.075	0.020	0.969	0.031
3-4	190 (37.8)	74 (46.3)	112 (37.2)					
5-7	107 (21.2)	19 (11.8)	63 (20.9)					
<i>Living alone</i>								
Yes	11 (2.3)	15 (9.4)	7 (2.3)	148.40 ^a	<0.001	<0.001	0.998 [^]	0.002 [^]
No	492 (97.7)	145 (90.6)	294 (97.7)					
<i>With family</i>	487 (99.0)	142 (97.9)	285 (96.9)	4.35 ^a	0.114	0.391 [^]	0.049 [^]	0.758 [^]
<i>With friends</i>	5 (1.0)	3 (2.1)	9 (3.1)					
<i>Financial difficulties</i>								
Yes	125 (24.9)	54 (33.8)	91 (30.2)	5.84 ^a	0.054	0.032	0.101	0.462
No	378 (75.1)	106 (66.3)	210 (69.8)					
<i>Close contact with people with Covid19 positive</i>								
Yes	316 (62.8)	90 (56.3)	174 (57.8)	3.20 ^a	0.075	0.162	0.179	0.767
No	187 (37.2)	70 (43.8)	127 (42.2)					

(continued)

Sociodemographic	Cluster		C (n = 301) n (%)	Statistics	Test	p-value	A vs B	Paired comparison [^]	
	A (n = 503) n (%)	B (n = 160) n (%)						A vs C	B vs C
<i>Chronic physical illness</i>									
Yes	56 (11.1)	24 (15.0)	43 (12.8)	2.55 ^a		0.280	0.210	0.222	0.890
No	447 (88.9)	136 (85.0)	258 (85.7)						
<i>Mental illness</i>									
Yes	36 (7.2)	14 (8.8)	52 (17.3)	21.06 ^a		<0.001	0.495	<0.001	0.012
No	467 (92.8)	146 (91.3)	249 (82.7)						
<i>Resilience (BRS)</i>									
High (4.31–5.00)	0 (0.0)	5 (3.1)	13 (4.3)	807.10 ^a		<0.001	<0.001	<0.001	<0.001
Normal (3.00–4.30)	503 (100.0)	101 (63.1)	0 (0.0)						
Low (1.00–2.99)	0 (0.0)	54 (33.8)	288 (95.7)						
Mean ± SD	3.3 ± 0.3	3.1 ± 0.6	2.6 ± 0.5	241.00 ^b		<0.001	<0.001	<0.001	<0.001
<i>Perceived stress (PSS-4)</i>									
Mean ± SD	7.4 ± 2.1	7.8 ± 2.6	8.7 ± 2.4	28.64 ^b		<0.001	0.170	<0.001	<0.001
<i>Meaning in life (MLQ)</i>									
<i>Presence</i>									
Mean ± SD	25.3 ± 6.8	24.5 ± 7.0	22.4 ± 6.8	16.70 ^b		<0.001	0.664	<0.001	0.005
<i>Search</i>									
Mean ± SD	24.4 ± 7.8	24.3 ± 7.6	26.0 ± 7.5	4.16 ^b		0.016	0.978	0.021	0.095

Note(s): Brief Resilience Scale (BRS): 6 items, score 1–5/item, ranging from 1.00 to 5.00, higher scores meaning high resilience; Perceived Stress Scale-4 (PSS-4): 4 items, score 0–4/item, ranging from 0 to 16, higher score meaning perceived higher stress; Meaning of Life Questionnaire (MLQ): 10 items, score 1–7/item, two subscale: Presence and Search, each scale range 5–35; a, Chi-square test/Fisher exact test; b, ANOVA; ^, Post-hoc (Bonferroni) test for continuous data

Source(s): Author's own creation/work

Table 2.

Discussion

Three clusters were identified based on studying the sociodemographic, perceived stress, resilience and meaning in life outcomes of students in Oman during the COVID-19 pandemic. There are differences between the three groups of students in their responses to these outcomes. The students in clusters A and C tend to have similar sociodemographic profiles. Compared to cluster A, more students in cluster C reported a mental illness and a high perceived stress level and were more likely to seek meaning in life. In addition, students in cluster C have less resilience and meaning in their lives than those in cluster A. The students in cluster A were deemed to be at “*low risk and have fewer impacts*” on psychological problems during the COVID-19 pandemic, whereas those in cluster C were considered as the “*high risk and had more impacts*” group. Clusters A and B comprised 52.2 and 31.2% of our samples. Compared to clusters A and C, cluster B students have significantly different sociodemographic characteristics, including age, gender, living alone, studying program, living status, mental illness, and perceived resilience, stress and meaning in life. We categorize this cluster as the “*moderate risk and moderate impacts*” group, representing 16.6% of our sample.

Impacts of resilience, meaning in life and stress on the university students

There were gender differences in the resilience scores; female students in cluster C scored higher than male students (cluster B). According to previous research, gender differences were also found (Rodriguez-Besteiro *et al.*, 2021; Xiao *et al.*, 2020). The study suggests that males report higher feelings of ability than females, while females report more social support and have a lower level of introspection. Educators/clinicians who counsel students may consider such differences when selecting resources.

We found significant differences between the groups with and without a history of mental illness and high perceived stress. According to our study, students who reported less resilience had a high stress level, consistent with the theoretical framework. In addition, previous studies also indicated that resilience predicts high stress and hopelessness (Ostafin and Proulx, 2020; Laher *et al.*, 2021; Yu *et al.*, 2022). Overall, the average resilience scores (3.0 ± 0.5) of the total sample were not different from previous research (Laher *et al.*, 2021). Our study found that a particular group of students (cluster C) have extremely low resilience scores compared with previous studies. Educators and clinicians who work with students who have mental illness and experience high stress may find these results relevant. A clinical therapist can provide students with online consultations when their resilience skills are challenged by stress, like during COVID-19 (Philips, 2020). It may be necessary to increase self-efficacy on the individual level, and one way to increase social resources is to work toward increasing social networks (Choi, 2020).

Students in cluster C scored higher on a search for meaning in life and had lower scores on the presence of meaning in life. Consequently, they showed a lack of a sense of purpose in their present life but displayed a strong desire to find meaning despite the high level of psychological distress caused by the epidemic. Based on previous work, university students were less likely to search for meaning in life during the COVID-19 epidemic than to experience meaning in life (Yu *et al.*, 2022).

Based on the findings of an earlier study, COVID-19 negatively correlated with meaning in life and resilience, suggesting that painful experiences negatively impacted personal inner resources (Yu *et al.*, 2022). In line with our findings, clusters A and B students had high resilience and meaning in life scores but low perceived stress. A high level of meaning in life and resilience increases stress resistance and positively affects mental health (Nowicki *et al.*, 2020; Ran *et al.*, 2020). Meaning in life and resilience were negatively correlated with depression (Ostafin and Proulx, 2020), which supports this study’s conceptual framework.

A previous study reported that people who face stressful or traumatic events also experience psychological distress (Yu *et al.*, 2020). The results suggest that psychological resources and assets were crucial to maintaining and improving mental health and stability during the COVID-19 outbreak.

In addition, a longitudinal survey of the Chinese population reported that stress, anxiety, and depression levels did not significantly change during the initial outbreak of COVID-19 and four weeks after it (Wang *et al.*, 2020a, b). Those students at high risk and impact mental health problems are mostly affected by COVID-19 found all over the World (Alotaibi *et al.*, 2020; Wang *et al.*, 2020a, b). However, it does not imply that all students suffer from the stress and meaning of life due to the vagaries of COVID-19. The present study defined what constitutes students, suggesting that high-risk and highly impacted students (cluster C) comprised 31.2% (n = 301) of the sample.

Limitations

The results of this study are subject to certain limitations that may affect the validity of the findings. One of the limitations that might influence the results of this online survey was a self-administered questionnaire. The respondents' honesty is a possible error that could influence the results (O'Connor and Evans, 2020). Additionally, the study was conducted early in the pandemic, and the findings may not be generalizable to other periods or populations. The present study collected psychiatric symptoms via self-report questionnaires, but no diagnosis was made. The COVID-19 pandemic will cause hemodynamic changes in the brain (Olszewska-Guizzo *et al.*, 2021). A systematic review has recommended a clinical interview and functional neuroimaging as the gold standard for psychiatric diagnosis in future studies (Husain *et al.*, 2021). The study's cross-sectional design and low response rates limit its generalizability, and cause-effect relationships among mental health outcomes cannot be discerned. In the long run, a follow-up survey could explore the impact of mental health on students over time.

Implications for practices

To support students during this period, there is an increased need for education and counseling (Ye *et al.*, 2020). Our results and other studies report similar findings that students are experiencing varying levels of stress, resilience and sense of meaning in life issues during the COVID-19 pandemic. Additionally, this study identified three distinct groups of students, each with different levels of severity in their problems. University management should focus on implementing personal precautionary measures and providing high-tech, user-friendly platforms for students to enhance their learning (Wang *et al.*, 2020a, b). They should also develop psychological support programs tailored to each profile group, including cognitive-behavioral therapy (CBT), counseling and support services (Zhang *et al.*, 2020).

Further, those using online CBT experienced a greater decrease in their stress level than those using a face-to-face CBT group (Soh *et al.*, 2020). Compared with conventional face-to-face CBT, online CBT was less expensive and more effective in improving mental health symptoms (Zhang and Ho, 2017). Resources should be allocated to address students' mental health issues like those in cluster C. These programs can probably help them because they suffer from mental health problems compared to the other 2 clusters. Every profile group should employ an integrated method to promote CBT (Zhang *et al.*, 2020). In addition, the availability of COVID-19 vaccination for students is vital because it will enhance their protection and reduce the probability of acquiring and transmitting COVID-19.

Conclusion

Our study has revealed that students in cluster C have experienced more mental health problems and are at the greatest risk during the COVID-19 pandemic. It would be advantageous to prioritize this vulnerable group with early psychological interventions. As the COVID-19 pandemic continues, university management should develop customized strategies for each profile group to address their unique mental health needs.

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