**RESEARCH ARTICLE / ARAŞTIRMA YAZISI**

# Mental Health, Loneliness and Social Support during COVID-19 Pandemic among International University Students in North Cyprus

## Kuzey Kıbrıs'taki Uluslararası Üniversite Öğrencileri Arasında COVID-19 Salgını Sırasında Ruh Sağlığı, Yalnızlık ve Sosyal Destek

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**Abstract:**

The COVID-19 pandemic has adversely affected the mental health of various populations. It is thought that international students are more affected by this situation among university students who are prone to mental disorders. For this reason, the aim of the current study was to investigate depression, anxiety, stress, loneliness and perceived social support among international students in North Cyprus during the COVID-19 pandemic. Depression, anxiety, stress, loneliness and perceived social support scores were compared between international students who stayed in Cyprus during the quarantine period and students who returned to their home countries and also the factors predicting depression, anxiety and stress scores among international students staying in Cyprus during the quarantine period were examined. The sample of the study included 262 students who were recruited using convenience sampling. A socio-demographic form, Depression Anxiety Stress Scale-Short Form, Revised University of California Los Angeles Loneliness Scale and Multidimensional Scale of Perceived Social Support Scale were used for data collection. The results revealed that during the lockdown the students mostly worried about their health, their families' health and their academic performance. International students who stayed in Cyprus during the lockdown had higher depression and lower perceived family support scores than the international students who travelled back to their home countries and were there during the lockdown. The result of hierarchical linear regression indicated that length of stay in Cyprus, perceived support of significant other and stress were predictors which explained 73% of variance in depression scores. Gender, monthly income and stress were significant predictors of anxiety which explained 63% of variance and grade, significant other support, depression and anxiety were predictors of stress which explained 78% of the variance. The current study result highlight that universities and states should consider social support and protective mental health programs for international students.

**Keywords:** Depression, Anxiety, Stress, Perceived Social Support, International University Students

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## Öz:

COVID-19 salgını, çeşitli popülasyonların ruh sağlığını olumsuz yönde etkiledi. Ruhsal rahatsızlıklara yatkın olan üniversite öğrencileri arasında uluslararası öğrencilerin bu durumdan daha fazla etkilendiği düşünülmüştür. Bundan dolayı bu çalışmanın amacı, COVID-19 pandemisi sırasında Kuzey Kıbrıs'taki uluslararası öğrenciler arasında depresyon, kaygı, stres yalnızlığı ve algılanan sosyal desteği incelemektir. Depresyon, kaygı, stres, yalnızlık ve algılanan sosyal destek puanları karantina dönemi Kıbrıs'ta kalan uluslararası öğrenciler ile memleketlerine dönen öğrenciler karşılaştırılmıştır ve ayrıca karantina dönemi Kıbrıs'ta kalan uluslararası öğrenciler arasında depresyon, kaygı ve stres puanlarını yordayan faktörler incelenmiştir. Araştırmanın örneklemini kolayda örnekleme ile seçilen 262 öğrenci oluşturmuştur. Veri toplamada sosyodemografik form, Depresyon Anksiyete Stres Ölçeği-Kısa Form, Revize California Los Angeles Üniversitesi Yalnızlık Ölçeği ve Çok Boyutlu Algılanan Sosyal Destek Ölçeği kullanılmıştır. Sonuçlar, karantina sırasında öğrencilerin en çok kendi sağlıkları, ailelerinin sağlığı ve akademik performans konusunda endişelendiğini ortaya koydu. Karantina sırasında Kıbrıs'ta kalan uluslararası öğrenciler, kendi ülkelerine geri dönen ve karantina sırasında orada bulunan uluslararası öğrencilere göre daha yüksek depresyon ve daha düşük algılanan aile desteği puanına sahipti. Hiyerarşik lineer regresyon sonucu, Kıbrıs'ta kalış süresinin, önemli birinin algılanan desteğinin ve stresin, depresyon puanındaki varyansın %73'ünü açıklayan yordayıcılar olduğunu göstermiştir. Cinsiyet, aylık gelir ve stres, varyansın %63'ünü açıklayan kaygının önemli yordayıcılarıydı, önemli birinin algılanan desteğinin, depresyon ve kaygı, varyansın %78'ini açıklayan stresin yordayıcılarıydı. Mevcut çalışmanın bulguları, üniversitelerin ve devletlerin uluslararası öğrenciler için sosyal destek ve koruyucu ruh sağlığı programlarını dikkate alması gerektiğini vurgulamaktadır.

**Anahtar Kelimeler:** Depresyon, Anksiyete, Stres, Algılanan Sosyal Destek, Uluslararası Üniversite Öğrencileri

## Introduction

Since the COVID-19 became a pandemic, it causes a sudden change in lifestyle of people all over the world (Balanzá-Martíneze et al., 2020; Van der Werf et. al., 2021) and has negatively affected the mental health of various populations (Wu et al. 2021). University students are a population prone to mental disorders (Zivin et. al., 2009). Following the onset of the COVID-19 pandemic, it was found that they experienced more mental challenges than all other occupations as a result of the pandemic (Naser et al., 2020). International students who enter a foreign country with the intention of pursuing education (UNESCO, 2015), experienced the hardest times due to the financial, language and information barriers during COVID-19 pandemic which led them to be more isolated (Chen et al. 2020) and more vulnerable to mental disorders (Alam et al., 2021).

Studies conducted with university students in different countries revealed that students are experiencing difficulties due to the COVID-19 pandemic. In a study involving university students in Germany indicated that 38% of the students experienced low or very low wellbeing (Dadaczynski et al., 2021). Recent studies have reported heightened posttraumatic stress disorder (PTSD), depression, anxiety and insomnia among university students (Tang et al., 2020; Cao et al., 2020; Islam et al., 2020; Al Omari et al., 2020). 80.7% of the students were suffering from depression in Turkey (Bulut et al., 2021). Living in an urban area, with low parental income, living without parent was found to be associated with anxiety (Cao et al., 2020). Tang and colleagues (2020) found that feeling extreme fear, short sleep durations, being in their graduating year and living in severely afflicted areas as risk factors for PTSD and depression. Another study found that being a woman, poor general health status, being aged

between 18-24 and spending 8 or more hours on screen daily were found high risk for mental health among university students (Browning et al., 2021).

The limited studies with international students, who were viewed as the most vulnerable group in higher education due to the COVID-19 pandemic (Firang, 2020) indicate that mental health problems were common. Alam and colleagues (2021) found that the prevalence of depression, anxiety, stress, insomnia, psychological distress, loneliness and fear was 73.4%, 76.6%, 58.5%, 77.6%, 71.4%, 62.4% and 73.1% respectively. Ochnik et al., (2021) reported that depression was associated with the female gender and prevalent among bachelor's student. Furthermore, loneliness which is a state of negative discrepancy between desired and actual personal relationships and networks (Hu et al., 2020), increased for the general population, the increase was more marked for students (Bu et al., 2020). On the other hand, social support could be a protective factor for mental health issues and loneliness. Social support is a complex contrast that describes the assistance and comfort that one receives from others during times of physical, emotional and social stress (APA, 2022). English and colleagues (2022) reported that social support was the dominant coping mechanism employed by international university students during the pandemic. Studies have shown that university students are affected by the changes introduced to their social and academic life as a result of the COVID-19 pandemic. Therefore, universities and the state should pay more attention particularly to the wellbeing of international students.

Turkish Republic of Northern Cyprus (TRNC) is an island in the Mediterranean that has a student population of 103.743 according to statistics for the 2019-2020 education semester and nearly 39% of the students were international students (YOBIS, 2020). To prevent the

spread of the disease due to the detection of cases of COVID-19, the TRNC government gave a lockdown order (stay at home order) on March 14th 2020. This has led to restrictions in many areas including transportation, schools, banks and restaurants which were closed apart from pharmacies and markets. Education for university students commenced online. Native students adapted with support of their families and financially affluent international students could return to their homeland and continued their courses online. Another group of international students had to stay in the island due to the economic inadequacies. Being away from their families restricted their access to some opportunities and support which delimits their ability to cope in the COVID-19 pandemic. As a result, financial issues, lack of support, lack of internet connection, lack of a computer etc. may have affected the mental health of international students. The aim of the present study is to investigate the level of depression, anxiety, stress, loneliness and perceived social support of international students in North Cyprus during COVID-19 pandemic. In addition, the predictors of depression, anxiety, stress were examined among international students.

## Methods

### Sample

The current study employs a comparative research model. Convenience sampling was used to select 262 international students in TRNC for inclusion in the current research. 4 questionnaires were excluded from the analysis due to the substantial missing data. 208 (79.4%) were students who stayed in Cyprus during the lockdown and 54 (20.6%) had returned to their home countries. The sample comprised on 169 women (64.2%) and 93 men (35.5%), 24 (9.2%) married participants and 271 (90.8%) single students. 6 (2.3%) member of the sample was employed on a full-time bases, 39 (14.9%) on a part-time bases and 216 (82.4%) were not employed while 208 (79.4%) stayed in a rented apartment, 11 (4.2%) owned apartments and 33 (12.6%) stayed in the dormitory.

The research questionnaire was distributed online through school emails and social media platforms. An information sheet and an informed consent form were attached to the distributed survey to ensure the participants understood the purpose of the research.

### Instruments

The questionnaire was presented in English language. It included a sociodemographic questionnaire as well as 3 standardized questionnaires collecting information about the depression, stress, anxiety, loneliness and social support levels experienced by the participants.

The socio-demographic form consisted of two parts. The first part is related to some basic socio-demographic characteristics of the respondents such as age, gender, grade, country of origin, marital status, duration of stay in Cyprus, where and with whom they live in Cyprus, working status as well as monthly income. The second part included questions about the COVID-19 related life events among university students such as fear or worry about their

health, the health of family members, partners, financial hardships, worry about academic performance, job loss, lack of computer, lack of internet connection...etc. The socio-demographic form was prepared by the researchers.

**Depression Anxiety Stress Scale-Short Form (DASS-21):** The scale is a self-report scale and was developed by Lovibond and Lovibond (1995) to measure the negative emotional states of depression, anxiety and stress. DASS-21 includes 21 items with a 4-point Likert scale and 3 subscales (depression, anxiety and depression). The Cronbach alpha of Depression, Anxiety, and Stress were 0.71, 0.86 and 0.88 respectively (Lovibond & Lovibond, 1995). A Cronbach's alpha of 0.936 was found in the current study.

**Revised University of California Los Angeles Loneliness Scale (UCLA Loneliness Scale-R):** This scale was developed to assess participants' degree of loneliness (Russell et al., 1980). It is a self-report measure, consisting of 20 items and participants were asked to respond to each item statement with responses of never, rarely, sometimes, and always. Higher scores on the loneliness scale indicate higher loneliness. The reliability score for the scale was 0.94 Cronbach's Alpha (Russell et al., 1980). A Cronbach's alpha of 0.890 was found in the current study.

**Multidimensional Scale of Perceived Social Support (MSPSS):** MSPSS measures the participants' perception of the adequacy of the support they receive (Zimet et al., 1988). The scale consists of 12 items and 3 subscales: support from significant other, support from family and support from friends. Higher scores indicate greater perceived social support. The total scale has a reliability coefficient of 0.88 Cronbach's alpha and the Cronbach's alpha of significant other, family and friends support were 0.91, 0.87, and 0.85, respectively (Zimet et al., 1988). The reliability coefficient for the current study was 0.91 Cronbach Alpha.

### Procedure

The ethical approval was taken from the Social Science Ethical Committee of Near East University (application number YDÜ/SB/2020/872). An electronic questionnaire was created using Google Forms since the data was collected when classes were mainly held online because of the pandemic. The questionnaire was distributed among international students through school emails and WhatsApp groups for international students

## Results

Among the international students, 54% of them reported worrying about their health and 53% worried about the health of family members, 50% reported worrying about academic performance and 46% experienced financial hardships during the lockdown between March 14 and May 18. Apart from concerns about health and academic performance, lack of social interactions (48%), not meeting friends to worry about COVID-19 transmission (44%) and 'feeling of being stuck' in Cyprus (44%) were other common challenges (Table 1).

**Table 1.** Challenges experienced during the 'stay at home order' In Cyprus

| Challenges experienced during the 'stay at home order' In Cyprus | n | % |
|---|---|---|
| 1. Fear or worry about your health | 112 | 54 |
| 2. Fear or worry about family member's health | 110 | 53 |
| 3. Fear or worry about partner's health | 28 | 14 |
| 4. Increased cigarette smoking | 26 | 13 |
| 5. Increased alcohol consumption | 21 | 10 |
| 6. Financial hardships | 96 | 46 |
| 7. Not able to meet basic needs (eg. Food, medical) due to financial hardships | 50 | 24 |
| 8. Job loss | 22 | 11 |
| 9. Academic delay | 54 | 26 |
| 10. Worry about academic performance | 104 | 50 |
| 11. Not attending to online class due to problems with internet connection | 57 | 27 |
| 12. Not attending to online class due to other technical reasons (eg. Lack of computer) | 35 | 17 |
| 13. Lack of social relations due to 'stay at home' order | 99 | 48 |
| 14. Not meeting friends due to worry about COVID-19 transmission | 92 | 44 |
| 15. Inability to go shopping due to lack of highway transport | 62 | 30 |
| 16. 'Feeling of being stuck' in Cyprus | 91 | 44 |
| 17. Being unable to go your country due to lack of air transport | 49 | 24 |

After the lockdown in the 2020-21 Spring semester worry about their health was the leading problem (41%) closely followed by worry about academic performance (40%), worry about the health of one's family (35%), financial hardships (34%) and 30% of them felt stuck in Cyprus (Table 2).

**Table 2** Challenges experienced during the Spring semester

| Challenges experienced during the Spring semester | n | % |
|---|---|---|
| 1. Fear or worry about your health | 96 | 41 |
| 2. Fear or worry about family member's health | 83 | 35 |
| 3. Fear or worry about partner's health | 30 | 13 |
| 4. Increased cigarette smoking | 16 | 7 |
| 5. Increased alcohol consumption | 13 | 6 |
| 6. Financial hardships | 80 | 34 |
| 7. Not able to meet basic needs (eg. Food, medical) due to financial hardships | 46 | 19 |
| 8. Job loss | 24 | 10 |
| 9. Academic delay | 58 | 25 |
| 10. Worry about academic performance | 94 | 40 |
| 11. Not attending to online class due to problems with internet connection | 52 | 22 |
| 12. Not attending to online class due to other technical reasons (eg. Lack of computer) | 39 | 16 |
| 13. Not meeting friends due to worry about COVID-19 transmission | 73 | 31 |
| 14. 'Feeling of being stuck' in Cyprus | 71 | 30 |

Comparison of the mean scores of depression, anxiety, stress, loneliness and perceived social support scales between international students in Cyprus during the lockdown and those that travelled back to their home-countries showed that international students who had been in Cyprus during lockdown between March 14 and May 18 had higher mean scores in depression (p=0.022*) but lower mean scores in perceived family (p=0.006**)and friend support (p=0.047*) than international students that travelled back to their home (Table 3).

**Table 3:** Comparison of wellbeing between international students in Cyprus during the lockdown and those that travelled back to their home-countries

| | In Cyprus | | Home country | | | |
|---|---|---|---|---|---|---|
| Test Variable | mean | Std | mean | Std | T | p |
| Depression | 11.82 | 10.86 | 8.67 | 8.25 | 2.331 | 0.022* |
| Anxiety | 7.69 | 8.78 | 7.48 | 7.45 | 0.162 | 0.872 |
| Stress | 11.53 | 9.84 | 10.93 | 8.43 | 0.413 | 0.680 |
| Loneliness | 46.10 | 14.56 | 44.37 | 12.19 | 0.803 | 0.423 |
| Significant other support | 3.91 | 1.74 | 4.20 | 1.51 | -1.131 | 0.259 |
| Family support | 3.98 | 1.68 | 4.62 | 1.41 | -2.834 | 0.006** |
| Friends support | 3.56 | 1.54 | 4.01 | 1.26 | -1.993 | 0.047* |

*p < .05, **p < .01, ***p <.001

A Pearson correlation analysis revealed that depression was positively correlated with anxiety, stress, loneliness and negatively correlated with family support. Anxiety was found to be positively correlated with depression, stress and loneliness. It was also negatively correlated to family support and friend support. Stress was negatively correlated with family support and positive correlated with depression and anxiety. Loneliness was positively correlated with depression and anxiety but negatively correlated with friend support. The subscales of social support: significant other, family and friend support were all significantly correlated with each other.

**Table 4:** Correlational analysis between loneliness, depression, anxiety, stress and support

|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1.Depression |  |  | 0.82*** | 0.67*** | -0.13 | -0.23** | -0.12 |
| 2.Anxiety | 0.67*** |  | 0.77*** | 0.19** | -0.07 | -0.017* | -0.15* |
| 3.Stress | 0.82*** | 0.77*** |  | 0.13 | -0.02 | -0.19** | -0.10 |
| 4. Loneliness | 0.17* | 0.19** | 0.13 |  | -0.06 | 0.06 | -0.20** |
| 5.Significant other support | -0.13 | -0.08 | -0.02 | -0.06 |  | 0.61*** | 0.68*** |
| 6.Family support | -0.23** | -0.17* | -0.19** | 0.06 | 0.61*** |  | 0.58*** |
| 7.Friend support | -0.12 | -0.15* | -0.10 | -0.20** | 0.65*** | 0.57*** |  |

$*p < .05, **p < .01, ***p < .001$ 1, Depression; 2, Anxiety; 3, Stress; 4, Loneliness; 5, Significant other support; 6, Family support; 7, Friend support

In the hierarchical linear regression for variance predicting depression, socio-demographic information is entered in the first model accounting for 15% variance in depression. Age, length of stay in Cyprus and number of coping challenges reported during the lockdown had significant beta weights. In the second model loneliness and perceived social support were added, accounting for 24% of variance in depression scores. The final model included stress and anxiety subscales of DASS which accounted for 73% variance in depression scores. Length of stay in Cyprus, significant other support and stress were significant predictors in the final model (Table 5).

**Table 5.** Hierarchical Regression Analysis for Variables Predicting Depression Scores

|  | Model 1 $(R^2=0.15)$ | | | Model 2 $(R^2=0.24)$ | | | Model 3 $(R^2=0.73)$ | | |
|---|---|---|---|---|---|---|---|---|---|
| Variables | *B* | SE | *B* | *B* | SE | *β* | *B* | SE | *β* |
| Gender (female/male) | 0.08 | 1.73 | .004 | 0.14 | 1.66 | .01 | -0.20 | 1.02 | -0.09 |
| Age | -0.51 | 0.18 | -.27** | -0.57 | 0.17 | -.30** | -0.19 | 0.10 | -.10 |
| Grade | 0.72 | 0.66 | .10 | 1.18 | 0.67 | .16 | -0.27 | 0.41 | -.03 |
| Living (alone/someone) | -0.23 | 1.80 | -0.1 | -.035 | 1.73 | -.01 | -1.19 | 1.04 | -.05 |
| Work (yes/no) | 0.86 | 2.08 | 0.3 | 1.13 | 1.73 | .04 | -0.29 | 1.22 | -.01 |
| Marital status (single/married) | 2.46 | 2.879 | 0.7 | 0.47 | 0.02 | .16 | -1.27 | 1.71 | -0.4 |
| Length of stay in Cyprus | 0.05 | 0.02 | .19* | 0.04 | 0.02 | .16** | 0.02 | 0.01 | .10* |
| Monthly income (low-moderate/high) | 2.12 | 1.63 | 0.10 | 0.88 | 1.60 | 0.04 | 1.02 | 0.98 | .04 |
| Number of events related COVID-19 | 0.96 | 0.33 | .22** | 0.84 | 0.32 | .19* | 0.11 | 0.20 | .02 |
| Loneliness |  |  |  | 0.10 | 0.06 | .14 | 0.06 | 0.03 | .07 |
| Significant other support |  |  |  | -0.58 | 0.65 | -.09 | -1.10 | 0.40 | -.17** |
| Family support |  |  |  | -1.41 | 0.65 | -.21* | 0.06 | 0.40 | .01 |
| Friend support |  |  |  | 0.01 | 0.73 | 0.0 | 0.42 | 0.44 | .06 |
| Depression total |  |  |  |  |  |  |  |  |  |
| Anxiety total |  |  |  |  |  |  | 0.13 | 0.08 | .11 |
| Stress total |  |  |  |  |  |  | 0.77 | 0.08 | .70*** |

$*p < .05, **p < .01, ***p < .001$

Table 6 shows the results of the hierarchical linear regression for variance predicting anxiety. The first model inputs demographic variables, accounting for 7% variance in anxiety scores. The second model entered loneliness and perceived family, friends and significant other support which accounted for 15% variance in anxiety score. Age and family support had significant beta weights. In the third model

depression and stress subscales of DASS are added accounting for 63% variance in anxiety. Gender, monthly income and stress were significant predictors of anxiety.

**Table 6**. Hierarchical Regression Analysis for Variables Predicting Anxiety Scores

| Variables | Model 1 (R²=0.07) | | | Model 2 (R²=0.15) | | | Model 3 (R²=0.63) | | |
|---|---|---|---|---|---|---|---|---|---|
| | *B* | SE | *B* | *B* | SE | *β* | *B* | SE | *β* |
| Gender (female/male) | -1.73 | 1.48 | -.09 | -1.82 | 1.43 | -.09 | -2.28 | 0.96 | -.12* |
| Age | -0.28 | 0.15 | -.18 | -0.32 | 0.15 | -.21* | 0.09 | 0.10 | .06 |
| Grade | 0.75 | 0.57 | .13 | 0.92 | 0.58 | .15 | -0.20 | 0.40 | -.04 |
| Living (alone/someone) | 0.58 | 1.54 | .03 | 0.46 | 1.49 | .02 | -0.10 | 1.00 | -0.05 |
| Work (yes/no) | 1.84 | 1.78 | .08 | 1.97 | 1.73 | .08 | 0.95 | 1.16 | .04 |
| Marital status (single/married) | 2.90 | 2.46 | .10 | 1.86 | 2.45 | .06 | 0.66 | 1.64 | 0.02 |
| Length of stay in Cyprus | 0.01 | 0.01 | .06 | 0.07 | 0.01 | .03 | -0.09 | 0.01 | -.04 |
| Monthly income (low-moderate/high) | -1.29 | 1.39 | -.07 | -1.95 | 1.38 | -.11 | -2.14 | 0.93 | -.12* |
| Number of events related COVID-19 | 0.51 | 0.28 | .14 | -1.95 | 1.38 | -.11 | -0.20 | 0.19 | -.05 |
| Loneliness | | | | 0.09 | 0.05 | .15 | 0.05 | 0.03 | .08 |
| Significant other support | | | | 0.42 | 0.56 | .08 | 0.13 | 0.38 | .02 |
| Family support | | | | -1.24 | 0.56 | -.22* | -0.07 | 0.39 | -.01 |
| Friend support | | | | -0.52 | 0.63 | -.09 | -0.26 | 0.04 | -.61 |
| Depression total | | | | | | | 0.12 | 0.07 | 0.14 |
| Anxiety total | | | | | | | | | |
| Stress total | | | | | | | 0.59 | 0.08 | 0.65*** |

*p < .05, **p < .01, ***p <.001

Table 7 presents the results of the hierarchical linear regression for predictors of stress. The first model includes demographic variables which account for 14% of variance in stress scores. Age and number of coping challenges reported during the lockdown had significant beta weights. Loneliness, family, friends and significant other support are added in the second model resulting in a 21% variance in stress scores. Age, number of coping challenges reported during the lockdown and family support had significant beta weights. In the last model the DASS subscales are input accounting for 78% of variance in stress scores. Grade, significant other support, depression and anxiety had significant beta weights.

**Table 7.** Hierarchical Regression Analysis for Variables Predicting Stress Scores

| Variables | Model 1 (R²=0.14) | | | Model 2 (R²=0.21) | | | Model 3 (R²=0.78) | | |
|---|---|---|---|---|---|---|---|---|---|
| | *B* | SE | *B* | *B* | SE | *β* | *B* | SE | *β* |
| Gender (female/male) | 0.71 | 1.59 | .03 | 0.76 | 1.55 | .03 | 1.46 | 0.82 | .07 |
| Age | -0.38 | 0.16 | -.22* | -0.44 | 0.16 | -.26** | -0.01 | 0.08 | -0.1 |
| Grade | 1.35 | 0.61 | .20 | 1.68 | 0.62 | .25** | 0.69 | 0.33 | .10* |
| Living (alone/someone) | 1.08 | 1.66 | .05 | 1.02 | 1.61 | .04 | 1.00 | 0.85 | .05 |
| Work (yes/no) | 1.52 | 1.92 | .06 | 1.51 | 1.87 | .06 | 0.10 | 0.99 | .04 |
| Marital status (single/married) | 3.05 | 2.65 | .09 | 1.95 | 2.64 | .06 | 0.93 | 1.39 | .03 |
| Length of stay in Cyprus | 0.03 | 0.02 | .12 | 0.01 | 0.02 | .07 | -0.07 | 0.01 | -.03 |
| Monthly income (low-moderate/high) | 0.68 | 1.50 | .03 | 0.14 | 1.49 | .07 | 0.52 | 0.80 | .03 |
| Number of events related COVID-19 | 0.96 | 0.30 | .24** | 0.88 | 0.29 | 0.22** | 0.28 | 0.16 | .07 |
| Loneliness | | | | 0.05 | 0.05 | .06 | -0.05 | 0.03 | -.07 |
| Significant other support | | | | 0.61 | 0.61 | .11 | 0.726 | 0.32 | .12* |
| Family support | | | | -1.71 | 0.61 | -.28** | -0.47 | 0.33 | -.07 |
| Friend support | | | | -0.44 | 0.68 | -.07 | -0.23 | 0.36 | -.04 |
| Depression total | | | | | | | 0.51 | 0.05 | .56*** |
| Anxiety total | | | | | | | 0.42 | 0.06 | .37*** |
| Stress total | | | | | | | | | |

*p < .05, **p < .01, ***p <.001

## Discussion

The results of the study reveal that international students who stayed in Cyprus during the lockdown have significantly higher depression scores and significantly lower family and friend support scores in comparison to their counterpart who travelled to their home countries. Zhai and Du (2020) suggested that international students

residing far from their families are more susceptible to psychological problems such as depression and anxiety. Zhai and Du (2020) outlined the importance of the physical presence of the family and close relationships for psychological health. The results also show significantly lower scores of family and friend support among the international students who remained in Cyprus. International students separated from family during the pandemic worry about the health of their family members and also their personal health and academic success (Zhai & Du, 2020; Jain et al., 2020). Similarly personal health, academic performance and worries about the health of family members were the three foremost challenges reported by students during and after the lockdown. In a study by Gutterer (2020) more students studying abroad reported that the pandemic had affected their studies or having changed their study plans as compared to students studying in their home countries. This shows that students living abroad were disproportionately affected by the pandemic.

The most prevalent challenge experienced by international students residing in Cyprus during the lockdown was fear and worry about their health. Worry about one's health was closely followed by worry about the health of family members. This is in line with the finding of a WHO (2022) report which identified fear of contracting the corona virus, suffering and death as well as death of loved one and bereavement as being some of the stressors individuals experienced as a result of the pandemic. The results are similar to the study by Chirikov and Soria (2020) which stated that the 52% of undergraduate international students were worried about their physical health in relation to the pandemic.

Apart from health concerns, worry about academic performance, lack of social interactions and financial concerns were other common challenges. In the current study 50% of the sample reported worrying about their academic performance but only 27% stated that they could not attend classes because of internet problems and 17% had difficulties attending class because of lack of laptops. An OECD report states that countries similar to Turkey which had less than 1% of the students studying online exclusively had greater challenges adapting to the online educational model required in the COVID-19 pandemic (OECD, 2021). According to Gillet-Swan (2017), with the remote mode of learning many students faced challenges in participation in learning activities particularly group activities which are important for meaningful learner centred learning. Instructors also struggle with the extra workload required to gain competence and proficiency in the technical skills required to successful facilitating learning on the online platform.

After the lockdown worry about their health was still the leading problem among international students, followed by worry about academic performance, worry about the health of one's family and financial hardships. Many students mentioned that they had problems coping or keeping up with online classes, lecture workload and studying and also communicating with the university staff remotely. The students stated that it was difficult to stay motivated while studying online, this is congruent with the findings of Stark (2019) who stated that students studying online have lower motivation than students who study face to face.

The results reveal that depression was positively correlated to anxiety, stress and loneliness among international students in Cyprus. It was also negatively correlated to family support among international students who remained in Cyprus. According to Martin and Hartley (2017) loneliness is associated with higher scores of depression and stress is believed to be one of the mediating variables in this relationship. Such that lonely people tend to perceive stressors as being more intense than their less lonely counterparts. During the pandemic having other people around would provide sociodrama that helps deviate one's attention from the apparent fragility of their life and the lives of their loved ones. The pandemic represents an uncontrollable and unpredictable event which makes it especially stressful for individuals. According to Chang et al. (2017) reduced family support has an incremental effect on depression among lonely individuals. Family support is a positive psychological resource that can buffer the adverse effects of loneliness.

Anxiety was found to be positively correlated to depression, stress and loneliness. It was also revealed to be negatively correlated to family support and friends support. The relationship between anxiety, stress and depression is well documented. Anxiety often precedes depression while anxiety is a reaction to environmental stressors. Isolation during the pandemic was associated with increased anxiety symptoms (Mehus et al., 2021). International students depend on social support from family and friends in different context including those in their home country, friends from the host country, friends and family in the host country but from their native country or other countries (Bhocchibhoya et al., 2017). This support is employed to substitute the societal support lost through migration. Language and cultural distance are some of the factors that delimit the social support available to international students. According to Gatwiri (2015), international students' loss in addition to losing support includes loss former roles that offered respect and admiration from their peers which makes accessing social support more difficult.

The results showed that stress was positively correlated to depression and anxiety but negatively correlated to family support. The results agree with the findings of Panteli et al. (2021) that a negative relationship exists between stress and family support among college students. They assert that among other types of support, only family support was a protective factor from stress during the lockdown. This may be because of the ability of the family to provide stability and cohesion as opposed to the more fluid nature of friendship. During the pandemic the family became the main source interaction and social support as family members regularly inquire after each other's health and wellbeing.

Loneliness was revealed to be correlated to depression, anxiety, stress, and friends' support. This is supported by previous research stating that support particularly from friends can delimit experiences of loneliness. Friends are a useful instrument for the discussion of challenges and contact with others. Friends also help with co-operative learning which can reduce the experience of loneliness (Diehl et al., 2018). Lee et al. (2016) suggested that only friends' support among other sources of support provided protection against stress and loneliness. This can be linked to the effect of physical contact on stress since friends were more likely to have physical conduct with the students

during the pandemic. Moderate physical contact reduces loneliness especially among single individuals (Tejada et al., 2020).

The results of the study reveal that length of stay in Cyprus, significant other support and stress are predictors of depression. High depression scores are expected among international students who have resided in Cyprus for longer, having lower family support and high stress levels. Length of stay was also found to be a predictor variable for depression in a study by Nguyen et al. (2019) where senior students were more susceptible to depression. This is believed to be associated with the increase in complexity of learning activities as well as emerging adulthood responsibilities that the student begins to concentrate on. Emerging adulthood responsibilities such as career decisions and planning. Both would be made even more difficult because of the loss of employment and employment opportunities during the pandemic. This uncertainty can account for the influence of the length of stay in Cyprus on depression.

The results also indicate that significant other support is predictive of lower depression score. Most research identify family support and supportive friends as the forms of social support associated with lower depression contrary to the current research (Griffiths et al., 2011; Alsubaie et al., 2019; Ioannou et al., 2019). This importance of significant other support seen in the study is appropriate for the developmental stage of emerging adulthood were individuals focus on finding intimacy. Gariépy et al., (2016) found that spousal support was the protective factor against depression. Stress was also revealed as a predictor of depression in the current study. Wang et al. (2014) reported that undergraduate students with high stress had higher depression scores. Similar to the result of the current study, it has been found that there was a relationship between high perceived stress and depression among international students in Cyprus (Solomou et al., 2021).

The results of this study reveal that gender, monthly income and stress were significant predictors of anxiety. In the current study, being female was one of the predictors of anxiety. This result is in line with the previous research which indicated that anxiety prevalence is more common among women rather than men (McLean et al., 2011; Baxter et al., 2013). The low monthly income was found to be predictor of anxiety in the current study. According to Ridley (2020), individuals with low income are between 1.5 to 3 times more susceptible to anxiety and other mental health problems. Negash et al., (2021) reported that 25% of the students had a worsened financial situation when compared their financial status before the COVID-19 pandemic which is likely to increase their anxiety. Lee et al., (2021) found that higher family income to be related with lower depression among undergraduate students during the COVID-19 Pandemic. Students have delayed graduation, lost their job or had postponed their future plans related to work due to the pandemic (Aucejo et al., 2020). This disproportionately affects students from lower income families. Financially disadvantaged international students may have lost jobs, or their families may be in a similar situation which results in difficulties meeting basic needs or tuition-related fees. Furthermore, due to the long-lasting impact of the pandemic on the whole world, their anxiety may have increased by losing their hopes of earning money after graduation. The current study

indicates that stress is a predictor of anxiety. Similarly, Maideen et al, (2015) assert that individuals with high stress scores are 5.4 times more likely to develop anxiety in comparison to their low stress counterparts. High perceived stress was seen to be a predictor of anxiety. Common stressors among international student during the pandemic included educational stress, and poor coping skills which were viewed as communal predictors of anxiety (Yuan, 2021).

The study results reveal that year of education, significant other support, depression and anxiety are predictors of stress. According to Alzahem et al, (2013), senior students experience more stress because of the increased complexity of examinations and evaluation criterion. Al-Qahtani and Alsubaie (2020) had similar results showing the predictive relationship between year of study and stress and stressor outlined were associated with academic as well as group activities. One of the interesting results of the current study was that increase in perceived support of a significant other increases stress. Family, peers and significant others were highlighted as the main support systems for students with conventional students preferring fellow students and friends as sources of support while second degree students depended more on significant other or spousal support (Reeve et al., 2013). Previous research revealed that social support has a positive impact on mental health (Wang et al., 2014; Gariépy et al., 2016; Ioannou et al., 2019). Hefner and Eisenberg (2009) reported that one of the factors leading to social isolation among university students is being an international student and that social support especially reduces the level of depression. Moreover, Panteli et al., (2021) reported that family support protects students from stress during the lockdown. Contrary to the literature, in the current study greater support of significant other leads to greater stress among international students who stayed in North Cyprus during the COVID-19 lockdown. In line with this study, Lui et al, (2021) reported that social support from other sources had an adverse impact on mental health symptoms. According to Lui et al. (2021) each source of social support has a different role. The participants might experience stress because of expectations imposed by significant other support on their academic and personal life such as future career prospects and marriage. Further exploration of this phenomena is required to shed light onto the mediating variables.

The current study has several limitations. The result of the study cannot be generalized to international students in North Cyprus due to the small sample size. Further studies can include a large sample size. A self-report questionnaire was used; this may cause response biases. Clinical evaluation is important for the appropriate diagnosis of depression, anxiety and stress. Because the questionnaire was distributed by online there can be a poor representation of some subgroups due to the lack of equipment or internet connection. The current study lacks information about previous experiences of students such as adaptation to university life or North Cyprus.

Despite these limitations, the result revealed that international students who stayed far from their homeland during the lockdown in North Cyprus suffered from mental health problems and lack of family support. This study also contributes to the literature by identifying risk factors for depression, anxiety and stress among international students who stayed in North Cyprus during the lockdown.

The results of the study highlight that universities and states should take into consideration the mental health of international students and provide intervention and prevention programs for the pandemic and similar future situations.

## Declarations

### Ethics Approval and Consent to Participate
Ethics Committee Approval for the present study was obtained from Near East University Ethics Committee on the date of 18/12/2020. Informed consent of the students was obtained online before the application of the online questionnaire.

### Consent for Publication
Not applicable.

### Availability of Data and Materials
Data sets used and / or analyzed during the study can be obtained from the relevant author upon appropriate request.

### Competing Interests
The author declares that no competing interests in this manuscript.

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Not applicable.

### Authors' Contributions
GM and DE contributed to find the subject, planning and literature review, data collection, statistical analysis, writing and interpretation of the article.

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