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The Association between Mental Health and Stressful Life Events among Undergraduate Students in Cyprus: A Descriptive Correlational Study

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Abstract

Background: Previous studies have indicated a causal link between stressful life experiences and mental health. However, little is known about the impact of the frequency and seriousness of recent stressful life events on clinical mental discomfort among university students. This study explored the mental health status of undergraduate students in Cyprus. It examined the association between the number and severity of stressful life events and clinical symptoms of mental distress.

Methods: This was a cross-sectional, descriptive, correlational study conducted using convenience sampling, with a total of 1,500 undergraduate students participating. Descriptive statistics for sociodemographic characteristics, mental distress symptoms, and life events of the participants were calculated and expressed in frequencies, mean values, and standard deviations. One-way analysis of variance and independent sample t-tests were conducted to compare the General Health Questionnaire – 28 (GHQ-28) subscales with groups based on the number of events and total score in Life Events Scale for Students (LESS).

Results: After adjusting for sociodemographic characteristics using logistic regression analysis, gender remained the only variable significantly associated with mental distress symptoms before and after controlling for stressful life events, with women being 1.6 times more likely to report clinical levels of distress than men (95% CI: 0.98–2.46). However, a statistically significant association was observed between gender and mental distress symptoms. Specifically, women had a higher level of mental distress than men.

Conclusion: Individual characteristics, stress, negative life events, and psychological distress were interconnected. Collaboration among teachers, students, parents, and mental health professionals is essential to create a supportive and nurturing school environment.

Introduction

Worldwide, approximately one in seven people aged 10 to 19 suffer from mental health conditions, accounting for 13% of the global disease burden in this age group[1]. Adolescents' daily lives are affected by mental health difficulties, including psychological distress, and are a public health concern. This affects how they function in the workplace and school, how they connect with friends and family, and how they engage in community activities[1].

Compared with the general population, university students endure higher levels of mental distress[2]. The Healthy Minds Study collected data from 373 schools in the USA and found that over 60%

of college students met the criteria for at least one mental health concern during the 2020–2021 academic year.

"Stressful life events" are observable external circumstances that have the potential to adversely affect mental health and increase the risk of depression and anxiety. These include financial difficulties, interpersonal conflicts, familial difficulties, and health-related demands[3]. The COVID-19 pandemic has been a particularly significant stressor and has resulted in significant changes and disturbances in college students' daily schedules, increased stress, and a decline in their mental and physical health[4].

For a student, attending university can be a rewarding and pleasant experience. However, empirical data suggest that being a university student can sometimes be a stressful experience[4], and that stress affects their academic success and well-being[5]. Additionally, research has indicated that some population subgroups of students, especially girls and minorities, face an increased risk of suffering from mental health problems[6]. Female students report higher levels of emotional struggle, compounded by a general disinterest in their field of study, limited social connections, academic pressures, and financial constraints[4]. Additionally, research has revealed that students' mental distress is linked to conflicts with friends, family history of mental illness, lack of rest, and lack of social support[7,8].

Various demographic characteristics affect students' mental health, and there is an urgent need for focused mental health investigations and interventions[6].

Although all university students face stressors, those belonging to minority groups experience heightened vulnerability to these challenges[6]. Understanding the relationship between mental health outcomes and the frequency and intensity of stressful life events can guide the design of tailored mental health services and support structures for these high-risk groups and help them build resilience.

Aim

This study aimed to examine the mental health status of undergraduate university students in Cyprus, specifically, it explores the relationship between psychological distress symptoms and the number and severity of self-reported stressful life events.

Materials and Methods

Design and Study Population

This cross-sectional study used a convenience sampling approach commonly used in mental health research among university students when time and resources are limited. As noted by Abuhamdah et al.[9], convenience sampling allows researchers to include participants who are readily accessible and willing to participate in real-world contexts.

This study explored the relationship between undergraduate students' mental health status and the severity and frequency of self-reported stressful life events. Additionally, it examined the associations between clinical mental distress symptoms and various factors, including sociodemographic characteristics and stressor exposure, which have not been previously evaluated in this population.

The study was conducted at the Cyprus University of Technology (CUT), the second-largest university in Cyprus after the University of Cyprus. CUT offers free undergraduate education to students admitted through national examinations, with 2,452 active students enrolled across 10 departments within five schools, primarily focusing on technological disciplines.

All active undergraduate students (N = 1,783 at the time of data collection) were eligible to participate, regardless of age, gender, or nationality. Participation was voluntary and written informed consent was obtained. Postgraduate and doctoral students, and students who submitted incomplete or blank questionnaires, were excluded from the study.

The final sample comprised 1,500 undergraduate students, with a response rate of 85%. This resulted in an estimated margin of error of ±1.5% at a 95% confidence level, indicating high precision for prevalence estimates. Of the 283 students who were not included in the final analysis, 20 were physically present during the data collection sessions but chose not to complete the questionnaire after being informed about the study and their rights as participants, and 23 were excluded due to incomplete or missing data.

Instruments

General Health Questionnaire – 28 scale

The GHQ-28 is a psychological assessment tool developed by Goldberg and Hillier in 1979 that measures 28 symptoms across four subscales: somatic symptoms, anxiety/insomnia, social dysfunction, and severe depression. It uses a 4-point Likert scale with total scores ranging from 0 to 84, with higher scores indicating greater psychological distress. This instrument is based on Goldberg's conceptualization of psychological distress as a deviation from an individual's typical or baseline psychological functioning in response to recent stressors. According to this model, mental distress is not understood as a fixed clinical disorder but rather as a transient disruption in psychological equilibrium, which may manifest through emotional, behavioral, and somatic symptoms. The dynamic nature of this framework emphasizes that individuals normally maintain a state of psychological homeostasis, and when faced with internal or external stressors, such as academic pressure, interpersonal conflict, or health

concerns, this balance can be temporarily disturbed. Thus, the GHQ-28 was designed to detect early and context-sensitive signs of psychological strain, particularly in non-clinical or general population samples[10]. This instrument is grounded in Goldberg's conceptualization of psychological distress as a deviation from an individual's psychological functioning in response to recent stressors, reflecting a dynamic model of psychological homeostasis[10]. The GHQ-28's four-factor structure has been validated through factor analysis, which confirmed its reliability and validity. Each subscale score is calculated by summing the relevant items, with higher scores reflecting poorer psychological health[10]. The GHQ-28 has been previously validated in the Greek language, with studies confirming its four-factor structure through exploratory and confirmatory factor analyses of students and the general population[11,12]. These studies supported the construct validity and factorial stability of the instrument in Greek-speaking samples.

In the present study, the reliability was assessed using Cronbach's alpha. The total scale showed satisfactory reliability (α = .74), while subscales ranged from α = .68 to .77, indicating acceptable internal consistency across the dimensions. Each subscale score is calculated by summing the relevant items, with higher scores reflecting poorer psychological health. In the present study, a cut-off score of ≥ 24 was used to indicate probable psychological distress, consistent with the original authors' recommendations and subsequent validation studies.

Life Events Scale for Students

To quantify stressful life events, a modified version of Wolfgang Linden's Life Event Scale for Students (LESS) was used. In this scale, 36 incidents taken from the SRRS are listed and rated for their level of stress from 0 to 100. The theoretical framework underpinning the scale assumes that major life events, regardless of whether they are perceived as positive (e.g., graduation, marriage) or negative (e.g., bereavement, academic failure), involve a significant degree of psychosocial adjustment. According to Holmes and Rahe's stress theory, the accumulation of such life changes disrupts an individual's adaptive resources and homeostasis, which in turn increases vulnerability to physical and mental health problems. The model emphasizes that it is not necessarily the nature of the event itself, but the amount of readjustment required that determines its psychological impact. Repeated or concurrent stressors may have a cumulative effect leading to heightened emotional distress, especially in populations undergoing rapid developmental or environmental transitions, such as university students.

The LESS has demonstrated acceptable reliability in university settings. Similar dichotomous student life-event checklists have reported Cronbach's α ranging from 0.67 to 0.95[13,14], indicating acceptable-to-excellent internal consistency. In the present study, LESS showed good internal consistency with α = .72, supporting its reliability in the current sample.

To culturally adapt the tool, 90 postgraduate students from Cyprus participated in a pilot project to determine appropriate weights for the events. The event rated as most disturbing was "Death of a parent." Participants ranked the amount of work required for adjustment[15]. Stress from life events was strongly related to depression among Cypriot university students in the primary study, which used the original and culturally adapted weights.

Sociodemographic Questionnaire

This study aimed to examine the sociodemographic characteristics of students with regard to their mental health status. A questionnaire was developed with 16 items about individual characteristics, such as gender, age, residence, family, and employment status. Questions also explored parental marital status. Furthermore, academic status explored satisfaction with the program and learning difficulties. Social life was defined as the frequency of one's social interactions. Relationship satisfaction items were related to satisfaction with parents and friends. Health status included self-assessed physical and mental health, and chronic disorders. The researchers developed the tool using data from previous studies to determine whether it showed any link with students' mental well-being[2,16,17].

Data collection

The GHQ-28, LESS, sociodemographic questionnaire designed for this study, and an information page outlining the goals and methods of the study were included in the questionnaire pack. The pack was given to students during lecture periods in lecture halls or laboratories, and participation in the study required written consent. Participation was voluntary, anonymous, and confidential. Students who did not want to participate had the option of not completing the questionnaire after a brief introduction. The completed questionnaire packs were placed in sealed envelopes and returned in a collection box. The research team ensured that the data collection process would not coincide with the final exams, midterm exams, or any other potential study-related stress scenarios, such as clinical placements or internships. The data collection process spanned a duration of 10 weeks. The researchers visited a total of 40 classes across 5 schools (with each school hosting 10 classes) to gather comprehensive information.

Ethical considerations

This study was approved by the Research Ethics Committee of CUT in Limassol. Ethical approval was granted by the Cyprus National Bioethics Committee [Ref.

No 2010.01.38]. The potential participants were informed of the research objectives, hazards, and advantages. They were also made aware that participation in the study was voluntary and that they could withdraw their participation at any time. The study was approved by the ethics committee of the university before data collection. Each participant signed and provided a voluntary informed consent form. No financial incentives were provided to the participants. Students who participated in the study had no instructional relationship with the researchers who administered the questionnaires.

At the end of the questionnaire, the researchers informed all participants about the availability of free psychological counselling services specifically tailored for university students.

Data analysis

The Statistical Package for Social Sciences Software version 20, which is one of the most widely known tools in the field of social sciences as an effective tool for quantitative data analysis, was used to analyze the data[18,19]. Descriptive statistics for the sociodemographic characteristics, mental distress symptoms, and life events of the participants were calculated and expressed as frequencies, mean values, and standard deviations. In this study, the frequency of life events was defined as the total number of events reported on the LESS, whereas the severity was assessed using the total weighted LESS score, reflecting the cumulative stress impact of the reported events. One-way ANOVA analysis of variance and independent sample t-tests were conducted to compare the GHQ-28 subscales with groups based on the number of events and total LESS scores. Before performing these analyses, assumptions of normality and homogeneity of variance were assessed. Normality was examined using the Kolmogorov–Smirnov test and Q–Q plots, and homogeneity of variance was evaluated using Levene's test. All the assumptions were met. For LESS, chi-square test was conducted on the number and severity groups to compare the proportion of students with total GHQ score (above the cut-off point GHQ ≥ 24). This cut-off score was selected based on the recommendation by Goldberg and Hillier (1979) who proposed this threshold as indicative of probable psychiatric caseness. This cutoff has also been supported by subsequent studies in similar populations[10,20]. We investigated the degree of mental distress symptoms with values greater than 24 on this scale. For the cut-off points for the LESS scale scores, we formed categories based on the quartiles of the distribution of scores and to reflect increasing levels of exposure to stressful life events, that is, minimal to moderate exposure, thereby enhancing the interpretability of the findings. Specifically, the first quartile was further split into two separate categories from 0–49 and 50–150; the second quartile consisted of participants who scored from 150–241, the third quartile from 242–350, and the last quartile comprised the category with the highest LESS scores (i.e., 351–1100). The GHQ-28 cut-off score (≥24) was selected based on the recommendation by Goldberg and Hillier (1979), who proposed this threshold as indicative of probable psychiatric caseness. This cut-off has been supported by subsequent studies in similar populations[21,22]. Total LESS scores were divided into quartiles to reflect increasing levels of exposure to stressful life events, based on the empirical distribution of the sample. The first quartile was further subdivided into two groups (0–49 and 50–150) to distinguish participants with minimal or no exposure from those with low-to-moderate exposure, thereby enhancing the interpretability of the findings. This categorization was also informed by the theoretical framework of the Social Readjustment Rating Scale, in which scores below 150 are considered indicative of a low risk of illness[23].

Similarly, the number of stressful events was categorized into quartiles based on its distribution, with the upper quartile including participants who reported 12–14 stressful events. For additional statistical analysis, the variable was also dichotomized: the first category included participants who reported 0–7 events, whereas the second included those with 8 or more events.

A similar approach was applied to the total LESS score, with participants categorized into two groups: those scoring ≤ 350 and those scoring ≥ 351. Odds ratios (OR) and 95% confidence intervals (CI) for the presence of clinical mental distress symptoms (defined as GHQ-28 ≥ 24) were calculated using logistic regression before and after adjusting for potential confounders. All statistical analyses were conducted at a significance level of $p < 0.05$.

Results

Sociodemographic and academic characteristics

Table 1 presents the sociodemographic and academic characteristics of the final sample (N = 1500, response rate = 85%). The majority of the participants were female (n = 29.9, 70.1%), while males were almost one-third of the sample (n = 448, 29.9%). The students' ages ranged from 18-40 years and the mean age was 20.3 (SD±2.1). Most students lived in urban (n = 850, 58%) or rural areas (n = 452, 27.6%), and only 198 (14.4%) lived in suburban areas. In terms of relationship status, the majority of participants were single (n = 1402, 93.5%) and 6.2% (n = 92) were living with a partner or were married. Additionally, most students were unemployed during their studies (n = 1063, 71%). Most of the participants were from the first (n = 443, 29.5%) and second (n = 426, 28.4%) year of study.

Table 1: Socio-demographic and academic characteristics of sample (N = 1500)

	Frequency (N)	Percentage (%)
Gender		
Male	448	29.9
female	1052	70.1
Age		
18-20	933	62.2
21-25	520	34.7
26-40	47	3.13
Place of residence		
Urban area	850	58
Rural areas	452	27.6
Sub-urban area	198	14.4
Family status		
Single	1402	93.5
Divorce	6	0.4
Married /living with partner/parents	92	6.2
Employment		
Yes	437	29
No	1063	71
Academic year of study		
First	443	29.5
Second	426	28.4
Third	377	25.1
Fourth	254	16.9

Note: This table presents the socio-demographic and academic characteristics of the participants.

Mean total score of General Health Questionnaire-28 by sociodemographics, individual and academic characteristics and self-reported health status

In terms of total score of GHQ-28 and sociodemographic characteristics, the females reported a higher mean score than did the males [M(±SD) 27.71(±13.32) vs. 25.22(±14.20), $p = 0.002$]. Additionally, the students with an annual family income above 36,301 euros noted a higher mean value [28.34(±13.10), $p < .05$] than the other categories of annual family income; for instance, the category with incomes between 28,001 and 36,300 euros noted the lower mean value of total score in the GHQ-28 scale [24.84(±11.99)] (Table 2).

Participants who self-assessed their mental health [27.75(±14.19), $p < .05$] as poor or very poor during the past month reported a higher mean score of GHQ-28 in relation to other students who characterized their mental health as excellent/very good or good [25.52(±13.79) and 25.82(±12.89), respectively] (Table 3).

A statistically significant difference was observed in participants who were not satisfied with their relationship with their parents (no/low level of satisfaction); they reported a higher mean score [27.81(±14.07), $p < .05$] compared with those who stated they were satisfied (high/very high level of satisfaction) with their relationship with their parents [25.82(±13.54)]. Moreover, students who spent little or no time with their friends noted a higher mean score on the GHQ-28 scale [27.81(±13.31), $p < .005$] than students who spent more time with their friends

Table 2: The mean total score of GHQ-28 based on Sociodemographic characteristics

Total score in GHQ-28	n	n	Mean	SD	F	P
	1500	1500	26.95	13.63		
Gender					0.342	0.002
Male	449	449	25.22	14.02		
Female	1051	1051	27.71	13.32		
Age					0.706	0.494
18-20	933	933	27.20	13.40		
21-25	520	520	26.72	14.20		
26-40	47	47	25.00	11.60		
Parental marital status					2.267	0.104
Married	1290	1290	27.20	13.73		
Divorce	140	140	24.63	12.51		
Widower/widow	70	70	27.20	13.80		
Family status					0.516	0.597
Single	1402	1402	26.98	13.64		
Married/Living with a partner	92	92	27.10	13.72		
Separated/divorced	6	6	21.33	11.84		
Employment					0.011	0.805
Yes	437	437	26.91	13.69		
No	1063	1063	27.10	13.52		
Place of residence					0.388	0.679
Urban area	850	850	26.78	13.51		
Rural areas	452	452	26.92	26.92		
Sub-urban area	198	198	27.53	27.53		
Annual family income					2.444	0.045
0-19500	710	710	26.66	13.74		
19501-28000	442	442	27.52	14.20		
28001-36300	201	201	24.84	11.99		
>36301	147	147	28.34	13.10		
Learning difficulties					1.023	0.087
No	1181	1181	25.85	12.93		
Yes	319	319	27.27	13.80		
Academic year of study					1.914	0.125
First	443	443	27.40	13.21		
Second	426	426	25.71	13.38		
Third	377	377	26.95	14.22		
Fourth	254	254	26.95	13.81		
Level of satisfaction with program/course of study					2.216	0.581
No/ Low	312	312	27.07	13.42		
Hight/ Very high	1188	1188	26.57	14.45		

Note: This table presents the mean total score of GHQ-28 based on sociodemographic characteristics.

[25.63(±14.07)]. In terms of other characteristics (age, parental marital status, family status, employment, place of residence, learning difficulties, academic year, level of satisfaction with the program/course of study, satisfaction with relationships with friends, chronic physical disorder or disability, and chronic physical disorder or disability), the differences, while present in average values, were not statistically significant.

Differences in General Health Questionnaire-28 total score/subscale scores by gender

The females had a higher mean value in total score of GHQ-28 than the males [Mean difference (MD): -2.49, 95% CI: -4.0–0.95, p = .002] (Table 4). A similar statistically significant difference was observed in the subscales [somatic symptoms: MD: -1.3, 95% CI: -1.77–0.83, p < .001, anxiety/insomnia symptoms: MD: -1.23, 95% CI: -177–0.68, p < .001]. No statistically significant differences were found in social dysfunction or severe depression between males and females. The mean total score of the GHQ-28 was 26.95 (SD = 13.33) (min = 0, max = 84). The mean value observed on the subscale of somatic symptoms was 7.83(±4.26), in the subscale reflecting anxiety/insomnia was 8.10 (±4.95), in the social dysfunction was 7.64(±4.95), and for the severe depressive symptoms, the mean value was 3.40(±4.24). For all subscales, the minimum value was 0 and the maximum value was 21.

Table 3: The mean total score of GHQ-28 based on social life and self-reported health status

Total score in GHQ-28	n	Mean	SD	F	P
Satisfaction with relationship with friends				3.654	0.376
No/ Low	177	27.06	13.77		
Hight/ Very high	1323	26.10	12.52		
Satisfaction with relationship with parents				0.494	0.031
No/ Low	470	27.46	13.54		
Hight/ Very high	1030	25.82	13.65		
Frequency of spending time with my friends				0.379	0.004
No/Low	542	27.81	13.31		
Hight/Very high	958	25.63	14.07		
Chronic physical disorder or disability				0.445	0.220
No	1371	25.63	12.81		
Yes	129	27.09	13.71		
Mental health self-assessment during last month				3.941	0.020
Excellent/very good	917	25.52	13.79		
Good	405	25.82	12.89		
Poor/very poor	178	27.75	14.19		
Physical health self-assessment during last month				2.836	0.059
Excellent/very good	424	25.62	12.99		
Good	999	27.48	13.63		
Poor/very poor	77	27.73	16.08		

Note: This table presents the mean total score of GHQ-28 based on social life and self-reported health status.

Differences in General Health Questionnaire-28 total score/subscale scores by number of events and total score in Life Events Scale for Students

Most students (n = 754, 50.3%) reported 4-7 stressful life events, whereas 35 (2.3%) did not report any stressful events in the past 12 months. Regarding the relationship between the GHQ-28 and LESS, the total score of the GHQ-28 scale and all subscales (except the social dysfunction subscale) had statistically significant differences in mean values. Specifically, in terms of the total score of GHQ-28, the highest mean value was noted by participants who reported 12–21 stressful life events [n = 84, [M(±SD) 34.30(±14.9), p < .001]. Similarly, statistically significant differences were observed between the same group of stressful life events and subscales [somatic symptoms: 9.93(±4.6), p < 0.001, anxiety/insomnia: 11.04(±5.5), p < .001, and severe depression: 5.11(±4.8), p < 0.001]. A clear stepwise increase was found in the mean value of the GHQ-28 among students who reported more events. The differences between the GHQ-28 total score/subscale scores and the number of events in the LESS are presented in Table 5.

A similar pattern was observed in terms of the total score on the LESS and GHQ-28. Statistically significant differences were detected between participants who scored the highest on the LESS and GHQ-28. For somatic symptoms the mean value was 9.93(±4.6) (p < .001), for anxiety/insomnia symptoms it was 11.04(±5.5) (p < .001)

Table 4: The mean total score/ subscales of GHQ-28 scores and differences by gender

	GENDER	GENDER				TOTAL
	Male	Female	MD	95%CI	P	
	M (±SD)	M (±SD)				M (±SD)
Somatic Symptoms	6.99(±4.28)	8.22(±4.19)	-1.30	-1.77-0.83	<0.001	7.83(±4.26)
Anxiety/Insomnia	7.22(±4.75)	8.46(±5.0)	-1.23	-1.77-0.68	<0.001	8.10(±4.95)
Social dysfunction	7.57(±3.16)	6.68(±3.2)	-0.18	-0.47-0.26	0.567	7.64(±3.33)
Severe depression	3.50(±4.72)	3.35(±4.0)	0.15	-0.32-0.62	0.530	3.40(±4.24)
Total score of GHQ-28	25.22(±14.20)	27.71(±13.32)	-2.49	-4.0-0.95	0.002	26.96(±13.63)

Note: This table presents the mean total score/ subscales of GHQ-28 scores and differences by gender.

Table 5: The mean scores of subscales (GHQ-28) based on numbers of stressful life event groups

	Number of events in LESS	n	Mean	SD	F	P
Somatic Symptoms	1	35	6.51	4.4	12.50	<0.001
	2	339	6.92	4.1		
	3	754	7.77	4.0		
	4	288	8.59	4.4		
	5	84	9.93	4.6		
	Total	1500	7.83	4.26		
Anxiety/Insomnia	1	35	5.83	4.9	18.69	<0.001
	2	339	6.86	4.8		
	3	754	8.02	4.7		
	4	288	9.16	4.9		
	5	84	11.04	5.5		
	Total	1500	8.10	4.95		
Social dysfunction	1	35	6.89	3.0	1.99	0.094
	2	339	7.46	3.2		
	3	754	7.58	3.3		
	4	288	7.94	3.5		
	5	84	8.23	3.7		
	Total	1500	7.64	3.3		
Severe depression	1	35	2.40	4.0	12.03	<0.001
	2	339	2.57	3.5		
	3	754	3.23	4.10		
	4	288	4.44	4.86		
	5	84	5.11	4.8		
	Total	1500	3.40	4.29		
Total score of GHQ-28	0	35	21.63	14.7	16.62	<0.001
	1-3	339	23.81	12.7		
	4-7	754	26.60	13.0		
	8-11	288	30.13	14.2		
	12-21	84	34.30	14.9		
	Total	1500	26.96	13.63		

Note: Groups of number of stressful life events: 1: the participants who reported 0 Events, 2: the participants who reported 1-3 Events, 3: the participants who reported 4-7 Events, 4: the participants who reported 8-11 Events, 5 the participants who reported 12-21 Events.

and for severe depression 5.11(±4.8), (p <.001). Meanwhile, with regard to the total score in the LESS scale, the group that scored between 351 and 1100 also scored the highest mean on the scale [32.31(±14.6), p < .001] (Table 6).

Post-hoc analysis was used to determine which variables accounted for the difference in variance relative to the total score of the GHQ-28 and its subscales. Specifically, in terms of the number of stressful life events, group 1(1-3 Events), compared to group 5 (12-21 Events), seemed to have the greatest variation with the sub-category of insomnia/anxiety (F = 18.69, MD = 4,17, p < .001). Contrarily, concerning the total score of stressful life events, Group 1 (0-49 total score) in relation to Group 5 (351-1100 total score) appeared to have the largest variance in the GHQ-28 overall score (F = 35.1, MD = 11.5 p < .001).

Table 6: The mean scores of subscales (GHQ-28) based on total score of stressful life event groups

	Total Score in LESS	n	Mean	SD	F	P
Somatic Symptoms	1	110	6.04	4.0	21.7	<0.01
	2	341	6.72	3.8		
	3	331	7.55	4.1		
	4	326	8.39	4.1		
	5	392	9.06	4.4		
	Total	1500	7.83	4.2		
Anxiety/Insomnia	1	110	6.05	5.0	28.5	<0.01
	2	341	6.54	4.4		
	3	331	7.69	4.6		
	4	326	8.77	4.7		
	5	392	9.80	5.1		
	Total	1500	8.10	4.9		
Social dysfunction	1	110	6.89	2.8	9.3	<0.01
	2	341	7.13	2.9		
	3	331	7.33	2.8		
	4	326	7.90	3.5		
	5	392	8.36	3.7		
	Total	1500	7.64	3.3		
Severe depression	1	110	1.82	2.8	31.1	<0.01
	2	341	2.04	3.0		
	3	331	3.06	3.6		
	4	326	3.65	4.4		
	5	392	5.09	5.0		
	Total	1500	3.40	4.2		
Total score of GHQ-28	0-49	110	20.80	12.7	35.1	<0.01
	50-149	341	22.43	11.3		
	150-241	331	25.63	12.3		
	242-350	326	28.71	13.6		
	351-1100	392	32.31	14.6		
	Total	1500	26.96	13.6		

Note: *Groups of total score in LESS 1: the participants who scored 0-49 on the LESS scale, 2: the participants who scored 50-149 on the LESS scale, 3: the participants who scored 150-241 on the LESS scale, 4: the participants who scored 242- 350 on the LESS scale, 5: the participants who scored 351-1100 on the LESS scale.

Prevalence of clinical mental distress symptoms and associations between degree of clinical mental distress symptoms and stressful life events

Table 7 presents the prevalence of clinical mental distress symptoms by participant classification in terms of the number of stressful life events, total score on the LESS scale, and relative risk of developing clinical mental distress.

In total, 808 (53.9%) students scored ≥ 24 of the total score in GHQ-28 (clinical mental distress symptoms). 213 (47.4%) were male and 595 (56.6%) were female. Regarding the association between clinical mental distress symptoms and stressful life events, a positive statistically significant association was observed between high scores on the LESS, indicative of the severity of life stressors in

a student's life, and clinically significant mental distress symptoms (x^2 = 56.64, df = 1, p < .001). Similarly, an association existed between the number of stressful life events and clinically significant mental distress (x^2 = 26.12, df = 1, p < .001). Students who reported experiencing eight or more stressful life events were 1.8 times more likely to report clinical levels of mental distress compared to those who reported fewer than eight events (95% CI: 1.47–2.39). Additionally, students with the highest scores on the LESS were 2.8 times more likely to report clinical mental distress symptoms compared to those with lower scores.

A statistically significant association was observed between gender and mental distress symptoms. Specifically, females reported a higher level of mental distress than males [x^2 = 10.65, OR: 1.44, 95% CI: 1.15–1.80, p = .001]. The female students who reported the greatest number of stressful life events (≥ 8) also appeared 1.93 times (95% CI: 1.43–2.59) more likely to report mental clinical distress symptoms compared to males who reported ≥ 8 events (OR: 1.77, 95% CI: 1.14–2.74, p < *.001*). With regard to the total score in LESS, males with the highest score (≥ 351) were 2.8 times more likely to report mental clinical distress symptoms compared with females (95% CI: 1.79–4.36, p < .001) (Table 7). By contrast, the difference between males and females in the number of stressful life events [n = 110 (24.5%) vs. n = 262(24.9%), p = .860] and total score on the LESS [n = 115 (25.6%) vs. n = 277(26.4%), p = .764] before comparison with clinical mental distress was not statistically significant.

Associations between clinical mental distress symptoms by stressful life events with sociodemographic characteristics and self-assessment of participants' health

Multivariable logistic regression were performed to investigate the effect of sociodemographic characteristics on the occurrence of clinical mental distress symptoms (GHQ-28 ≥ 24) (Table 8). First, logistic regression was performed and adjusted for the main sociodemographic characteristics and self-assessment of participants' health. Next, the analysis was repeated to include those who reported ≥ 8 number of events and scored ≥ 351 in LESS (n = 460, 30.6%). After adjusting for sociodemographic characteristics using logistic regression analysis, gender remained the only variable significantly associated with mental distress symptoms before and after controlling for stressful life events, with females being 1.6 times more likely to report clinical levels of distress than men (95% CI: 0.98–2.46). Regarding academic characteristics, students in the second year of study appeared to be 0.74 times more likely to have mental clinical distress symptoms compared to those in the first year (95% CI: 0.55–0.99, p < .005). Third-year students who had reported the greatest number of stressful life events and had highest total score in LESS appeared 1.79 times more likely to report clinically significant mental distress compared to first-year students. However, this difference was not statistically significant (95% CI: 0.96–3.34, p = .066).

A statistically significant association was found between students' self-assessed mental health and clinical distress. Students who evaluated their mental health as "good" were 1.5 times more likely to report clinically significant mental distress compared to those who rated their mental health as "very good" or "excellent" (95% CI: 1.07–2.21, p = .019*)*. Overall, in most of the evaluated parameters, participants who noted the greatest number of stressful life events and had the highest total score on the LESS were more likely to have clinically significant mental distress.

Table 7: Prevalence of clinically mental distress symptoms (CES-D ≥ 24) by classification of participants in terms of the number of stressful life events and total score on the LESS scale and by gender

		Male						Female								Total	
Life Events Scale for Students (LESS) (N = 1500)														X^2	OR (95% CI)	DF	P
		GHQ-28				Total		GHQ-28				Total					
		0-23		≥24				0-23		≥24							
		n	%	n	%	n	%	n		%		n	%				
Number of events in LESS	0-7	190	80.5	149	70	236	52.6	373	81.8	416	69.9	789	75.1	26.12	1.8(1.47-2.39)	1	<0.001
	≥8	46	19.5	64	30	213	47.4	83	18.2	179	30.1	262	24.9				
Total Score in LESS	0-350	197	83.5	137	64.3	334	74.4	378	82.9	396	66.6	774	73.6	56.64	2.53(1.98-3.24)	1	<0.001
	≥351	39	16.5	76	35.7	115	25.6	78	17.1	199	33.4	277	26.4				
Total		236	52.6	213	47.4	449	100	456	43.4	595	56.6	1051	100				

*Relative risk: Male odds ratio for total score in LESS ≥551/0-350: 2.8 with 95% CI: 1.79 - 4.36, Female odds ratio for total score in LESS ≥551/0-350: 2.43 with 95% CI: 1.80-3.27

Male odds ratio for the number of events ≥ 8/0-7: 1.77 with 95% CI: 1.14-2.74, Female odds ratio for the number of events in LESS 0-7/≥ 8: 1.93 with 95% CI: 1.43-2.59

Table 8: Odds ratios (and 95 % CI) of clinically mental distress symptoms (GHQ ≥ 24) by the number of stressful life events (≥8) and total score in LESS scale (≥ 351) after adjusting for all sociodemographic factors as estimated in multivariable logistic regression models

LESS	Adjusted (n=1500)		Adjusted (n=460)	
	OR (95%CI)	P value	OR (95%CI)	P value
Gender				
Male	1	---------	1	----------
female	1.57(1.23-2.00)	**0.000**	1.6(0.98-2.46)	**0.044**
Age				
18-20	1	---------	1	----------
21-25	0.89(0.66-1.21)	0.478	0.88(0.51-1.30)	0.327
26-40	0.94(0.46-1.90)	0.870	1.79(0.43-7.36)	0.420
Family status				
Single	1	---------	1	----------
Married /living with partner	4.13(0.45-38.05)	0.210	4.0(0.27-61.21)	0.308
separated/divorced	4.31(0.45-41.30)	0.205	2.6(0.16-43.83)	0.492
Parental marital status				
Married	1	---------	1	----------
divorce	1.16(0.68-1.97)	0.569	2.0(0.80-5.43)	0.132
widow	0.82(0.44-1.53)	0.541	0.91(0.28-2.9)	0.884
Annual family income				
0-19500	1	---------	1	----------
19501-28000	1.09(0.84-1.41)	0.504	0.79(0.47-1.35)	0.400
28001-36300	0.77(0.55-1.07)	0.123	0.66(0.34-1.27)	0.202
>36301	1.32(0.90-1.92)	0.149	1.22(0.56-2.62)	0.600
Employment				
Yes	1	---------	1	----------
No	1.4(0.82-1.33)	0.700	0.76(0.48-1.18)	0.228
Place of residence				
Urban area	1	---------	1	----------
Rural areas	1.05(0.76-144)	0.759	0.89(0.49-1.58)	0.692
Sub-urban area	1.25(0.97-1.60)	0.750	1.3(0.78-2.1)	0.305
Learning difficulties				
No	1	---------	1	----------
Yes	0.89(0.66-1.18)	0.440	0.67(0.41-1.10)	0.118
Academic year of study				
First	1	---------	1	----------
Second	0.74(0.55-0.99)	**0.048**	1.16(0.64-2.13)	0.614
Third	1.03(0.76-1.39)	0.845	1.79(0.96-3.34)	0.066
Fourth	0.96(0.68-1.34)	0.818	1.58(0.69-3.61)	0.270
Level of satisfaction with program/course of study				
No/ Low	1	---------	1	----------
Hight/ Very high	1.14(0.86-1.52)	0.339	1.22(0.71-2.0)	0.453
Satisfaction with relationship with friends				
No/ Low	1	---------	1	----------
Hight/ Very high	1.05(0.74-1.49)	0.761	0.84(0.43-1.65)	0.624
Satisfaction with relationship with parents				
No/ Low	1	---------	1	----------
Hight/ Very high	0.81(0.55-1.14)	0.218	1.0(0.49-213)	0.934
Frequency of spending time with my friends				
No/Low	1	---------	1	----------
Hight/Very high	1.09(0.85-1.40)	0.488	1.18(0.72-1.93_	0.508
Chronic physical disorder or disability				
No	1	---------	1	----------
Yes	1.01(0.68-1.50)	0.943	0.81(0.37-1.80)	0.621

Mental health self-assessment during last month				
Excellent/very good	1	---------	1	----------
Good	1.54(1.07-2.21)	**0.019**	1.72(0.85-3.4)	0.131
Poor/very poor	1.23(0.83-1.83)	0.290	1.16(0.55-2.4)	0.682
Physical health self-assessment during last month				
Excellent/very good	1	---------	1	----------
Good	1.0(0.58-1.70)	0.996	2.15(0.75-6.12)	0.151
Poor/very poor	0.99(0.75-1.31)	0.978	0.94(0.57-1.55)	0.825

* Adjusted Odds ratios (and 95 % CI) of clinical mental distress symptoms (GHQ ≥ 24) after adjusting for all sociodemographic factors (n=1500).
┼ Adjusted odds rations (and 95% CI) of clinical mental distress symptoms (GHQ ≥ 24) by the number of stressful life events (≥8) and total score in LESS scale (≥ 351) after adjusting for all sociodemographic factors as estimated in multivariable logistic regression models (n=460).

Discussion

This study is the first of its kind conducted in Cyprus. In respective countries, the outcomes are extremely important and valuable tools for universities, public health bodies, and government agencies. Of particular interest are the implications of the findings for the institution where the research was conducted, as well as for its counselling services and university authorities, as they provide a better understanding of students' mental health. As evidenced by overall GHQ-28 scores, concerns about the mental health distress among Cypriot University students is prevalent. University life is a persistent multidimensional stressor that significantly affects students' psychological well-being. Notably, the proportion of students with elevated distress levels in our sample appears relatively higher than that reported in Northern European studies, possibly due to differences in institutional support structures, cultural stigma around help-seeking, and the economic pressures experienced by students in Southern Europe[24,25]. This finding is consistent with European reviews suggesting that mental health issues among students are particularly pronounced in Mediterranean countries, including Cyprus, Greece, and Italy, where up to 40–50% report significant psychological symptoms[24,26].

The COVID-19 pandemic intensified these stressors, marking a critical turning point in students' mental health trajectories. Scholars have documented a surge in stressors since the onset of the pandemic, including disruptions to daily routines, academic uncertainty, and reduced social interactions. This impact was evident in our sample, with 33% of undergraduate students (mean GHQ-28 = 26.95) reporting high levels of psychological distress, indicating that the pandemic compounded pre-existing vulnerabilities and had lasting effects on student well-being. This level of psychological distress may impair students' academic functioning, affecting their ability to concentrate, attend classes, and stay motivated, and ultimately threaten their retention at university[27]. A cross-sectional online survey conducted between November and December 2020 covering 324 college students in India, revealed that a considerable number of the participants were distressed due to the COVID-19 outbreak[28]. Specifically, 68.8% declared that they felt worried about the virus to a high degree, and 28.7% reported symptoms that were indicative of depression, which was more severe than that for other students. Additionally, 51.5% suffered from mild to severe anxiety, and the rest of the participants scored somewhere in the middle of the scale, that scale being the other findings related to the survey[28]. Another 22-week study of 66 college students in China demonstrated that sleep quality was a significant factor influencing their emotional health. Moreover, these changes and other information may also have a butterfly effect, which could be observed globally among different cultures. This research reinforces the idea that regular physical exercise and sufficient rest could be key factors in reducing mental health issues among students[29].

The dilemmas resulting from the pandemic had major effects on the well-being of university students, leading to higher levels of stress, anxiety, depression, and other mental health issues[6,28,30]. Therefore, the novel coronavirus pandemic can be described as a crisis that is a multi-dimensional stressor for students, affecting their mental well-being in a persistent manner. This persistence is supported by chronic stress theories, which suggest that prolonged academic, social, and economic pressures gradually erode coping mechanisms and increase psychological vulnerability. Recent longitudinal studies have also confirmed that students' psychological distress often remains elevated beyond acute stress periods[31]. These findings underscore the need for societies and educational institutions to reconsider the role of environmental and structural factors in shaping student mental health.

A study from Jordan has affirmed the utility of longitudinal data in examining the interrelation and co-occurrence of poor mental health and repeated exposure to negative life events[9]. Our study confirmed that psychological distress peaked during the second year, which was in agreement with the findings of Barbayannis et al.[32]. Research on the yearly stress cycle among students has reported for the first time that stress, anxiety, and depression levels were ameliorated over the course of postsecondary education[33]. Increased stress due to academic pressure to perform well, difficulties in time management, and lack of strong social

networks may be contributing factors[34]. Hence, longitudinal research is needed to gain a clearer understanding of anxiety across academic years. However, the changing prevalence of mental health issues during the third year of study has also been reported in recent studies.

Based on the aforementioned conclusions, it can be considered that the students of Cypriot universities faced a large number of stressful events. Academic stress has been a representative point of interest for the past few years[35]. Moreover, several studies conducted in universities across Saudi Arabia, Nigeria, and India have identified academic pressure and institutional demands as primary sources of stress among students[17,36,37].

The study confirmed that students reported the highest scores on the anxiety/insomnia subscale of the GHQ-28. A global meta-analysis of 34 studies has shown a relationship between the elements of stress and loss of sleep quality, which can lead to the emergence of insomnia[38]. Most of these studies were cross-sectional, which meant that it was difficult to determine whether one caused the other. Longitudinal studies also reported two-way predictive associations between poor sleep quality and mental health[39,40]. Sleep hygiene practices alongside inherent circadian rhythm preferences, such as delayed sleep onset and wake-up time stress, can disrupt students' daily routines and reduce sleep duration. These factors could potentially explain the high prevalence of insomnia and sleep disturbances among university students[41]. Our study's findings align with previous research, indicating that a variety of sleep disorders and self-reported mental health issues (e.g., anxiety, phobias, sadness and restlessness) have a strong positive correlation with overall academic stress. Based on these findings, the current study provides evidence of how academic stress affects the mental and physical health of university students.

A recent imagery-based intervention sought to alter students' perceptions of stress by framing it as potentially beneficial—that is, a "stress-can-be-enhancing" mindset[42]. Students with high baseline levels of perceived distress showed the most improvement; at a two-week follow-up, the students reported enhanced coping, improved affect, better academic performance, and reduced distress. These results imply that interventions targeting students' perceptions of stress may be beneficial, although many questions remain.

In terms of gender, the majority of participants were females, and all participants were single. The primary conclusions demonstrated that the female gender could be regarded as a risk factor linked to a higher likelihood of somatic complaints and anxiety in university students. According to the present study's findings, considerably more female students than male students reported experiencing stress, which is in line with findings from recent studies of university students from Saudi Arabia, and Turkey[43,44]. Interestingly, in Chinese samples, male university students showed more stress than their female counterparts possibly due to heightened concerns about future employment[45,46]. However, Quek et al. found no significant gender difference in the occurrence of anxiety among university students globally[47].

Additionally, given that mental disorders are more common in females, their vulnerability to developing risk factors for mental disorders may begin as early as adolescence[48].

Amid challenging circumstances such as the COVID-19 pandemic, some individuals demonstrate resilience, whereas others undergo notable challenges. Despite the temporal limitations of the data under consideration, our investigations, when juxtaposed with contemporaneous scholarly works, revealed a rise in mental health issues among student populations. One of the most significant issues faced by freshmen is stress, loneliness, and sleep problems. Elmer et al. noted increased stress loneliness, and intensified depression and anxiety symptoms among university students during the COVID-19 lockdown[49]. Moreover, the sleep quality of university students worldwide has shown deteriorating patterns due to lockdown measures[50,51].

Notably, Viselli et al.[52] reported a decrease in severe insomnia and depression cases during the COVID-19 lockdown. However, another research identified heightened tension and anxiety among first-year French students, particularly among those who remained away from their families during that period[53].

Moreover, persistent stressors exacerbate students' psychological difficulties, with recent studies highlighting a notable gender gap in these findings. Recent findings confirm that female students consistently report higher levels of stress and anxiety than their male peers[54]. Although somatic symptom disorders were not specifically addressed in our research, current literature highlights these symptoms as common somatic manifestations of underlying psychological conditions. The symptoms are due to the body's belief that it is going through physical responses to mental issues or might be due to underlying mental health problems[55].

This study contributes to the growing body of evidence linking the occurrence of stressful events with mental health issues in college students[56]. Rather than evaluating isolated incidents, we assessed the total number of stressors experienced over the past 12 months using a 36-item checklist. Our results revealed a correlation between the prominence of mental symptoms and the frequency of events, even after taking into account how large these occurrences

were. It also shows that our research provides evidence of the psychometric reliability of the GHQ-28 and the LESS.

Limitations

Our study has certain limitations. First, although the sample size was relatively large, participants were drawn from a single institution, which limits the generalizability of the findings to all university students in Cyprus. Nonetheless, the high response rate and sample size support the reliability of the findings and may offer insights relevant at both the national and international levels.

A key limitation of this study is its reliance on self-administered questionnaires. This method may introduce certain biases, including social desirability and potential misinterpretation of questions. Although the instruments used have been validated and widely applied in similar populations, the absence of an interviewer may have affected the consistency or accuracy of the responses. Nevertheless, the participants were university students with adequate cognitive and language abilities to comprehend the content, and standardized instructions were provided to ensure clarity. However, this limitation should be considered when interpreting the findings.

Another limitation of this study is the lack of data on participants' ethnicity and religion. These variables were not collected as they were not within the original scope of the study and were considered less relevant because of the relatively homogeneous ethnic and religious composition of the study population. However, the inclusion of such factors in future research could provide deeper insights into potential sociocultural influences on mental health outcomes.

The use of robust and appropriate tools (i.e., the GHQ-28 and student-specific LESS) to measure students' mental health symptoms and stressful life events allows for a more accurate estimation of mental health problems and their correlation with stressful life events . Most importantly, in contrast to previous studies, this study did not focus on particular events, but assessed the extent to which the reported number of stressful life events and their severity were linked to mental health problems[57,58].

The cross-sectional structure of this study did not allow for any conclusions regarding the direction of the relationship between mental health problems and the frequency and severity of stressful life events. For example, dropping a class because of poor grades could cause and result in mental health issues. Similarly, cross-national comparisons are challenging because multi-center international research is required to investigate the incidence of mental health issues in student populations as well as in various contexts and cultures, using the same instruments and techniques. We examined only life events included in the LESS and did not consider other severe stressors.

Finally, to investigate the effect of personality traits on psychological distress, which is likely to be a factor influencing outcomes, it is necessary to conduct a longitudinal study that monitors participants' coping mechanisms, depression levels, and physical symptoms over a longer period.

Conclusion

Incidentally, there is a high ratio of mental health distress among Cypriot university students, which differs among college students in a number of aspects, such as the severity of the reported symptoms or the potential effect on academic performance, social relationships, and general well-being. Our research uncovered compelling support for the assumption that the COVID-19 pandemic is a key factor in the development of mental health problems among students. Students have mentioned particular sleep disturbances, increased psychological distress, an escalated level of stress in females, and some differences in academic progression during the pandemic. All these factors are clearly defined in our study. Additionally, the number and severity of stressful life events are related to the presence of clinical symptoms of mental distress. The findings of this study have important implications for identifying the most vulnerable students who require psychological support. Most importantly, in view of the relatively high mental distress symptoms among Cypriot university students, there is a wider need to educate this population on how to cope with stressors and mental distress symptoms to achieve a better quality of life and an elevated level of performance at individual and institutional levels.

Notably, there is a greater need to teach Cypriot university students how to deal with stress symptoms in light of the relatively high prevalence of mental health symptoms among them.

The gender-specific aspects of mental health distress hold great importance in the formulation of specific interventions and support systems for female undergraduate students, including raising awareness, peer education, and stigma reduction initiatives.

Additionally, interventions that help students acclimatize to their university experience, such as improving their social networks and coping strategies, may have a favorable impact on their personal and academic lives. School counselling programs and educational initiatives promoting healthy lifestyles (e.g., education workshops, symposia, or even individual consultations) may also be efficient approaches to lessen and even prevent significant mental health issues. These programs may help students avoid passive coping mechanisms and provide them with the social networks they need to pursue more active ones.

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Ethics Approval

Our study was approved by the National Bioethics Committee [Ref. No 2010.01.38]. Additionally, the study was approved by universities research committees. All methods were carried out in accordance with the relevant guidelines and regulations of the aforementioned committees. The participants were informed about the purpose of the study and the data collection procedures prior to providing their consent. All participants agreed to participate and informed consent was obtained from all subjects and/or their legal guardians. Participation in the study was voluntary and anonymous in order to guarantee confidentiality. Questionnaires and consent forms were distributed to the students at the beginning of the conference. Then, after a short briefing on the study aim and procedures, students who wished to participate could place their filled-in questionnaires in sealed envelopes in a collection box located outside of the conference room.

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Declaration of Interest

The authors report there are no competing interests to declare.

Data Availability

The datasets generated and/or analyzed during the present study are not publicly available because the authors are currently working on them in order to prepare the final version of this manuscript. However, they are available from the corresponding author upon reasonable request.

Authors' Contributions

Sokratous Sokratis: Methodology, Supervision, Writing-Reviewing and Editing. Zavrou Rafailia: Writing, reviewing and revised the manuscript. Alexandrou Giorgos: Carried out the statistical analyses, writing and reviewing. Rousou Elena: Writing- Reviewing. Sokratous Nikolas: Writing-Reviewing. Karanikola Maria: Supervision, curation, writing and reviewing. All authors read and approved the final manuscript. All authors have given final approval of the present version to be published.

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