Social determinants of student mental health before and after the Beirut port explosion: two cross-sectional studies

Julia Scheuring[1] and Tania Bosqui[1,2*]

Abstract

Background Students in Lebanon are facing the devastating impact of multiple national crises, including an unprecedented economic collapse and the Beirut port explosion that killed hundreds, injured thousands, and displaced hundreds of thousands of people. The aim of this study was to identify key social determinants of common mental health symptoms before and after the Beirut port explosion for students at the American University of Beirut, a university based around 4 km from the port.

Methods Two cross-sectional studies were conducted using a representative sample of undergraduate and graduate students at the American University of Beirut. The study was conducted just before (Study 1) and repeated after the Beirut port explosion (Study 2).

Results A total of 217 students participated ($n = 143$ in Study 1 and $n = 74$ in Study 2). In Study 1 before the explosion, poorer family functioning and social support were correlated with higher levels of depressive symptoms, but not with anxiety or trauma symptoms. Financial stress was correlated with depressive and trauma symptoms. In the partially adjusted regression model (adjusting for demographics), only financial stress was significantly associated with depressive symptoms. In the fully adjusted model (adjusting for adversity), financial stress was associated with depressive and anxiety symptoms. In Study 2 after the explosion, poorer family functioning and poorer social support were correlated with higher levels of depressive symptoms, while only poorer social support was correlated with higher levels of anxiety symptoms—trauma symptoms were not correlated with either. Financial stress was correlated with all symptoms. In the partially adjusted regression model, only financial stress was significantly associated with all symptom clusters. In the fully adjusted model, no variables were significant.

Conclusion Findings indicate a detrimental impact of financial stress on the mental health of students in Lebanon, beyond the otherwise protective effects of family and social support, in the context of an unprecedented economic crisis and extremely high levels of distress after the explosion. Findings indicate that mental health interventions for college students in Lebanon should include addressing financial stress, and that further research is needed to identify protective factors during acute emergencies.

Keywords Student, Mental health, Family, Social support, Financial stress, Lebanon

*Correspondence:
Tania Bosqui
tb33@aub.edu.lb
[1] Trinity Centre for Global Health, Trinity College Dublin, Dublin, Ireland
[2] Department of Psychology, American University of Beirut, Beirut, Lebanon

Background

Globally, one in eight young people suffer from mental health difficulties [1], while in Lebanon following the devastating Beirut port explosion the number is closer to two in three [2]. College students are particularly at risk of developing mental disorders [3], largely

due to additional pressures like social isolation, financial stress, and academic pressure [4]. Risk and protective factors for college student mental health have helped to inform college-wide support for students, including free counselling, peer support and awareness campaigns [5]. However, little research has been done in low-and middle-income countries and in humanitarian settings, where students face even greater adversities. In addition, few studies have included interpersonal and family systems factors, despite strong evidence for the impact of family and friends on the mental health of this age group [6] especially in the Middle East where social networks are the cornerstone of everyday life [7].

Lebanon is a lower middle-income country, severely affected by a debilitating economic crisis and government corruption that has pushed two-thirds of the population into poverty [8], as well as reeling from the devastation of the Beirut port explosion. The largest non-nuclear explosion in history occurred on August 4, 2020, causing over 170 deaths, leaving more than 6500 people injured and displacing approximately 300,000 people [9]. The explosion was felt more than 120 km away in Cyprus [10]. The culminating effects of the port explosion, political corruption, and the economic crisis, exacerbated by the COVID-19 pandemic, have created a pervasive sense of uncertainty and anxiety throughout the country [11]. This has since been exacerbated by a 7.8 magnitude earthquake in neighbouring Syria in 2022 and the escalation of cross-border armed conflict with Israel since October 2023.

Even before these multi-layered crises, the prevalence of mental disorders in Lebanese adolescents and young adults was higher than the population average, at 26%, with only 6% accessing treatment [12]. College students at the American University of Beirut, the largest university in the country, reported an even higher level of distress, with 38% meeting criteria for major depression and 39% for generalised anxiety [13]. The impact of the economic crisis, as well as the COVID-19 pandemic, the Beirut port explosion, and socio-political insecurity are all likely to have further exasperated the mental health of students [11]. Community studies since the onset of the devastating devaluation of the local currency and following the Beirut port explosion have found even higher prevalence of mental health difficulties in adolescents [2] and adults [14]. In these studies, more than half of the population were suffering from anxiety and traumatic stress. Amongst college students, over a third of students at the American University of Beirut reported severe symptoms of depression and anxiety, and this was strongly associated with food insecurity [15].

The evidence for the social determinants of mental health—non-biological socio-economic factors linked to the aetiology or worsening of psychological health—is increasingly well supported. A recent review of social determinants identified strong evidence for the role of conflict, violence and maltreatment, life events and experiences, racism and discrimination, culture and migration, social interaction and support, structural policies and inequality, financial factors, employment factors, living conditions, and demographic factors, on mental health [16]. Research in low-and-middle income countries has long established the impact of poverty [17] and, in humanitarian contexts, of violence and conflict [18]. At the micro-system level, family functioning and social support have been found to have protective effects on mental health [19–24] and mitigate the effects of humanitarian emergencies [22, 23]. However, gaps remain in our understanding of social determinants of mental health for college students in such settings. Huggard et al. [16] advocates for further research to identify the impact of multiple social determinants and across time, to better understand their relationships and most importantly to inform targeted interventions and college policy.

This study, therefore, aimed to identify the differential associations of multiple determinants of mental health (social, family, and demographic characteristics), all of which have been under-researched in Lebanon and other settings affected by humanitarian emergencies, especially for college students. In addition, in response to the sudden-onset disaster of the Beirut port explosion during data collection, our additional secondary aim was to identify the differential impact before *and* after the explosion.

Methods
Study design
Two cross-sectional studies were conducted. In Study 1, *before* the port explosion, data collection took place from May 20th to the afternoon of August 4th, 2020. After the August 4th port explosion, we added additional questions with Institutional Review Board (IRB) approval, and continued data collection. Data collected *after* the port explosion, which we will refer to as Study 2, was collected from August 19th to October 21st, 2020. Data was split in this way because 1) the sample was no longer homogenous given the devastating impact of the explosion, and 2) it was a naturally occurring opportunity to observe differences between samples before and after a humanitarian disaster. The timeline of events and data collection are outlined in Fig. 1.

Participants
Participants were recruited from a random and representative sample of undergraduate and graduate students enrolled at the American University of Beirut
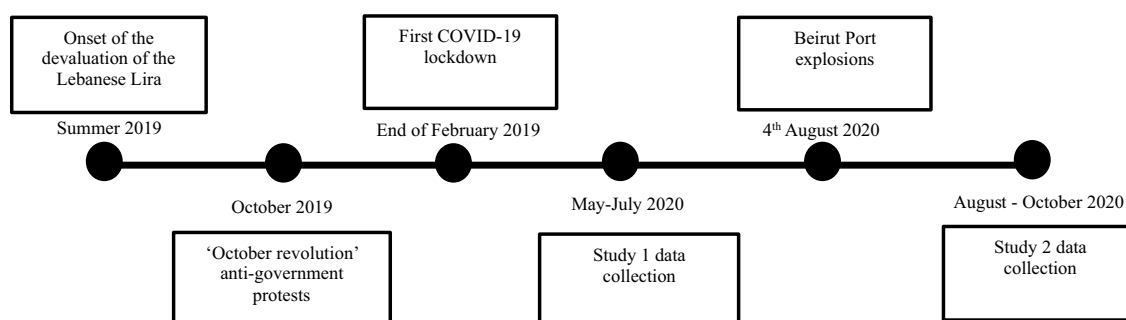
Fig. 1 Timeline of events in Lebanon before and during data collection

(AUB) at the time of the study. The sample was identified independently from the research team by the Student Affairs office. In line with overall student numbers, 20% of the sample were graduate students. All students were included as long as they met the inclusion criteria of 1) enrolled at AUB as a graduate or undergraduate student, and 2) aged 18 years old or more (any gender or nationality). An online survey was first sent to a total of 1400 students in May 2020. Due to a low response rate, a further 1400 students—selected using the same criteria—were contacted in July 2020. After the port explosion, additional questions were added after an IRB amendment for all students completing the survey after the explosion. The invitation and reminder emails were also amended to acknowledge the impact of the explosion, and to signpost students to support systems in the university.

Measures

The full online survey was developed with multiple rounds of feedback from the Psychiatry Department, Counselling Centre, Department of Psychology and Student Affairs office. The survey consisted of 8 self-report questionnaires. The survey took approximately 20 min to complete, including the consent form and debriefing. The survey was delivered via LimeSurvey 3.0 in English.

Mental health and wellbeing

Depression symptoms were assessed using the Patient Health Questionnaire (PHQ-9) [25]. This 9-item self-report measure has been found to have high internal reliability with a Cronbach's alpha of 0.86–0.89 [25]. In our study, Cronbach's alpha was 0.81 in Study 1 and 0.87 in Study 2.

Anxiety s*ymptoms* were assessed using the General Anxiety Disorder Scale (GAD-7) [26]. This 7-item self-report measure has been found to have high internal reliability with a Cronbach's alpha of 0.92 in the original developmental study, and 0.89 in subsequent-studies

[27]. In our study, Cronbach's alpha was 0.89 in Study 1 and 0.90 in Study 2.

Trauma symptoms were assessed using the Child Revised Impact of Events Scale (CRIES-8) [28]. Participants were asked to report how they felt in the past two weeks. Reports were not linked to any specific stressful life event. This 8-item self-report measure has good evidence of internal reliability, with a Cronbach's alpha of 0.81–0.86 [29] including for adolescents and young adults [30]. In our study, Cronbach's alpha was 0.86 in Study 1 and in Study 2.

Social and family characteristics

Social support was assessed using The Brief Social Support Scale (BS6) [31]. This 6-item self-report measure has good evidence of reliability, with a Cronbach's alpha of 0.86 [31]. In our study, Cronbach's alpha was 0.85 for Study 1 and 0.77 for the Study 2.

Family functioning was assessed using the General Family Functioning Subscale of the Family Assessment Device (FAD) [31]. This 12-item self-report measure has evidence of good internal reliability with a Cronbach's alpha of 0.70 [32]. In our study, the Cronbach's alpha was 0.93 for Study 1 and 0.89 for Study 2.

Demographic characteristics

Age, gender, and nationality were assessed with single item questions. Age was recorded as a continuous variable. Gender was recorded categorically as male, female, or other, with an option to specify. Nationality was recorded from a list of the most common nationalities and an option to write the nationality/ies if the option was not present. Due to low numbers of non-Lebanese students, categories were labelled as Lebanese or other in the analysis.

Financial stress was assessed using a single item designed for the study; 'are you personally experiencing budget difficulties to make necessary payments?' Students then rated their answers on a scale of 1−5, with

1 corresponding with "not at all," and 5 corresponding with "a great deal".

Proximity to explosion was assessed for students responding after 4th August (Study 2) and was designed for the study with a dual item; 'were you in Beirut at the time of the August 4th port explosion?' with the option of yes/no/prefer not to say. For those who answered yes, a secondary question asked, 'in which area of Beirut were you?' and participants could write the neighbourhood they were in. Locations were grouped using the 'Beirut explosion site with infrastructure sites and vulnerability' map from MapAction [33], (Fig. 2) into distances of 0 km (not in Beirut at the time of the explosion), 0–1 km, 1–4 km, and greater than 4 km away from the explosion site.

Injury to Self in Study 2 was assessed with one question asking, 'were you injured?' and given the option of yes/no/prefer not to say.

Family or Friends Injured in Study 2 was assessed using one question 'Was anyone within your network of family or friends injured?' and given the option of yes/no/prefer not to say.

Any Other Adverse Event was measured to assess *all* events in the student's lives that could contribute to trauma. This was measured in both studies with the question 'Have you ever experienced an adverse event(s)? (Any adverse event that is distressing or disturbing, such as a sexual assault, a beating, a car crash, death of a loved one, divorce of parents, or bullying?'. After the explosion the team added 'excluding the Beirut pot explosion'. Students were given the option to answer with 'no', 'yes, one', 'yes, multiple'.

Procedure

Potential participating students were sent a brief email with a link to the information sheet, consent form and survey. After completion of the survey, students were sent a link to enter a drawing for three cash prizes of $50, $100, or $200, using their email address.

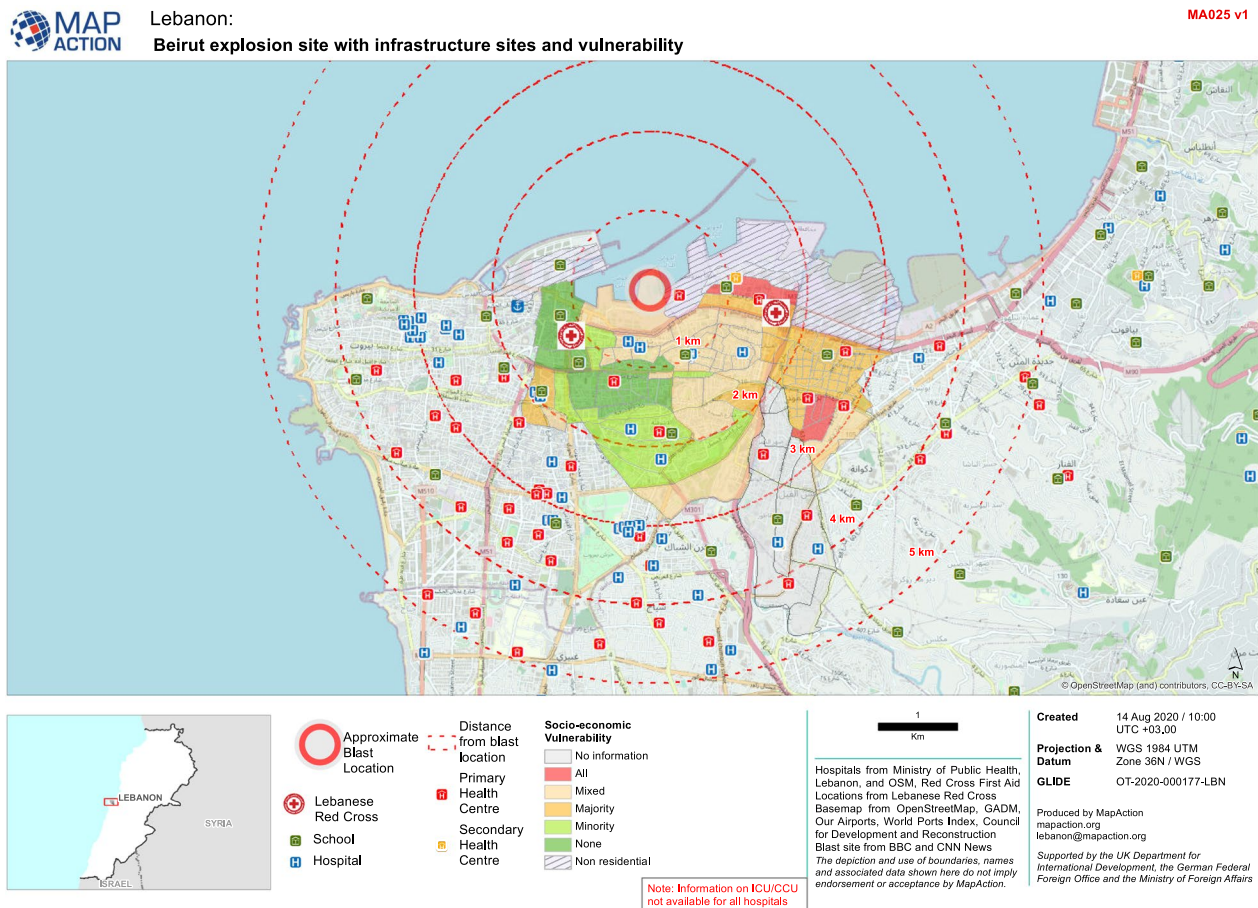A sample size calculation was conducted using G*Power (version 3.1.9.7) [34]. With an expected medium

Fig. 2 Map of Beirut by level of damage incurred by the Beirut Port Explosion (reprinted with permission)

effect size of 0.21, based on a similar study [21], α set to 0.05, and power 0.95, we estimated a required sample size of 105. We added a 20% margin for missing data, making a total sample size of 120. Assuming a response rate of no more than 10%, based on previous experience of online surveys, we estimated the need to contact 1400 potential participants.

Analysis

Data analysis was performed using IBM SPSS version 27 [35]. Participants were excluded if more than 20% of the items for any of the measures were missing. Bivariate correlations were conducted to identify independent relationships. Independent T-tests and Chi-square were conducted to test for differences between participants in Study 1 and Study 2. All variables were tested for test assumptions, including the normal distribution of residuals using histograms outputs and Shapiro–Wilk tests. Due to some non-normal distribution of residuals, bootstrapping was conducted. For the primary aim, we ran unadjusted multiple linear regressions for each of our dependent variables (depression, anxiety, trauma) with social and family characteristics as predictors. Next, we ran a partially adjusted multiple linear regression for our dependent variables with social and family support and demographic variables added (gender, nationality, and financial stress). We then ran fully adjusted linear regressions controlling for demographic variables and other adverse events, for each dependent variable. We conducted the same analysis for Study 1 (before the explosion) and Study 2 (after the explosion), with the exception of the addition of explosion-related experiences in Study 2. For the secondary aim, we visually compared results from the analyses of Study 1 and Study 2 and ran interaction effects to test for any statistically significant differences.

Ethics

Ethical approval was obtained from the IRB at AUB (AUB IRB ID: SBS-2020–0198) and from the Data Protection Risk Assessment at Trinity College Dublin to allow data sharing.

Results
Participant characteristics
A total of 217 participants made up Study 1 (*n* = 143) and Study 2 (*n* = 74). An additional 88 participants were excluded across studies due to more than 20% of items missing from one or more questionnaires.

A summary of participant descriptive characteristics can be seen in Table 1.

Participants in Study 1 were predominantly female (60.1%, n = 86), Lebanese (81.11%, n = 116), with a mean

age of 21.00 years old (SD = 3.26). Most students experienced one (32.17%, n = 46) or multiple (37.06%, n = 53) adverse events in their lives. Participants in Study 2 were also predominantly female (60.81%, n = 45), Lebanese (83.79%, n = 62), with a mean age of 20.48 years old (SD = 1.32). Most students experienced one (21.62%, n = 16) or multiple (37.84%, n = 28) adverse events in their lives, besides the port explosion. Of those in Beirut at the time of the port explosion, most students were between 1 and 4 km (45.45%, n = 15) or greater than 4 km (39.39%, n = 13) away from the explosion site. Bootstrap independent t-tests and chi-square tests comparing the demographic properties between Study 1 and Study 2 found no statistically significant differences. A summary of measures is presented in Table 2.

Correlation matrix
Bootstrapped correlations are presented in Table 3, which shows that predictor variables social support and family functioning correlate with each other, however VIF factors showed low risk of multicollinearity (VIFs < 2).

Correlations for Study 1 revealed that age did not significantly correlate with anxiety, depression, or trauma. Depression correlated with social support, family functioning, and financial stress. Anxiety and trauma did not correlate with any of the independent variables. Correlations for Study 2 showed that age did not correlate with anxiety, depression, or trauma. Depression significantly correlated with social support, family functioning, and financial stress. Anxiety correlated with social support and financial stress. Trauma correlated with financial stress.

Regression models
Study 1—before the port explosion
Table 4 shows the results of the unadjusted, partially adjusted, and fully adjusted multiple linear regressions for Study 1. Unadjusted models showed that social support was the stronger predictor of depressive symptoms ($R^2 = 0.10$, $F_{(2,131)} = 8.61$, $p = 0.00$). Neither social support nor family functioning were predictors of anxiety symptoms ($R^2 = 0.04$, $F_{(2,132)} = 3.53$, $p = 0.03$). Social support was the stronger predictor of trauma symptoms ($R^2 = 0.04$, $F_{(2,132)} = 3.46$, $p = 0.03$).

Partially adjusted models (adjusted for demographics) showed that financial stress was the strongest and only predictor of depressive symptoms ($R^2 = 0.13$, $F_{(6,116)} = 3.97$, $p = 0.00$). No variables significantly predicted anxiety ($R^2 = 0.02$, $F_{(6,117)} = 1.42$, $p = 0.21$), or trauma symptoms ($R^2 = 0.03$, $F_{(6,117)} = 1.59$, $p = 0.16$).

Fully adjusted models (adjusted for demographics *and* adverse experiences) showed that age and financial stress were predictors of depressive symptoms ($R^2 = 0.15$, F

Table 1 Demographic characteristics

	Study 1 (N = 143)				Study 2 (N = 74)			
	n	%	Mean	*SD*	*n*	%	Mean	SD
Gender								
Female	86	60.14	–	–	45	60.81	–	–
Male	48	33.56	–	–	24	32.43	–	–
Nationality								
Lebanese	116	81.11	–	–	62	83.79	–	–
Other	18	12.59	–	–	8	10.81	–	–
Age	–	–	21.00	3.26	–	–	20.48	2.93
Financial stress[a]	–	–	3	1.35	–	–	3	1.32
Neighborhood distance at time of explosion[b]								
Not in Beirut	–	–	–	–	39	52.70	–	–
0 km–1 km	–	–	–	–	4	5.41	–	–
1 km–4 km	–	–	–	–	15	20.27	–	–
>4 km	–	–	–	–	13	17.57	–	–
Injured in the explosion								
Yes	–	–	–	–	5	6.75	–	–
No	–	–	–	–	26	35.14		
Prefer not to say	–	–	–	–	2	2.70	–	–
Family or friends injured in the explosion								
Yes	–	–	–	–	41	55.41	–	–
No	–	–	–	–	33	44.59	–	–
Any other adverse event								
One	46	32.17	–	–	16	21.62	–	–
Multiple	53	37.06	–	–	28	37.84	–	–
No	43	30.00	–	–	29	39.19	–	–

[a] On a scale 1–5. Higher scores relate to higher financial stress

[b] If students were in Beirut (n = 33) at the time of the explosion, their exact location (self-reported neighborhood) was grouped by distance from the port using a port explosion map from MapAction [33]

T-Test's and Chi-square's showed no significant differences between Study 1 and Study 2 on any variable

Table 2 Descriptives of measures

	Study 1					Study 2				
	Mean	SD	*Range*	Min	Max	*Mean*	SD	*Range*	Min	Max
PHQ-9[a]	11.01	5.41	25	0	25	12.54	6.26	24	3	27
GAD-7[a]	10.43	5.51	21	0	21	11.50	5.49	20	1	21
CRIES-8[a]	18.34	10.66	40	0	40	21.99	10.76	40	0	40
BS6[b]	18.44	4.42	17	7	24	19.00	3.38	12	12	24
FAD[c]	2.27	0.69	3	1	4	2.33	0.73	3	1	4

PHQ-9 patient health questionnaire, *GAD-7* generalized anxiety disorder-7, *CRIES-8* children revised impact of events scale, *BS6* brief social support scale, *FAD* family assessment device

[a] Higher scores relate to higher symptoms

[b] Higher scores relate to higher levels of social support

[c] Higher scores relate to poorer family functioning

Table 3 Bootstrap correlation matrix, Study 1 and Study 2

Study 1	1	2	3	4	5	6	7
1. Depressive symptoms	–	[0.60, 0.78]*	[0.22, 0.55]*	[− 0.43, − 0.10]*	[0.06, 0.37]*	[− 0.27, 0.03]	[0.13, 0.46]*
2. Anxiety symptoms	[0.60, 0.78]*	–	[0.27, 0.60]*	[− 0.34, 0.01]	[− 0.04, 0.30]	[− 0.27, 0.05]	[− 0.02, 0.3]
3. Trauma symptoms	[0.22, 0.55]*	[0.27, 0.60]*	–	[− 0.34, − 0.01]*	[− 0.09, 0.27]	[− 0.29, 0.04]	[− 0.01, 0.36]
4. Social support	[− 0.43, − 0.10]*	[− 0.34, 0.01]	[− 0.34, 0.01]	–	[− 0.71, − 0.49]*	[− 0.31, 0.03]	[− 0.41, − 0.04]*
5. Family functioning	[0.06, 0.37]*	[− 0.04, 0.30]	[− 0.09, 0.27]	[− 0.71, − 0.49]*	–	[− 0.04, 0.26]	[− 0.16, 0.22]
6. Age	[− 0.27, 0.03]	[− 0.27, 0.05]	[− 0.29, 0.04]	[− 0.31, 0.03]	[− 0.04, 0.26]	–	[− 0.19, 0.12]
7. financial stress	[0.13, 0.46]*	[− 0.02, 0.36]	[− 0.01, 0.36]	[− 0.41, − 0.04]*	[− 0.16, 0.22]*	[− 0.19, 0.12]	–
Study 2	1	2	3	4	5	6	7
1. Depressive symptoms	–	[0.49, 0.80]*	[0.34,0.66]*	[− 0.61,− 0.09]*	[0.03, 0.52]*	[− 0.12, 0.34]	[0.04, 0.48]*
2. Anxiety symptoms	[0.49, 0.80]*	–	[0.53, 0.79]*	[− 0.48, 0.00]	[− 0.01, 0.46]	[− 0.07, 0.31]	[0.07, 0.48]*
3. Trauma symptoms	[0.34, 0.66]*	[0.53, 0.79]*	–	[− 0.28, 0.24]	[− 0.28, 0.20]	[− 0.12, 0.33]	[0.05, 0.54]*
4. Social support	[− 0.61, − 0.09]*	[− 0.48,0.00]	[− 0.28, 0.24]	–	[− 0.73, − 0.38]*	[− 0.46, 0.04]	[− 0.32, 0.14]
5. Family functioning	[0.03, 0.52]*	[− 0.01, 0.46]	[− 0.28, 0.20]	[− 0.73, − 0.38]*	–	[− 0.05, 0.34]	[− 0.30, 0.11]
6. Age	[− 0.11, 0.34]	[− 0.07, 0.31]	[− 0.12, 0.33]	[− 0.65, 0.04]	[− 0.05, 0.34]	–	[− 0.14, 0.39]
7. Financial stress	[0.04, 0.48]*	[0.07, 0.48]*	[0.05, 0.54]	[− 0.30, 0.14]	[− 0.30, 0.11]	[− 0.14, 0.39]	–

Bolded values indicate significant correlations with BCa that does not pass through 0

Table 4 Bootstrapped regression models for Study 1

Model	Unadjusted					Partially adjusted					Fully adjusted				
	B	SE	BCa 95% CI		p	B	SE	BCa 95% CI		p	B	SE	BCa 95%CI		p
			LL	UL				LL	UL				LL	UL	
Depressive symptoms															
Social support	− 0.34	0.13	− 0.58	− 0.08	0.01*	− 0.19	0.15	− 0.49	0.11	0.19	− 0.20	0.14	− 0.50	0.09	0.16
Family functioning	0.69	0.82	− 0.82	2.19	0.38	1.02	0.82	− 0.62	2.57	0.21	0.57	0.84	− 0.96	2.21	0.50
Age	–	–	–	–	–	− 0.25	0.13	− 0.50	0.04	0.05	− 0.26	0.12	− 0.50	− 0.02	0.03*
Financial stress	–	–	–	–	–	0.95	0.37	0.28	1.56	0.02*	0.90	0.36	0.14	1.54	0.01*
Gender	–	–	–	–	–	0.02	1.00	− 1.97	1.90	0.99	− 0.25	0.98	− 2.20	1.75	0.78
Nationality	–	–	–	–	–	1.12	1.39	− 1.46	3.59	0.44	1.01	1.33	− 1.45	3.67	0.44
Adverse events	–	–	–	–	–	–	–	–	–	–	1.16	0.60	− 0.09	2.34	0.06
Anxiety symptoms															
Social support	− 0.26	0.14	− 0.52	0.02	0.06	− 0.12	0.16	− 0.42	0.18	0.44	− 0.20	0.14	− 0.50	0.09	0.16
Family functioning	0.28	0.87	− 1.67	1.99	0.74	0.68	0.91	− 1.07	2.33	0.46	0.57	0.84	− 0.96	2.21	0.50
Age	–	–	–	–	–	− 0.24	0.15	− 0.53	0.09	0.10	− 0.25	0.15	− 0.55	0.07	0.10
Financial stress	–	–	–	–	–	0.60	0.42	− 0.31	1.36	0.15	0.90	0.36	0.14	1.54	0.01*
Gender	–	–	–	–	–	0.12	1.05	− 1.94	2.33	0.90	− 0.25	0.98	− 2.20	1.75	0.78
Nationality	–	–	–	–	–	− 0.65	1.54	− 3.58	2.17	0.69	1.01	1.33	− 1.45	3.67	0.44
Adverse events	–	–	–	–	–	–	–	–	–	–	1.16	0.60	− 0.09	2.34	0.06
Trauma symptoms															
Social support	− 0.54	0.24	− 0.96	− 0.10	0.03*	− 0.40	0.26	− 0.90	0.08	0.13	− 0.40	0.26	− 0.90	0.08	0.12
Family functioning	0.01	1.50	− 3.06	2.94	0.99	0.27	1.58	− 2.52	3.20	0.85	− 0.72	1.68	− 2.52	3.20	0.65
Age	–	–	–	–	–	− 0.51	0.29	− 1.03	0.09	0.07	− 0.54	0.28	− 1.03	0.09	0.04*
Financial stress	–	–	–	–	–	0.99	0.75	− 0.52	2.55	0.19	− 0.54	1.90	− 4.12	3.16	0.78
Gender	–	–	–	–	–	0.04	2.00	− 3.77	4.23	0.99	0.91	0.71	− .49	2.24	0.19
Nationality	–	–	–	–	–	1.44	2.46	− 3.67	6.30	0.55	1.33	2.60	− 3.83	6.30	0.62
Adverse events	–	–	–	–	–	–	–	–	–	–	2.03	1.29	− 0.45	4.59	0.12

Statistically significant findings are highlighted in bold

* $p < 0.05$

$(7,114) = 3.98$, $p = 0.00$). Financial stress was the only predictor of anxiety symptoms ($R^2 = 0.03$, F $(7,115) = 1.49$, $p = 0.18$). Age significantly predicted trauma symptoms ($R^2 = 0.04$, F $(7,115) = 1.74$, $p = 0.11$).

Study 2—after the port explosion

Table 5 shows the results of the bootstrapped unadjusted, partially adjusted, and fully adjusted multiple linear regressions for Study 2. Unadjusted models showed that

Table 5 Bootstrapped regression models for Study 2

Model	Unadjusted[a]					Partially adjusted[b,d,f]					Fully adjusted[c,e,g]				
	B	SE	BCa 95% CI		p	B	SE	BCa 95% CI		p	B	SE	BCa 95%CI		p
			LL	UL				LL	UL				LL	UL	
Depressive symptoms															
Social support	−0.47	0.30	1.19	0.06	0.12	−0.39	0.37	−1.08	0.33	0.33	0.34	0.90	−1.32	2.40	0.65
Family functioning	1.88	1.41	−0.93	4.69	0.18	2.16	1.37	−0.32	4.88	0.13	4.73	4.02	−2.79	12.93	0.22
Age	–	–	–	–	–	0.06	0.29	−0.43	0.70	0.82	−0.07	0.92	−1.41	2.29	0.92
Financial stress	–	–	–	–	–	1.38	0.55	0.35	2.57	**0.02***	1.99	1.71	−2.08	4.99	0.20
Gender	–	–	–	–	–	0.00	1.86	−3.27	3.85	1.00	2.16	4.59	−6.61	11.52	0.64
Nationality	–	–	–	–	–	1.63	2.79	−3.81	6.91	0.55	−1.69	6.95	−16.68	11.43	0.73
Proximity	–	–	–	–	–	−0.67	0.58	−1.56	0.68	0.41	−1.31	2.24	−5.29	3.82	0.46
Injury to self	–	–	–	–	–	–	–	–	–	–	0.95	4.88	−9.80	11.98	0.71
Family or friends injured	–	–	–	–	–	–	–	–	–	–	−0.03	5.72	−11.88	8.94	1.00
Other adverse events	–	–	–	–	–	–	–	–	–	–	2.08	6.29	−7.79	18.66	0.68
Anxiety symptoms															
Social support	−0.25	0.22	−0.69	0.17	0.27	−0.30	0.28	−0.90	0.19	0.29	−0.18	0.61	−1.25	1.28	0.77
Family functioning	1.26	1.09	−1.20	3.40	0.26	2.16	1.08	−0.07	4.31	0.05	3.29	2.62	−1.78	8.83	0.19
Age	–	–	–	–	–	0.09	0.30	−0.41	0.77	0.76	0.05	0.49	−0.84	1.06	0.90
Financial stress	–	–	–	–	–	1.19	0.44	0.35	2.10	**0.01***	2.11	1.18	−0.56	4.42	0.07
Gender	–	–	–	–	–	−2.31	1.54	−5.61	0.49	0.13	−0.83	3.31	−7.51	5.17	0.83
Nationality	–	–	–	–	–	2.67	2.19	−1.86	7.13	0.20	−0.05	4.38	−8.02	8.83	0.99
Proximity	–	–	–	–	–	0.32	0.48	−0.66	1.29	0.49	1.19	1.72	−2.69	4.08	0.45
Injury to self	–	–	–	–	–	–	–	–	–	–	−2.73	3.89	−11.20	3.47	0.34
Family or friends injured	–	–	–	–	–	–	–	–	–	–	3.57	3.89	−4.38	10,52	0.34
Adverse events	–	–	–	–	–	–	–	–	–	–	−0.38	4.36	−8/01	10.19	0.93
Trauma symptoms															
Social support	−0.20	0.48	−1.24	0.89	0.68	−0.27	0.56	−1.34	0.89	0.64	−0.60	1.32	−2.67	2.45	0.64
Family functioning	−1.81	2.31	−6.78	3.03	0.45	1.23	2.18	−2.54	5.82	0.58	−2.61	6.75	−13.09	13.56	0.65
Age	–	–	–	–	–	0.44	0.45	−0.60	1.17	0.29	0.45	1.07	−1.56	3.02	0.63
Financial stress	–	–	–	–	–	2.26	0.98	0.34	4.13	**0.03***	1.70	3.01	−4.32	7.51	0.54
Gender	–	–	–	–	–	−5.46	2.85	−11.65	−0.30	0.06	−2.19	7.41	−18.75	13.01	0.76
Nationality	–	–	–	–	–	6.59	5.30	−3.86	17.31	0.17	12.42	12.96	−14.10	38.81	0.32
Proximity	–	–	–	–	–	1.26	1.16	−0.98	3.60	0.27	0.48	3.81	−6.37	7.43	0.88
Injury to self	–	–	–	–	–	–	–	–	–	–	−4.60	9.41	−14.78	20.85	0.44
Family or friends injured	–	–	–	–	–	–	–	–	–	–	4.83	8.49	13.13	19.81	0.59
Adverse events	–	–	–	–	–	–	–	–	–	–	0.19	9.44	−17.64	20.18	0.98

Statistically significant findings are highlighted in bold

* $p < 0.05$

[a] based on 1000 bootstrap samples

[b] Based on 997 bootstrap samples

[c] Based on 959 bootstrap samples

[d] Based on 995 bootstrap samples

[e] Based on 965 bootstrap samples

[f] Based on 998 bootstrap samples

[g] Based on 955 bootstrap samples

neither social support nor family functioning were predictors of depressive symptoms ($R^2 = 0.16$, F $(2,67) = 7.36$, $p = 0.00$), anxiety symptoms ($R^2 = 0.06$, F $(2,69) = 3.16$ $p = 0.05$), or trauma symptoms ($R^2 = -0.02$, F$(2,69) = 0.37$, $p = 0.70$).

Partially adjusted models (adjusted for demographics) showed financial stress was the strongest predictor of depressive ($R^2 = 0.18$, F $(7,52) = 2.83$, $p = 0.01$), anxiety ($R^2 = 0.19$, F$(7,54) = 3.00$, $p = 0.01$), and trauma symptoms ($R^2 = 0.15$, F $(7,54) = 2.51$, $p = 0.03$).

Fully adjusted models (adjusted for demographics *and* adverse experiences, including exposure to the explosions) showed no variables significantly predicted depression ($R^2 = 0.08$, F $(10,17) = 1.23$, $p = 0.34$) anxiety ($R^2 = 0.22$, F $(10,18) = 1.80$, $p = 0.13$), or trauma symptoms ($R^2 = -0.11$, F $(10,18) = 0.73$, $p = 0.69$).

Comparison of patterns between study 1 and study 2
Depressive symptoms
Before *and* after the explosion, social support, family functioning, and financial stress had significant correlations with depressive symptoms. In the unadjusted models before the explosion, low social support was the only predictor of depression symptoms, but not afterwards. After adjusting for demographics, before *and* after the explosion, financial stress was the only predictor. However, after adjusting for adversity as well, financial stress was significant before but *not* after the explosion. This difference was not statistically significant, as no interaction effects were found between group (before or after) and social determinants for depression (social support $b = -0.35$, SE $= 0.24$, $p = 0.15$; family functioning $b = 1.40$, SE 1.15, $p = 0.22$; financial stress $b = 0.35$, SE $= 0.58$, $p = 0.52$).

Anxiety symptoms
Before the explosion, no variables were significantly correlated with anxiety symptoms, while after the explosion, social support and financial stress were correlated with symptoms. Neither study found any significant predictors of anxiety in the unadjusted models. When adjusting for demographics, after—and not before—the explosion, financial stress predicted symptoms. In the fully adjusted model, adjusted for adverse experiences, before the explosion, financial stress was the only significant predictor of anxiety, but after the explosion there were no significant predictors. This difference was not supported statistically, as no significant interaction effects were found between group (before or after) and social determinants for anxiety (social support $b = -0.18$, SE $= 0.22$, $p = 0.40$; family functioning $b = 1.00$, SE 1.11, $p = 0.37$; financial stress $b = 0.63$, SE $= 0.56$, $p = 0.25$).

Trauma symptoms
Before the explosion, no variables were correlated with trauma symptoms. However, after the explosion, financial stress was significantly correlated with symptoms. Unadjusted models showed that social support predicted trauma symptoms before the explosion, but *not* after. In the partially adjusted model, adjusted for demographics, no significant predictors of trauma symptoms were found before the explosion, *but* financial stress did predict symptoms after the explosion. Fully adjusted models, adjusted for adverse experiences, showed that only age was a significant predictor before the explosion (lower age was associated with worse symptoms), but no variables were significant predictors for trauma after the explosion. This was supported statistically, as no significant interaction effects were found between group and social determinants for depression (social support $b = 0.40$, SE $= 0.44$, $p = 0.37$; family functioning $b = -1.54$, SE 2.19, $p = 0.47$; financial stress $b = 1.01$, SE $= 1.19$, $p = 0.40$).

Discussion
This study aimed to identify social determinants of student mental health during multiple national crises, and before and after the port explosion. Whilst we found associations between social support and depressive and trauma symptoms before the port explosion, only financial stress remained a significant predictor of depression after adjusting for demographics. After adjusting also for adverse experiences, financial stress and age were predictors of depression symptoms, while financial stress remained the only predictor of anxiety and trauma symptoms. After the port explosion financial stress was the only statistically significant predictor of depression, anxiety, and trauma symptoms after adjustment for demographics. However, after also adjusting for adverse experiences, which included proximity to the port, injuries sustained after the explosion, and other adverse events, no variables were significant predictors. In addition to these findings, we found no significant differences in relationships before or after the explosions, indicating that differences between the groups were only of small clinical significance. These results highlight that other factors than family and social support are important for the mental health of college students in Lebanon during multiple national crises, and that financial stress does play role, albeit not beyond the impact of adverse events themselves.

Our study clearly demonstrates a role of financial stress on mental health in the context of the multi-layered crises in Lebanon. This is in line with previous research that has found strong links between poverty and mental

health, with people of lower socioeconomic status or living in a high-deprivation neighbourhood having a higher likelihood of developing mental health problems [17, 36, 37]. Miller and Rasmussen [38], criticized the tendency of research in humanitarian settings to focus on the direct effect of war and conflict, neglecting the major impact of chronic exposure to daily stressors. Daily stressors can have a cumulative impact on mental health, worsening during crises [38]. Financial stress is an example of a daily stressor, especially during the economic crises facing Lebanon. This is likely to reflect the major financial losses students and their families are facing, including the devaluation of salaries by over 90%, frozen bank accounts, and total or partial loss of life savings [39]. It is also likely to reflect the impact this has had on buying power, including difficulties obtaining basic goods like food, medicine, and electricity [40]. For the first time in the country's history, Lebanon has been flagged for food insecurity risk by the United Nations [41], with 2.26 million people at risk. Food insecurity has also been found to be linked to poor mental health in students in Lebanon [15]. Without economic and political reform in the country that can reduce financial and food insecurity, we are unlikely to see major improvements in the population's mental health. For students, higher education institutions may help to support students through more accessible models of education that consider affordability, accessibility, and social (in)equities [42]. This can help to address student financial stress more structurally than can be addressed through financial support alone. Additionally, higher education institutions can support students by recognising the impact of financial stress as part of mental health and counselling campaigns and services. At the American University of Beirut, a University Mental Health Council was set-up to strengthen university systems to address the worsening mental health of the university community [43]. Findings of this study indicate that interventions and support should be targeted to those most at financial risk within the college community.

Social support was found to be a stronger predictor than family functioning of trauma symptoms for students before the explosion, though neither were as impactful as financial stress. Some previous literature on family and peer relations as a protective factor for mental health is in line with this finding. As college students are predominantly older adolescents or young adults, the importance of peers over families is well documented in this age group [44–46]. It may be reflective of the typical shift in attachment relationships during adolescence from the inner family to outer social world [45]. This indicates that peers are an important source of support for this population. However, our findings indicate that social support was not

able to buffer the impact of financial stress, particularly after the explosion, again emphasising the particularly negative impact of the economic collapse. This may be explained by the collective nature of both the economic collapse, COVID-19, and the port explosion, that affected the entire population. This interpretation is supported by our finding that the significance of financial distress after the explosions was lost after fully adjusting for demographics and explosion-related adversity. The collective nature of the experience may have negatively affected the ability of financial wealth, and families and friends, to buffer its impact, particularly as the explosion occurred during a COVID-19 lockdown. Lockdowns in Lebanon were long and strict, due to the limited public health infrastructure, and people were unable to leave their homes except for medical emergencies for months at a time. The usual buffering effect of social support on mental health and wellbeing found in previous studies in Lebanon [47–49] may therefore have been unable to function under the extreme nature of the disaster.

The overwhelming impact of financial stress on the mental health of college students in this sample, as well as the potential for social support, demonstrates the need to take a systems approach to student mental health during humanitarian emergencies. Interventions and services need to respond to the collective nature of distress, and address core social determinants of mental health alongside individual-focused interventions for mental health and stress management.

Strengths and limitations

This study benefits from a naturally occurring opportunity to study the impact of multiple social determinants of mental health in college students before and after a major humanitarian disaster. It is limited, however, by a relatively small and single-university sample limiting generalisability, and the use of brief self-report measures that may not comprehensively capture social determinants of mental health. In addition, the multiple crises occurring in parallel makes it challenging to differentiate impacts, with the freefall of the Lebanese Lira occurring throughout data collection, both before and after the explosion. We were limited in our exploration of financial stress with the use of a single question, and a more structured measure might have afforded a more nuanced picture. However, there is research that supports the use of single-item measures, and that there is no difference in the predictive validity between multiple-item and single-item measures [50]. The use of a single-item measure in our study gave a strong indication of stress in the population.

Conclusion

This study demonstrates the role of financial stress on the mental health of college students in Lebanon, in the context of the economic collapse of the country, port disaster, and the COVID-19 pandemic. This supports the importance of taking a collective and macro-systems approach to mental health in humanitarian settings, to address the wider social determinants that are so devastating for mental health.

Abbreviations

AUB	American University Beirut
BS6	Brief social support Scale
CRIES-8	Child revised impact of events scale
GAD-7	General anxiety disorder scale
FAD	Family assessment device
IRB	Institutional review board
PHQ-9	Patient health questionnaire

Availability of data and materials

Anonymous data can be shared on reasonable written request.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the IRB at the American University of Beirut (AUB IRB ID: SBS-2020–0198) and from the Data Protection Risk Assessment at Trinity College Dublin to allow data sharing.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

References

1. United Nations Children Fund (UNICEF). The State of the World's Children 2021: On My Mind - Promoting, protecting and caring for children's mental health. Available from: https://www.unicef.org/reports/state-worlds-children-2021. 2021 Oct. Accessed 2024 March 10.
2. Maalouf FT, Haidar R, Mansour F, Elbejjani M, El Khoury J, Khoury B, Ghandour LA. Anxiety, depression and PTSD in children and adolescents following the Beirut port explosion. J Affect Disord. 2022;1(302):58–65. https://doi.org/10.1016/j.jad.2022.01.086.
3. Auerbach RP, Mortier P, Bruffaerts R, Alonso J, Benjet C, Cuijpers P, Demyttenaere K, Ebert DD, Green JG, Hasking P, Murray E, Nock MK, Pinder-Amaker S, Sampson NA, Stein DJ, Vilagut G, Zaslavsky AM, Kessler RC. WHO world mental health surveys international college student project: prevalence and distribution of mental disorders. J Abnorm Psychol. 2018;127(7):623–38. https://doi.org/10.1037/abn0000362.
4. Limone P, Toto GA. Factors that predispose undergraduates to mental issues: a cumulative literature review for future research perspectives. Front Pub Health. 2022;16(10):831349. https://doi.org/10.3389/fpubh.2022.831349.
5. Moeller J, von Keyserlingk L, Spengler M, Gaspard H, Lee HR, Yamaguchi-Pedroza K, Yu R, Fischer C, Arum R. Risk and protective factors of college students' psychological well-being during the COVID-19 pandemic: emotional stability, mental health, and household resources. Aera Open. 2022;8:23328584211065724. https://doi.org/10.1177/23328584211065725.
6. Stewart T, Suldo S. Relationships between social support sources and early adolescents' mental health: the moderating effect of student achievement level. Psychol Sch. 2011;48(10):1016–33. https://doi.org/10.1002/pits.20607.
7. Zaatari Z. Lebanon. In: Joseph S, editor. Arab family studies: critical reviews. Syracuse University Press; 2018. p. 190–211.
8. United Nations Economic and Social Commission for Western Asia (ESCWA). Multidimensional Poverty in Lebanon: 2019–2021. Available from: http://www.unescwa.org/publications/multidimensional-poverty-lebanon-2019-2021.2021 Sep. Accessed 2024 March 10.
9. World Health Organization (WHO). Beirut Port Blast Emergency Strategic Response Plan, August–December 2020. Available from: https://www.emro.who.int/images/stories/lebanon/who-lebanon-strategic-response-plan-27.9.20.pdf?ua=1. 2020. Accessed 2024 Mar 10.
10. Singhvi A, Reinhard S, McCann A, Leatherby L, Migliozzi B. Mapping the Damage from the Beirut Explosion. The New York Times. Available from: https://www.nytimes.com/interactive/2020/08/04/world/middleeast/beirut-explosion-damage.html. 2020 Aug 4. Accessed18 Feb 2024.
11. Bosqui T. The need to shift to a contextualized and collective mental health paradigm: learning from crisis-hit Lebanon. Glob Ment Health (Camb). 2020;22(7):e26. https://doi.org/10.1017/gmh.2020.20.
12. Maalouf FT, Ghandour LA, Halabi F, Zeinoun P, Shehab AA, Tavitian L. Psychiatric disorders among adolescents from Lebanon: prevalence, correlates, and treatment gap. Soc Psychiatry Psychiatr Epidemiol. 2016;51(8):1105–16. https://doi.org/10.1007/s00127-016-1241-4.
13. Kronfol Z, Khalifa B, Khoury B, Omar O, Daouk S, de Witt JP, ElAzab N, Eisenberg D. Selected psychiatric problems among college students in two Arab countries: comparison with the USA. BMC Psychiatry. 2018;18(1):147.
14. El Khoury J, Ghandour L, Charara R, Adam L, Maalouf F, Khoury B. The Beirut explosion psychological impact study: an online cross-sectional population survey. Traumatology. 2022;28(4):491–502. https://doi.org/10.1037/trm0000353.
15. Itani R, Mattar L, Kharroubi S, Bosqui T, Diab-El-Harake M, Jomaa L. Food insecurity and mental health of college students in Lebanon: a cross-sectional study. J Nutr Sci. 2022;23(11):e68. https://doi.org/10.1017/jns.2022.68.
16. Huggard L, Murphy R, O'Connor C, Nearchou F. The social determinants of mental illness: a rapid review of systematic reviews. Issues Ment Health Nurs. 2023;44(4):302–12. https://doi.org/10.1080/01612840.2023.2186124.
17. Lund C, De Silva M, Plagerson S, Cooper S, Chisholm D, Das J, Knapp M, Patel V. Poverty and mental disorders: breaking the cycle in low-income and middle-income countries. Lancet. 2011;378(9801):1502–14. https://doi.org/10.1016/S0140-6736(11)60754-X.
18. Charlson F, van Ommeren M, Flaxman A, Cornett J, Whiteford H, Saxena S. New WHO prevalence estimates of mental disorders in conflict settings: a systematic review and meta-analysis. Lancet. 2019;394(10194):240–8. https://doi.org/10.1016/S0140-6736(19)30934-1.
19. Kendler KS, Myers J, Prescott CA. Sex differences in the relationship between social support and risk for major depression: a longitudinal study of opposite-sex twin pairs. Am J Psychiatry. 2005;162(2):250–6. https://doi.org/10.1176/appi.ajp.162.2.250.

20. Ellonen N, Kääriäinen J, Autio V. Adolescent depression and school social support: a multilevel analysis of a Finnish sample. J Community Psychol. 2008;36(4):552–67. https://doi.org/10.1002/jcop.20254.

21. Berryhill MB, Smith J. College student chaotically-disengaged family functioning, depression, and anxiety: the indirect effects of positive family communication and self-compassion. Marriage Fam Rev. 2021;57(1):1–23. https://doi.org/10.1080/01494929.2020.1740373.

22. Farhood LF, Noureddine SN. PTSD, depression, and health status in Lebanese civilians exposed to a church explosion. Int J Psychiatry Med. 2003;33(1):39–53. https://doi.org/10.2190/309D-7HQX-D4J4-T6TR.

23. Blais RK, Tirone V, Orlowska D, Lofgreen A, Klassen B, Held P, Stevens N, Zalta AK. Self-reported PTSD symptoms and social support in US military service members and veterans: a meta-analysis. Eur J Psychotraumatol. 2021;12(1):1851078. https://doi.org/10.1080/20008198.2020.1851078.

24. Wright BK, Kelsall HL, Sim MR, Clarke DM, Creamer M. Support mechanisms and vulnerabilities in relation to PTSD in veterans of the Gulf War, Iraq War, and Afghanistan deployments: a systematic review. J Trauma Stress. 2013;26(3):310–8. https://doi.org/10.1002/jts.21809.

25. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001;16(9):606–13. https://doi.org/10.1046/j.1525-1497.2001.016009606.x.

26. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med. 2006;166(10):1092–7. https://doi.org/10.1001/archinte.166.10.1092.

27. Löwe B, Decker O, Müller S, Brähler E, Schellberg D, Herzog W, Herzberg PY. Validation and standardization of the generalized anxiety disorder screener (GAD-7) in the general population. Med Care. 2008;46(3):266–74. https://doi.org/10.1097/MLR.0b013e318160d093.

28. Perrin S, Meiser-Stedman R, Smith P. The children's revised impact of event scale (CRIES): validity as a screening instrument for PTSD. Behav Cogn Psychother. 2005;33(4):487–98. https://doi.org/10.1017/S1352465805002419.

29. Verlinden E, van Meijel EPM, Opmeer BC, Beer R, de Roos C, Bicanic IAE, Lamers-Winkelman F, Olff M, Boer F, Lindauer RJL. Characteristics of the children's revised impact of event scale in a clinically referred Dutch sample. J Trauma Stress. 2014;27(3):338–44. https://doi.org/10.1002/jts.21910.

30. Çeri V, Hamidi F, Çakır B, Bilaç Ö, İz M, Ay İz FB, Aydemir Ö. Child revised impact of event scale (CRIES): validity and reliability study of Turkish version. Neuropsychiatr Invest. 2021;59(1):21–6. https://doi.org/10.5455/NYS.20201101115427.

31. Beutel ME, Brähler E, Wiltink J, Michal M, Klein EM, Jünger C, Wild PS, Münzel T, Blettner M, Lackner K, Nickels S, Tibubos AN. Emotional and tangible social support in a German population-based sample: development and validation of the brief social support scale (BS6). PLoS ONE. 2017;12(10):e0186516. https://doi.org/10.1371/journal.pone.0186516.

32. Staccini L, Tomba E, Grandi S, Keitner GI. The evaluation of family functioning by the family assessment device: a systematic review of studies in adult clinical populations. Fam Process. 2015;54(1):94–115. https://doi.org/10.1111/famp.12098.

33. MapAction. Beirut explosion site with infrastructure sites and vulnerability. MapAction. Maps.mapaction.org. 2020 Aug 14. Available from: https://maps.mapaction.org/dataset/2020-lbn-001-ma025-v1-v1.

34. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods. 2007;39(2):175–91. https://doi.org/10.3758/bf03193146.

35. IBM Corporation. IBM SPSS Statistics for Macintosh, Version 27 [software]. Armonk, NY: IBM Corporation; 2020.

36. World Health Organization (WHO). Social Determinants of Mental Health. Geneva: World Health Organization; 2020. Available from: https://iris.who.int/bitstream/handle/10665/112828/9789241506809_eng.pdf. Accessed 2024 Mar 10.

37. Marbin D, Gutwinski S, Schreiter S, Heinz A. Perspectives in poverty and mental health. Front Public Health. 2022;4(10):975482. https://doi.org/10.3389/fpubh.2022.975482.

38. Miller KE, Rasmussen A. War experiences, daily stressors and mental health five years on. Intervention. 2014;12(4):33–42.

39. Jalabi R. Lebanon devalues official exchange rate by 90%. 2023 Feb 2023. Available from: https://www.ft.com/content/f37617e1-098b-459f-9502-50ffb50c6c0c. Accessed 2024 Mar 10.

40. Al Jazeera. How much do basic necessities cost in Lebanon? 2021. Available from: https://www.aljazeera.com/news/2021/4/12/infographic-how-much-do-everyday-items-costs-in-lebanon Accessed 2024 Mar 10.

41. United Nations. UN News. Around 2 million facing food insecurity across Lebanon | UN News. 2023. Available from: https://news.un.org/en/story/2023/01/1132642 Accessed 2024 Mar 10.

42. Reinders S, Dekker M, Falisse J-B. Inequalities in higher education in low- and middle-income countries: a scoping review of the literature. Dev Policy Rev. 2021;39:865–89. https://doi.org/10.1111/dpr.12535.

43. American University of Beirut Mental Health Council. The AUB-AUBMC Council for Mental Health Needs' Assessment Report June 2019 [not published] (2019 Jun). Accessed 10 Mar 2024.

44. Secor SP, Limke-McLean A, Wright RW. Whose support matters? Support of friends (but not family) may predict affect and wellbeing of adults faced with negative life events. J Relatsh Res. 2017;8:e10. https://doi.org/10.1017/jrr.2017.10.

45. Wrzus C, Zimmermann J, Mund M, Neyer FJ. Friendships in young and middle adulthood: normative patterns and personality differences. In: Hojjat M, Moyer A, editors. The psychology of friendship. Oxford University Press; 2016. p. 21–35.

46. Yavuz Güler Ç, Çakmak I, Bayraktar E. Never walk alone on the way: friendships of emerging adults. Pers Relat. 2022;29(4):811–39. https://doi.org/10.1111/pere.12455.

47. Farhood LF, Dimassi H. Prevalence and predictors for post-traumatic stress disorder, depression and general health in a population from six villages in South Lebanon. Soc Psychiatry Psychiatr Epidemiol. 2012;47(4):639–49. https://doi.org/10.1007/s00127-011-0368-6.

48. Elbejjani M, Mansour S, Hammoud RA, Ziade C, Assi B, Assi A, et al. Mental health during the COVID-19 pandemic and first lockdown in Lebanon: risk factors and daily life difficulties in a multiple-crises setting. PLoS ONE. 2024;19(2):e0297670. https://doi.org/10.1371/journal.pone.0297670.

49. Elsayed NM, Puffer ES, Sikkema KJ. The ecology of resilience: predictors of psychological health in youth in Lebanon. Community Psychol Glob Perspect. 2018;4(2):136–49. https://doi.org/10.1285/i24212113v4i2p136.

50. Bergkvist L, Rossiter JR. The predictive validity of multiple-item versus single-item measures of the same constructs. J Mark Res. 2007;44(2):175–84. https://doi.org/10.1509/jmkr.44.2.175.

Publisher's Note