Archives of Public Health

RESEARCH Open Access

Mediating effect of intolerance of uncertainty between feeling of unsafety and depression/well-being among a sample of Lebanese adults

Melyssa Assaf[1], Diana Malaeb[2], Fouad Sakr[3], Mariam Dabbous[3], Feten Fekih-Romdhane[4,5], Souheil Hallit[6,7,8*] and Sahar Obeid[9]

Abstract

Background Eastern Mediterranean countries, particularly Lebanon, have seen a significant rise in mental disorders, primarily driven by ongoing economic instability, political unrest, and regional conflicts. These conditions fuel feelings of unsafety, which are linked to lower psychological well-being and increased depressive symptoms. Unsafe circumstances inflate apprehension and uncertainty, leaving individuals unable to foresee a stable, secure tomorrow and often trapped in an anticipatory negative thinking state. Therefore, this study posits that in unsafe environments, Intolerance of Uncertainty (IU) may mediate the relationships between the feeling of unsafety and depression/well-being and aims to test this hypothesis among a sample of adults from Lebanon, a frequently crisis-ridden country.

Methods A one-time-point online survey was conducted among Lebanese adults from the general population ($N = 905$; mean age = 27.38 (SD: 9.28); 60% females), recruited anonymously via snowball sampling. The questionnaire included socio-demographic variables and the following Arabic validated scales: Feeling of Unsafety Scale– Arabic (FUSA), World Health Organization Well-Being Index (WHO-5), Patient Health Questionnaire-9 (PHQ-9), and Intolerance of Uncertainty Scale (IUS-12). Statistical analysis was performed using SPSS v.27 with mediation analysis via PROCESS MACRO v3.4 Model 4.

Results After adjusting for potential confounders, mediation analysis showed that both prospective and inhibitory anxiety fully mediated the association between the feeling of unsafety and depression and partially mediated the association between the feeling of unsafety and well-being. Higher feeling of unsafety was significantly associated with higher prospective and inhibitory anxiety (Beta = 0.32; $p < 0.001$; 95% CI 0.27; 0.37 and Beta = 0.19; $p < 0.001$; 95% CI 0.15; 0.23 respectively), which in turn were significantly associated with higher depression (Beta = 0.42; $p < 0.001$; 95% CI 0.35; 0.48 and Beta = 0.62; $p < 0.001$; 95% CI 0.54; 0.70 respectively) and lower well-being (Beta = −0.39;

Feten Fekih-Romdhane, Souheil Hallit and Sahar Obeid are last co-authors.

*Correspondence:
Souheil Hallit
souheilhallit@usek.edu.lb

Full list of author information is available at the end of the article

$p < 0.001$; 95% CI -0.44; -0.33 and Beta = −0.39; $p < 0.001$; 95% CI -0.47; -0.32 respectively). It is of note that while higher feeling of unsafety did not show a direct association with higher depression (Beta = −0.03; $p = 0.187$; 95% CI -0.09; 0.02 and Beta = -0.02; $p = 0.399$; 95% CI -0.07; 0.03 respectively), it was significantly and directly associated with lower well-being (Beta = −0.07; $p < 0.01$; 95% CI -0.12; -0.03 and Beta = −0.12; $p < 0.001$; 95% CI -0.17; -0.07 respectively).

Conclusion The hypothesis that IU mediates the relationships between the feeling of unsafety and depression/well-being is confirmed. This finding highlights a key target for interventions. Psychotherapeutic and public mental health initiatives could enhance psychological well-being by dedicating efforts to promoting uncertainty tolerance, particularly in vulnerable populations facing unstable settings.

Keywords Feeling of unsafety, Intolerance of uncertainty, Depression, Well-being, Lebanon

Text box 1. Contributions to the literature

- While unsafe environments (e.g., war, political instability, economic collapse) are linked to poor mental health, the mechanisms underlying this association remain underexplored.
- This study aimed to address this gap by investigating the role of intolerance of uncertainty (IU) in explaining how perceived unsafety contributes to depression and reduced well-being.
- It is among the first to identify IU as a mediator in this relationship, highlighting a key target for interventions.
- The findings suggest that promoting tolerance to uncertainty might be particularly valuable for supporting mental health in crisis-ridden countries such as Lebanon.

Introduction

Over the past years, Arab countries have faced a growing burden of mental disorders. Indeed, in the Eastern Mediterranean countries, mental disorder rates exceeded the expected values, with depression being among the main contributors to the burden, followed by anxiety disorders [1]. This increase may stem from ongoing economic instabilities, political unrest, and the occurrences of long-standing conflicts, wars, and violence in these countries, which can craft fertile grounds for the development of mental conditions, placing significant strain on already fragile mental healthcare systems [1, 2].

The relationship between the feeling of unsafety and depression/well-being

Economic instability, political unrest, conflicts, and wars often lead to adverse consequences such as low income and poverty, job loss, inability to meet basic needs, food insecurity [3], public protests and strikes, distrust in leadership, corruption, political assassination [4], increased crime and theft, physical harm, destruction of homes and infrastructure, and forced displacements [5], generating a significant sense of unsafety among individuals.

Such a climate of insecurity can significantly impact social engagement, as individuals may limit their time spent outdoors, reducing their ability to cultivate ties with others who may provide informational or emotional support [6]. Safety concerns may also lower outdoor physical activity levels and access to green spaces as people adopt more precautionary behaviors [7]. Such an environment can also reduce educational and occupational outcomes [8]. All of these effects of unsafety will ultimately erode life satisfaction.

Indeed, studies have shown that feeling unsafe correlated with lower mental well-being [9] and increased depressive symptoms [10]. For instance, a meta-analysis estimated that the prevalence of depression in non-help-seeking Arabic-speaking refugees in Germany is 38%, and another study found that problems with sleep and energy loss were the most prevalent depressive symptoms reported by Arabic refugees in this country [11]. Similarly, a high prevalence of major depressive disorder was detected, alongside elevated rates of suicidal ideation and self-harm intentions among individuals exposed to the 2023 Sudan army conflict [12]. Among Palestinians, war-related quality of life was associated with depressive symptoms and hopelessness [13]. In Taliban-ruled Afghanistan, a high prevalence of depression, suicidal thoughts, and decreased quality of life was reported among Afghan women [14, 15]. Findings from eleven low-middle-income countries across Asia and Africa indicated that lack of environmental safety negatively impacted subjective well-being among women, altering perceived happiness and life satisfaction [16].

This body of literature highlights the profound impact that perceptions of unsafety have on psychological well-being, emphasizing the importance of intervention programs aiming to reduce depression and enhance mental health quality within vulnerable populations.

Intolerance of uncertainty as a possible mediator between the feeling of unsafety and depression/well-being

Unsafe circumstances inflate apprehension and uncertainty, causing individuals to worry about various aspects of their lives, often triggering a "What if" mindset that can be unbearable. The highly related concept—Intolerance of Uncertainty (IU)—emerged in the early 1990s and was further developed into a transdiagnostic risk factor in multiple forms of anxiety disorders [17]. Although there is no single definition for the notion of IU, it denotes, at its core, fear of the unknown [18]. Carleton

et al. structured IU into two components: *prospective anxiety*, which involves anxiety in anticipation of uncertainty, and *inhibitory anxiety*, which relates to avoidance or inaction when facing uncertain situations [19].

Research has shown that feelings of unsafety are associated with heightened uncertainty, intolerance of uncertainty, and increased anxiety. For example, in a Lebanese study conducted during a period of socio-political unrest, around 80% of the sample were highly intolerant to the uncertainty climate [20]. An epidemiological survey of refugees from Syria, Afghanistan, and Iraq in Greece revealed that these individuals overwhelmingly reported experiencing uncertainty and lack of control over their current situation and future, and depending on study sites, between 73% and 100% of the refugees grappled with anxiety disorders [21].

There is evidence that anxiety symptoms or disorders most often precede and perhaps are a conduit to depressive symptoms or disorders [22]. Furthermore, strong positive associations were observed between intolerance of uncertainty and depressive symptoms during the COVID-19 pandemic in New York [23]. A study during the earthquakes in Türkiye found that intolerance to uncertainty predicted lower subjective happiness [24].

The stress-vulnerability model provides a theoretical framework for understanding the relationship between environmental stressors and the development of psychopathology. It proposes an association between a latent vulnerability factor (e.g., intolerance to uncertainty) that interacts with a stressor (e.g., unsafe circumstances) to contribute to adverse mental health outcomes (e.g., depression, reduced well-being) [25]. Despite the available data on the association between the feeling of unsafety and IU on the one hand [20, 21] and the association between IU and depression/well-being on the other hand [22–24], there is a scarcity of studies testing the possibility of a mediating effect of IU in the association between perceived unsafety and depression/well-being.

Based on the empirical findings and the theoretical framework, it can be hypothesized that IU could serve as an intermediate process in the associations between the feeling of unsafety and depression/well-being, highlighting its potential role in understanding the pathways toward adverse mental health outcomes in the context of unsafe environments.

The present study

Since 2019, Lebanon, a small Mediterranean country, has experienced an unrelenting economic collapse, with the Lebanese Pound losing nearly 90% of its value, leading to acute shortages in essential goods, medicine, fuel, and electricity. Consequently, large-scale protests erupted on October 17, 2019, in response to the government's failure to address the economic crisis. The number of stolen cars, theft crimes, and murders significantly increased [26]. This financial crisis was soon compounded by the COVID-19 pandemic, which further strained the country's healthcare resources, intensified economic hardships, and introduced life-threatening health risks, along with widespread social isolation, quarantine measures, and disruptions in daily life, deepening the population challenges. Amid these adversities, Lebanon experienced the Beirut port explosion on August 4, 2020, which ranked as the third most devastating explosion of all time after the Hiroshima and Nagasaki bombings. In October 2021, the Lebanese army announced the arrest of approximately 486 individuals for involvement in a range of offenses, including narcotics trafficking, theft, smuggling, illegal possession of weapons, contraband, and driving vehicles without legal documentation [27].This series of crises continued with two earthquakes in February 2023, which shook the nation and forced many to evacuate their homes in terror. More recently, the October 7, 2023, Israel-Gaza war has immersed the Lebanese public in distressing media coverage of regional violence [2, 28, 29]. Lately, on September 17, 2024, the Israel-Hezbollah war started; pagers intended for use by Hezbollah exploded throughout Lebanon and Syria, causing deaths and injuries [30]. These cascading adversities have heightened feelings of unsafety, fostering widespread apprehension and deep uncertainty about the future [31, 32].

The psychological toll of this climate of insecurity and uncertainty has been profound, with evidence highlighting the deteriorating mental health of Lebanon's population. Recent studies on adults' mental health in Lebanon, amidst cumulative adversities, reported high levels of psychological distress, depression, anxiety, post-traumatic stress disorder (PTSD), suicidality, and cognitive impairment [33, 34], with over 63% of Lebanese young adults expressing high dissatisfaction with their circumstances [35].

Our study aims to assess the mediating role of intolerance of uncertainty between feeling of unsafety and depression/well-being among a sample of Lebanese adults from the general population. In this context, Lebanon presents an appropriate setting to test the hypothesis that IU mediates these associations, with higher feeling of unsafety contributing to greater IU (both prospective and inhibitory anxiety), which in turn leads to the development or exacerbation of depressive symptoms and reduces well-being.

By exploring mechanisms in the relationships between feelings of unsafety and depression/well-being, this study aims to contribute to existing knowledge by identifying potential intervention paths through mediating factors to reduce mental health issues within a frequently crisis-ridden society such as Lebanon.

Methods

Study population and data collection

The study was conducted between August and September 2024 and included 905 participants who met the following eligibility criteria: residents and citizens of Lebanon and aged 18 years or older. The mean age was 27.38 years (SD = 9.28), with 60% of the participants identifying as female. The data were collected via a survey, developed with Google Forms, and distributed through social media platforms. Recruitment employed the snowball sampling technique, starting with the research team sending a Google Form link to the survey to potential participants, who were encouraged to share the link with other eligible individuals within their network. Snowball sampling through online dissemination of the surveys was employed to facilitate recruitment and data collection via remote referral, as conducting research in conflict environments is challenging due to instability, security concerns, and prevalent attitudes of distrust and suspicion. Given the context of heightened instability and ongoing crises and the potentially sensitive nature of the topic, introductions through trusted social networks, which are at the core of this method, can help individuals overcome fear and mistrust, encouraging participation [36]. The survey was conducted anonymously, and participants provided digital informed consent before accessing the questionnaire detailed below. Participation was voluntary, with no compensation. Completing the survey was expected to take approximately 20 min.

Minimal sample size calculation

To detect the mediated effect, a sample size of 411 individuals is required, calculated using the formula suggested by Fritz and MacKinnon [37]. The formula is given as $n = \frac{L}{f^2} + k + 1$, where n is the minimal sample size. In this context, L is set to 7.85, which applies for a one-predictor ordinary least squares regression with a Type I error rate (α) of 0.05 and a power of 0.80. The value of f, representing a small effect size, is 0.14. The value of k is 9, which denotes the number of predictors in the regression equation.

Questionnaire

The survey, developed in Arabic, the official language in Lebanon, began with an overview of the study and an online consent checkpoint confirming voluntary participation and assuring participants of the confidentiality and anonymity of their responses. It collected socio-demographic data, including age, sex, marital status, and the Household Crowding Index (HCI), which reflects socioeconomic status (SES) and calculated by dividing the number of persons in the house by the number of rooms (excluding the kitchen and bathrooms). A higher HCI score indicates a lower SES [38]. Information was also gathered regarding participants' smoking, alcohol, cannabis use, and psychological problems, alongside four self-administered scales, outlined below.

The *Feeling of Unsafety Scale– Arabic (FUSA)* [31], the validated Arabic version of the Elders Feelings of Unsafety (EFU) scale [39], comprises eight items rated on a 5-point scale, ranging from 1 (feeling completely safe) to 5 (feeling completely unsafe). Higher scores reflect a greater sense of unsafety (Cronbach's α in this study = 0.93).

The *World Health Organization Well-Being Index (WHO-5)* [40], validated in six Arab countries [41], assesses subjective psychological well-being. It consists of five positively phrased items scored on a five-point Likert scale from 0 (At no time) to 5 (All of the time), based on how respondents felt over the past two-week period. Total scores range from 0 to 25, which can be multiplied by 4 to yield percentage scores ranging from 0 (worst possible mental well-being) to 100 (best possible mental well-being) (Cronbach's α in this study = 0.94).

The *Patient Health Questionnaire-9 (PHQ-9)* [42], validated in Arabic [43], scores each of the nine DSM-IV diagnostic criteria for major depressive disorder (MDD), including mood, interest, appetite, sleep, motor function, energy, self-perception, concentration, and suicidal ideation, on a 4-point Likert scale ranging from 0 (Not at all) to 3 (Nearly every day), based on the frequency of symptoms experienced over the past two weeks. Total scores range from 0 to 27, with higher scores indicating more severe levels of depression (Cronbach's α in this study = 0.92).

The *Intolerance of Uncertainty Scale (IUS-12)* [19], a shortened version of the IUS-27, validated in Arabic [32], consists of 12 items scored on a Likert scale from 1 (Not at all characteristic of me) to 5 (Very characteristic of me). This scale evaluates one's tendency to find uncertainty as upsetting and distressing. It includes two subscales: Prospective Anxiety and Inhibitory Anxiety. The Prospective Anxiety subscale assesses the individual's desire for predictability and tendency to actively information-seeking to reduce future uncertainties. The Inhibitory Anxiety subscale evaluates behavioral inhibition or avoidance when confronted with uncertainty. Subscale scores range from 7 to 35 for Prospective Anxiety and 5–25 for Inhibitory Anxiety, with higher scores indicating greater intolerance of uncertainty (Cronbach's α in this study = 0.90 for both prospective and inhibitory anxiety).

Statistical analysis

The SPSS v.27 software was used for the statistical analysis. The depression and well-being scores were considered normally distributed since the skewness and kurtosis

values were between the −1; +1 interval. The Student's t-test was used to compare a continuous variable and a dichotomous variable and Pearson's test to correlate two continuous variables. The mediation analysis was performed using PROCESS MACRO (an SPSS add-on) v3.4 Model 4, with the number of bootstrap samples set at 5000 and a 95% confidence interval. Four routes result from this analysis: pathway A of the independent variable to the mediator, pathway B of the mediator to the dependent variable, pathways C and C' indicating the total and direct effects of the independent variable to the dependent variable. We considered the mediation analysis to be significant if the confidence interval did not pass by zero. The selection of covariates (sociodemographic factors, smoking, alcohol use, cannabis use, and psychological problems) for adjustment in the mediation analysis was based on their reported associations with the psychological outcomes (depression and well-being) in previous studies [44–48] to minimize confounding. Covariates entered in the model were those that showed a $p < 0.25$ in the bivariate analysis. For statistical significance, a $p < 0.05$ was opted. For practical significance, effect sizes for comparing means of continuous variables between two groups were reported as Cohen's d. Values within the ranges of 0.20–0.49, 0.50–0.79, and 0.8 + indicated small, moderate, and large effects, respectively. Effect sizes for measuring the strength of the relationship between two continuous variables were reported as Pearson's r. Values of |0.10–0.24|, |0.25–0.39|, and |0.40+| indicated small, moderate, and large effects, respectively [49].

Table 1 Sociodemographic and other characteristics of the sample ($N = 905$)

Variable	*N* (%)
Sex	
Male	362 (40%)
Female	543 (60%)
Marital Status	
Single	804 (88.8%)
Married	101 (11.2%)
Smoking	
No	506 (55.9%)
Yes	399 (44.1%)
Alcohol	
No	784 (86.6%)
Yes	121 (13.4%)
Cannabis	
No	851 (94%)
Yes	54 (6%)
Psychological problems	
No	797 (88.1%)
Yes	108 (11.9%)
	Mean ± SD
Age (years)	27.38 ± 9.28
Household overcrowding index (person/room)	1.01 ± 0.43
Feeling unsafety	26.67 ± 7.49
Well-being	62.06 ± 21.76
Depression	9.41 ± 6.04
Prospective anxiety	19.26 ± 5.92
Inhibitory anxiety	12.84 ± 4.51

Results

Participants characteristics

The total sample consisted of 905 adults with a mean age of 27.38 years (SD = 9.28). Women accounted for a higher proportion (60%) of the sample. The majority were single (88.8%), and a considerable percentage abstained from smoking (55.9%), alcohol consumption (86.6%), and cannabis use (94%). The mean household crowding index was 1.01 (SD = 0.43). Psychological assessments revealed that while most participants reported no psychological issues (88.1%), a minority (11.9%) experienced such problems. The mean scores reported for unsafety feelings, well-being, depression, and prospective and inhibitory anxiety are presented in Table 1.

Bivariate analysis of factors associated with depression and well-being scores

Bivariate analysis results are presented in Tables 2 and 3. Regarding depression, a higher mean PHQ-9 score was observed in married participants compared to single ones (10.70 ± 6.08 vs. 9.25 ± 6.02; $p = 0.023$; Cohen's d = 0.241), in alcohol-consumers compared to non-consumers (11.17 ± 5.91 vs. 9.14 ± 6.02; $p < 0.001$; Cohen's d = 0.339), in cannabis users compared to non-users (13.63 ± 4.67 vs. 9.14 ± 6.02; $p < 0.001$; Cohen's d = 0.754), and in individuals with psychological problems compared to those without (12.95 ± 5.36 vs. 8.93 ± 5.96; $p < 0.001$; Cohen's d = 0.682). Moreover, feelings of unsafety ($r = 0.10$; $p < 0.01$), prospective anxiety ($r = 0.39$; $p < 0.001$), and inhibitory anxiety ($r = 0.47$; $p < 0.001$) were positively associated with depression.

Regarding well-being, a higher mean WHO-5 score was observed in males compared to females (15.96 ± 5.38 vs. 15.22 ± 5.46; $p = 0.043$; Cohen's d = 0.138), in non-cannabis users compared to cannabis users (15.61 ± 5.45 vs. 13.98 ± 5.02; $p = 0.032$; Cohen's d = 0.301), and in individuals without psychological problems compared to those with psychological problems (15.72 ± 5.38 vs. 14.00 ± 5.64; $p = 0.002$; Cohen's d = 0.318). Additionally, feelings of unsafety (r = -0.27; $p < 0.001$), prospective anxiety (r = -0.47; $p < 0.001$), and inhibitory anxiety (r = -0.39; $p < 0.001$) were negatively associated with well-being.

No statistically significant associations were detected between smoking status and the HCI in relation to depression and well-being in this sample.

Table 2 Bivariate analysis of categorical variables associated with depression and well-being

	Depression			Well-being		
Variable	**Mean ± SD**	**p**	**Effect size**	**Mean ± SD**	**p**	**Effect size**
Sex		0.842	0.014		**0.043**	0.138
Male	9.46 ± 5.81			15.96 ± 5.38		
Female	9.38 ± 6.19			15.22 ± 5.46		
Marital Status		**0.023**	0.241		0.084	0.183
Single	9.25 ± 6.02			15.63 ± 5.44		
Married	10.70 ± 6.08			14.63 ± 5.35		
Smoking		0.661	0.029		0.991	0.001
No	9.33 ± 5.86			15.52 ± 5.31		
Yes	9.51 ± 6.27			15.52 ± 5.61		
Alcohol		**< 0.001**	0.339		0.286	0.104
No	9.14 ± 6.02			15.59 ± 5.40		
Yes	11.17 ± 5.91			15.02 ± 5.67		
Cannabis		**< 0.001**	0.754		**0.032**	0.301
No	9.14 ± 6.02			15.61 ± 5.45		
Yes	13.63 ± 4.67			13.98 ± 5.02		
Psychological problems		**< 0.001**	0.682		**0.002**	0.318
No	8.93 ± 5.96			15.72 ± 5.38		
Yes	12.95 ± 5.36			14.00 ± 5.64		

Numbers in bold indicate significant p values

Table 3 Pearson correlation matrix

	1	2	3	4	5	6
1. Depression	1					
2. Well-being	-0.42***	1				
3. Feeling unsafety	0.10**	-0.27***	1			
4. Prospective anxiety	0.39***	-0.47***	0.40***	1		
5. Inhibitory anxiety	0.47***	-0.39***	0.31***	0.77***	1	
6. Age	0.04	-0.04***	-0.02	0.02	0.01	1
7. Household overcrowding index	0.05	0.01	-0.06	-0.05	-0.04	0.17***

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Analysis of mediation

The mediation analysis taking depression as the dependent variable, was adjusted for the following covariates: marital status, alcohol consumption, cannabis, psychological problems, age and the household overcrowding index. Prospective anxiety (indirect effect: Beta = 0.13; Boot SE = 0.02; Boot CI 0.10; 0.17) and inhibitory anxiety (indirect effect: Beta = 0.12; Boot SE = 0.02; Boot CI 0.09; 0.15) fully mediated the association between feeling of unsafety and depression.; higher feeling of unsafety was significantly associated with higher prospective and inhibitory anxiety but not directly associated with depression. Finally, higher prospective and inhibitory anxiety were significantly associated with higher depression (Figs. 1 and 2).

The mediation analysis taking well-being as the dependent variable, was adjusted over the following covariates: marital status, cannabis, psychological problems and sex. Prospective anxiety (indirect effect: Beta = -0.12; Boot SE = 0.02; Boot CI -0.15; -0.09) and inhibitory anxiety (indirect effect: Beta = -0.08; Boot SE = 0.01; Boot CI -0.10; -0.05) partially mediated the association between feeling of unsafety and well-being; greater feeling of unsafety was significantly associated with greater prospective and inhibitory anxiety and directly associated with reduced well-being. Finally, higher prospective and inhibitory anxiety were significantly associated with lower well-being (Figs. 3 and 4).

Discussion

This study investigated the mediating role of intolerance of uncertainty in the associations between the feeling of unsafety and mental health outcomes—specifically, depression and well-being—among a sample of adults from the general population in Lebanon, a country marked by ongoing conflict and political and financial instability. The mediation analysis used two models: one with depression as the dependent variable and the other with well-being. In both models, the two components of IU—prospective anxiety and inhibitory anxiety—were included as mediators. The findings supported the hypothesis that IU mediates these associations, with

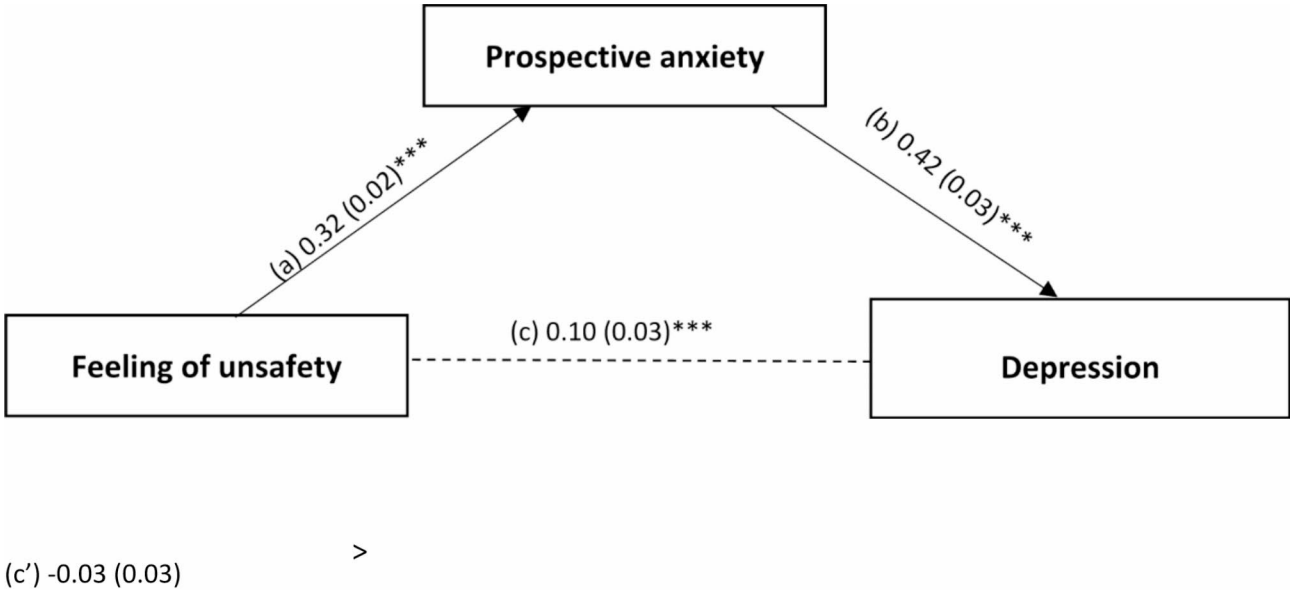

Fig. 1 Mediation model of the association between feeling of unsafety and depression via prospective anxiety. Prospective anxiety fully mediated the Feeling of Unsafety–Depression pathway. (**a**) Relation between feeling of unsafety and prospective anxiety ($R^2 = 0.171$); (**b**) Relation between prospective anxiety and depression ($R^2 = 0.218$); (**c**) Total effect of feeling of unsafety on depression ($R^2 = 0.081$); (**c'**) Direct effect of feeling of unsafety on depression. The numbers represent regression coefficients and their standard errors. ***$p < 0.001$

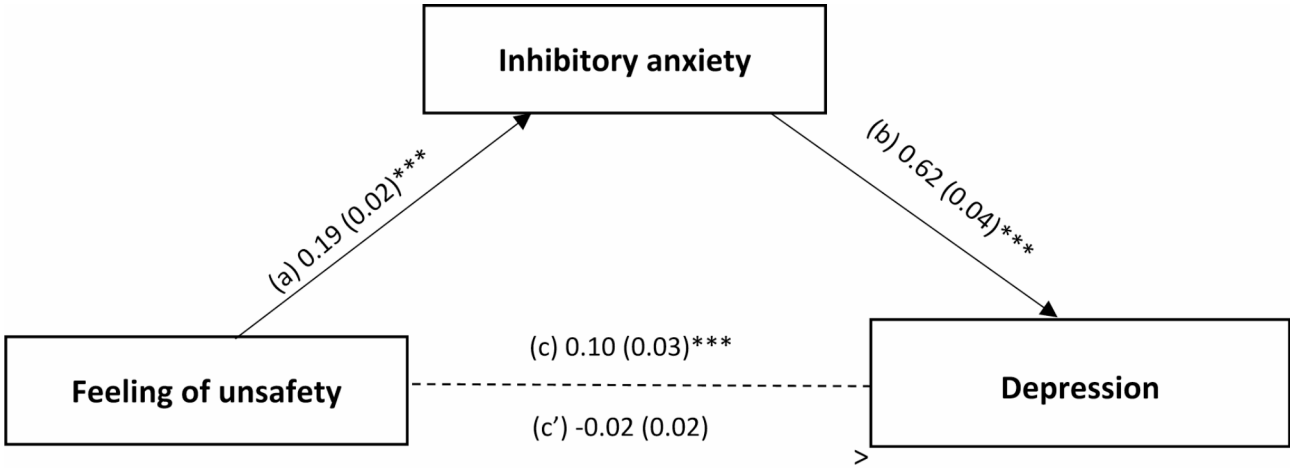

Fig. 2 Mediation model of the association between feeling of unsafety and depression via inhibitory anxiety. Inhibitory anxiety fully mediated the Feeling of Unsafety–Depression pathway. (**a**) Relation between feeling unsafety and inhibitory anxiety ($R^2 = 0.104$); (**b**) Relation between inhibitory anxiety and depression ($R^2 = 0.276$); (**c**) Total effect of feeling of unsafety on depression; (**c'**) Direct effect of feeling of unsafety on depression ($R^2 = 0.081$). The numbers represent regression coefficients and their standard errors. ***$p < 0.001$

higher feeling of unsafety contributing to greater IU (both prospective and inhibitory anxiety), which in turn leads to the development or exacerbation of depressive symptoms and reduces well-being. However, the degree of mediation differed between the models: IU fully mediated the effect of unsafety on depression, while it partially mediated the impact on well-being.

Mediating role of IU in the association between the feeling of unsafety and depression

The bivariate analysis showed that a higher feeling of unsafety was significantly associated with higher depression, aligning with previous studies linking perceived unsafety to depression. Safety needs are personal security, financial security, and health and well-being. In Maslow's theory of *Hierarchy of Needs*, safety needs come second to physiological needs [50]. However, Zheng et al. proposed a revised model placing safety needs first and argued that safety concerns are a primary reason for

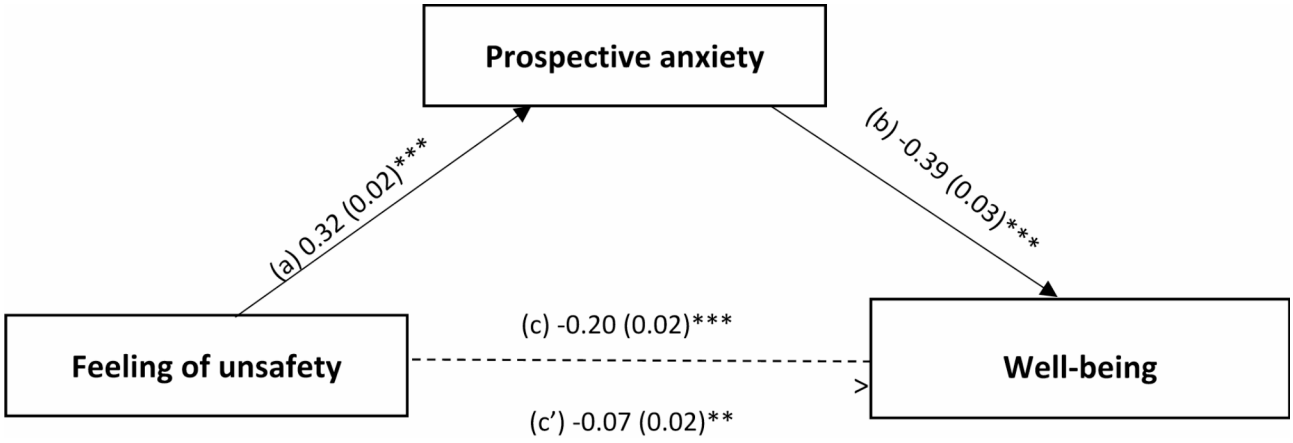

Fig. 3 Mediation model of the association between feeling of unsafety and well-being via prospective anxiety. Prospective anxiety partially mediated the Feeling of Unsafety–Well-being pathway. (**a**) Relation between feeling of unsafety and prospective anxiety ($R^2 = 0.176$); (**b**) Relation between prospective anxiety and well-being ($R^2 = 0.235$); (**c**) Total effect of feeling of unsafety on well-being; (**c'**) Direct effect of feeling of unsafety on well-being ($R^2 = 0.090$). The numbers represent regression coefficients and their standard errors. $^{**}p < 0.01$; $^{***}p < 0.001$

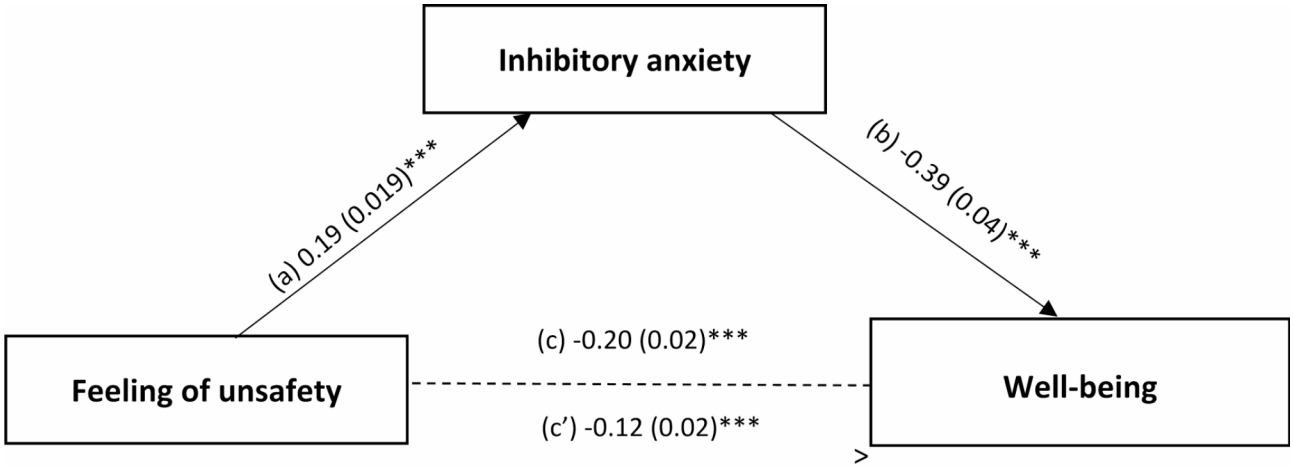

Fig. 4 Mediation model of the association between feeling of unsafety and well-being via inhibitory anxiety. Inhibitory anxiety partially mediated the Feeling of Unsafety–Well-being pathway. (**a**) Relation between feeling unsafety and inhibitory anxiety ($R^2 = 0.105$); (**b**) Relation between inhibitory anxiety and well-being ($R^2 = 0.185$); (**c**) Total effect of feeling of unsafety on well-being; (**c'**) Direct effect of feeling of unsafety on well-being ($R^2 = 0.090$). The numbers represent regression coefficients and their standard errors. $^{***}p < 0.001$

mental disorders such as anxiety, phobia, depression, and PTSD [51]. Research indicates that living in high-crime neighborhoods, financial stress, unemployment, armed conflicts, communal violence, perceived life threats, and unstable living conditions are risk factors for depression [52–54].A recently published 2025 Lebanese study investigating the impact of the aforementioned stressors (economic collapse, COVID-19 pandemic, Beirut port explosion, and political unrest) on adult mental health reported positive associations between exposure to these stressors and the development of adverse psychological outcomes of burnout and symptoms of anxiety and depression, highlighting the gravity of the psychological state of citizens as they navigate through the struggles of an uncertain future [55].

Beyond exploring the bivariate association between feeling of unsafety and depression, we sought to address the possible mediating mechanism that may explain this relationship. The mediation analysis revealed that IU (both prospective and inhibitory anxiety) fully mediated the relationship between feeling of unsafety and depression.

First, we found that higher feeling of unsafety was significantly associated with higher prospective and inhibitory anxiety, suggesting that unsafe environments increase intolerance of uncertainty. In fact, while uncertainty is a natural part of life, it becomes particularly pronounced in unsafe environments. When individuals perceive their environment as dangerous, they may become preoccupied and focused on potential threats and overestimate the likelihood of adverse outcomes,

which increases their prospective anxiety [56, 57]. Indeed, hypervigilance, a state of heightened awareness and watchfulness, was reported to be a consequence of violence [56] and is well documented in veterans where it manifests through safety-seeking behaviors such as planning escape routes, maintaining weapons, and avoiding situations where one could be trapped [58]. Notably, this state of hypervigilance is thought to maintain or exacerbate symptoms in anxiety disorders [59]. Furthermore, the fear of potential dangers can manifest as intrusive thoughts about "what if" scenarios. It has been shown that highly fearful individuals tend to overestimate the risks of fear-relevant encounters, which creates a heightened sense of anxiety about potential future threats [57]. Additionally, the fear associated with perceived unsafety can trigger inhibitory anxiety. For instance, in high-crime areas, fear of victimization often leads to avoidant behaviors, such as steering clear of locations considered unsafe, limiting outdoor activities, and restraining social interactions [60].

Second, our results showed that both prospective and inhibitory anxiety were significantly associated with higher depression, indicating that intolerance of uncertainty contributes to the development or exacerbation of depressive symptoms. This finding corroborates with existing literature proposing that negative-outcome certainty [61], mindfulness [62], and rumination [63], mediate the IU-depression relationship. Cognitively, IU may drive individuals to ruminate as a way to reduce ambiguity, improve understanding, and gain insight. However, rumination causes individuals to remain fixated on their problems and intensifies negative thinking. It enhances recall of negative memories, making problems feel unsolvable and fostering pessimistic predictions, ultimately contributing to symptoms of depression [63]. Physiologically, rumination has been shown to trigger extended activation of the hypothalamic-pituitary-adrenal (HPA) axis. HPA overactivation and increased basal cortisol levels have been associated with avoidance, withdrawal, and depression [64]. Elevated levels of circulating cortisol can provoke long-term damage to the hippocampus, a region with a critical role in mood regulation partly due to its connection to brain regions involved in emotion, like the amygdala and anterior cingulate cortex [65, 66].

While higher feelings of unsafety were initially associated with more depression, this association became non-significant when IU was included as a mediator. This indicates full mediation, which suggests a strong theoretical pathway whereby IU fully explains the effect of feeling of unsafety on depression and provides a focused target for understanding and influencing this relationship.

Mediating role of IU in the association between the feeling of unsafety and well-being

The bivariate analysis showed that higher feeling of unsafety was significantly associated with lower well-being, aligning with previous research linking perceived unsafety to reduced mental well-being [9, 16]. Life satisfaction is a key indicator of subjective well-being and mental health [67]. Following the 2011 Fukushima disaster in Japan, which involved a 9-magnitude earthquake, tsunami, and nuclear meltdown, life happiness dropped significantly among individuals in affected areas [68]. Similarly, since the onset of the Syrian conflict in 2011, life satisfaction among Syrians has declined while negative emotions have risen [69]. Furthermore, an assessment of Lebanon's August 2020 Beirut Port explosion, conducted by United Nations agencies and NGOs, revealed a marked increase in feelings of despair, hopelessness, anger, frustration, agitation, and anxiety across the affected population [70].

The mediation analysis revealed that IU (both prospective and inhibitory anxiety) partially mediated the relationship between the feeling of unsafety and well-being. Similar to the first model, higher feeling of unsafety was significantly associated with higher prospective and inhibitory anxiety, reinforcing the notion that unsafe environments increase intolerance of uncertainty, as discussed above.

Subsequently, higher IU (both prospective and inhibitory anxiety) was associated with lower well-being, indicating that intolerance of uncertainty detracts from overall psychological well-being, consistent with existing findings in the literature [24]. Worry and poor sleep quality can possibly explain this association. Individuals with high IU hold negative beliefs regarding uncertainty, which can lead to increased worry. Notably, individuals with experimentally elevated IU expressed higher levels of worry than those in the lowered IU group, suggesting that IU may play a causal role in the acquisition and maintenance of excessive worry [71]. Excessive worry can raise arousal above a critical threshold, disrupting the natural progression from relaxation to drowsiness and sleep onset. Indeed, it has been reported that the relationship between IU and sleep quality is mediated by worry [72]. Poor sleep quality, in turn, has been associated with a high level of negative psychological well-being [73]. Poor sleep quality results in irritability, low energy, negative mood, poor motivation, confusion, and brain fog [74].

The association between the feeling of unsafety and well-being remained significant after accounting for IU, indicating partial mediation. This implies that unsafety affects well-being through multiple pathways. While heightened IU may explain part of this relationship, other potential factors seem to contribute (e.g., interpersonal

sensitivity [75], social support, resilience [76], and self-efficacy [77]).

Limitations and strengths

Some limitations of the current study should be noted. First, selection bias may have occurred due to the snowball sampling, limiting the sample's representativeness to the broader population, especially since participation required access to a device and the Internet, potentially excluding individuals in rural areas without such access. Additionally, information bias is likely, given the reliance on self-reported measures, which can be influenced by participants' misunderstanding of the items, mood, memory recall, and social desirability. This is particularly relevant for the depression and well-being scales, which may capture respondents' momentary emotional states or subjective perceptions rather than providing solid, objective assessments. Moreover, residual confounding bias remains a concern, as not all factors influencing depression and well-being were accounted for. Further, while the HCI was used as a measure of socioeconomic status, incorporating additional SES indicators (e.g., income, education) would provide a more comprehensive understanding of participants' backgrounds. In addition, the cross-sectional design precludes establishing causality, limiting the ability to determine whether the observed associations are causal or influenced by other unmeasured factors. Lastly, it is important to note that while the study highlighted IU as a mediator, it did not investigate other potential mediators or moderators. Exploring a broader range of psychological mechanisms could provide more comprehensive insights into the relationship between feelings of unsafety and mental health outcomes. This approach would deepen our understanding of how individuals are affected by ongoing crises and could inform the development of more robust intervention strategies. Despite these limitations, a potential strength of this study is that we opted for a larger sample size than the one minimally required to enhance the statistical power and ensure the robustness of our findings. Given the complexities involved in testing the mediating effect of intolerance of uncertainty between feelings of unsafety and depression/wellbeing, a larger sample would help better capture the variability in the relationships between the different variables, account for potential non-response bias and increase the precision of our estimates.

Study implications

The mediation results provide insights into a mechanism through which feelings of unsafety contribute to depression and affect well-being. By identifying the role of mediators that prospective and inhibitory anxiety play in these relationships, this study suggests that screening for intolerance of uncertainty symptoms and targeting IU in interventions could help alleviate depression and promote well-being, especially in individuals experiencing feelings of unsafety. As wars and conflicts are not expected to subside in the near future, increasing tolerance to uncertainty might be particularly valuable for supporting mental health in countries with frequent insecurity, such as Lebanon. Of note, behavioral experiments for intolerance of uncertainty, a recently developed, highly focused treatment for adults with generalized anxiety disorder (GAD), have shown effectiveness in reducing the severity of GAD, intolerance of uncertainty, worry, somatic anxiety, and depression [78]. Community-based programs that offer psychoeducation about IU, its psychological effects, and strategies to manage it, such as mindfulness exercises, problem-solving training [79], and acceptance and commitment techniques [80], could represent a practical approach to promoting mental health, particularly in the challenging context of Lebanon.

Conclusion

In Lebanon, a country grappling with prolonged economic crisis, political instability, and security concerns, perceptions of environmental unsafety are particularly prevalent. This climate of instability has fostered a constant sense of unpredictability, where individuals struggle to foresee a stable, secure tomorrow. As a result, mental health status in Lebanon is becoming alarming and has been referred to as "Tomorrow's silent epidemic" [2]. This study is particularly relevant in this context as it suggests a pathway where feelings of unsafety can lead to heightened prospective and inhibitory anxiety, which, in turn, elevate depression risk and impair well-being. The findings support the hypothesis that intolerance of uncertainty mediates the link between environmental perceptions of unsafety and adverse mental health outcomes, offering theoretical insights into the mechanisms driving depression and poor well-being and actionable recommendations. Individuals living in unsafe conditions may experience depression and reduced psychological wellness because of their intolerance of uncertainty. Thus, targeting IU in interventions may be effective for improving mental health, particularly for those in unsafe settings. However, these findings stem from the context of Lebanon. Future research could replicate this study in other crisis-affected countries to assess the broader applicability of the mediating role of IU in the studied relationships across different backgrounds. Furthermore, future research could benefit from incorporating clinician-administered assessments or objective physiological measures (e.g., cortisol levels) to enhance the robustness of the findings. Additionally, longitudinal studies establishing the causality between the variables would be valuable in complementing this research. Moreover, future

research could explore other potential mediators and investigate the long-term effect of IU-focused interventions on mental health status.

Acknowledgements
The authors would like to thank all participants.

Author contributions
FFR, SO and SH designed the study; MA drafted the manuscript; SH carried out the analysis and interpreted the results; FS, MD and DM collected the data. FFR, SH and SO reviewed the paper for intellectual content; all authors reviewed the final manuscript and gave their consent.

Funding
None.

Data availability
All data generated or analyzed during this study are not publicly available due the restrictions from the ethics committee, but are available upon a reasonable request from the corresponding author (SH).

Declarations

Ethics approval and consent to participate
Ethics approval for this study was obtained from the ethics committee of the School of Pharmacy at the Lebanese International University (2024ERC-024-LIUSOP). Written informed consent was obtained from all subjects; the online submission of the soft copy was considered equivalent to receiving a written informed consent. All methods were performed in accordance with the relevant guidelines and regulations laid down in the Declaration of Helsinki.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Department of Biology, Faculty of Arts and Sciences, Holy Spirit University of Kaslik, P.O. Box 446, Jounieh, Lebanon
[2]College of Pharmacy, Gulf Medical University, Ajman, United Arab Emirates
[3]School of Pharmacy, Lebanese International University, Beirut, Lebanon
[4]The Tunisian Center of Early Intervention in Psychosis, Department of Psychiatry "Ibn Omrane", Razi hospital, Manouba 2010, Tunisia
[5]Faculty of Medicine of Tunis, Tunis El Manar University, Tunis, Tunisia
[6]School of Medicine and Medical Sciences, Holy Spirit University of Kaslik, P.O. Box 446, Jounieh, Lebanon
[7]Department of Psychology, College of Humanities, Effat University, Jeddah 21478, Saudi Arabia
[8]Applied Science Research Center, Applied Science Private University, Amman, Jordan
[9]Department of Psychology and Education, School of Arts and Sciences, Lebanese American University, Jbeil, Lebanon

Received: 12 November 2024 / Accepted: 20 February 2025
Published online: 10 March 2025

References

1. Collaborators GBD, Eastern Mediterranean Region Mental Health. 2015. The Burden of Mental Disorders in the Eastern Mediterranean Region, 1990–2015: Findings from the Global Burden of Disease 2015 Study. International Journal of Public Health 2017, *63*, 25.
2. Farran N. Mental health in Lebanon: tomorrow's silent epidemic. Mental Health Prev. 2021;24:200218.
3. Huang J, Kim Y, Birkenmaier J. Unemployment and household food hardship in the economic recession. Public Health Nutr. 2015;19:511.
4. Tarkhani H, Political Unrest. Factors and impact. In: Leal Filho W, Marisa Azul A, Brandli L, Lange Salvia A, Özuyar PG, Wall T, editors. Peace, justice and strong institutions. Springer International Publishing: Cham,; 2021. pp. 692–702.
5. Jayasinghe S. The 12 dimensions of health impacts of war (the 12-D Framework): A Novel Framework to Conceptualise impacts of war on Social and Environmental Determinants of health and Public health. BMJ Global Health. 2024;9:e014749.
6. Robinette JW, Piazza JR, Stawski RS. Neighborhood safety concerns and daily Well-being: A National diary study. Wellbeing Space Soc. 2021;2:100047.
7. Lenhart CM, Wiemken A, Hanlon A, Perkett M, Patterson F. Perceived neighborhood safety related to physical activity but not recreational Screen-Based sedentary behavior in adolescents. BMC Public Health. 2017;17:722.
8. Hadi F, Lai BS, Llabre MM. Life outcomes influenced by War-Related experiences during the Gulf crisis. Anxiety Stress Coping. 2013;27:156.
9. Valente R, Crescenzi-Lanna L. Feeling unsafe as a source of psychological distress in early adolescence. Soc Sci Med. 2022;293:114643.
10. Pearson AL, Clevenger KA, Horton TH, Gardiner JC, Asana V, Dougherty BV, Pfeiffer KA. Feelings of safety during daytime walking: associations with mental health, physical activity and cardiometabolic health in high vacancy, Low-Income neighborhoods in Detroit, Michigan. Int J Health Geogr. 2021;20:19.
11. Lindheimer N, Karnouk C, Hahn E, Churbaji D, Schilz L, Rayes D, Bajbouj M, Böge K. Exploring the representation of depressive symptoms and the influence of stigma in Arabic-Speaking refugee outpatients. Front Psychiatry. 2020;11:579057.
12. Awad MH, Mohamed RS, Abbas MM, Absam MB. Major depressive disorder: point prevalence, suicidal ideation, and risk factors among Sudanese children and adolescents during Sudan army conflict: A Cross-Sectional study. Discover Mental Health. 2024;4:28.
13. Mahamid F, Veronese G, Bdier D. War-Related quality of life is associated with depressive symptoms and hopelessness among Palestinians: sense of belonging and resilience as mediating variables. Global Mental Health. 2022;9:483.
14. Neyazi A, Padhi BK, Mohammadi AQ, Ahmadi M, Erfan A, Bashiri B, Neyazi M, Ishaqzada M, Noormohammadi M, Griffiths MD, Depression. Anxiety and quality of life of Afghan women living in urban areas under the Taliban government: A Cross-Sectional study. BMJ Open. 2023;13:e071939.
15. Mohammadi AQ, Neyazi A, Habibi D, Mehmood Q, Neyazi M, Griffiths MD. Female education ban by the Taliban: A descriptive survey study on suicidal ideation, mental health, and Health-Related quality of life among girls in Afghanistan. J Public Health (Oxf). 2024;46:e439–47.
16. Ghose B, Etowa J. Relationship between Self-Reported neighborhood safety and happiness and life satisfaction among women in Low-Middle income countries. Safety. 2022;8:31.
17. Gu Y, Gu S, Lei Y, Li H. From uncertainty to anxiety: how uncertainty fuels anxiety in a process mediated by intolerance of uncertainty. Neural Plast. 2020;2020:8866386.
18. Carleton RN. The intolerance of uncertainty construct in the context of anxiety disorders: theoretical and practical perspectives. Expert Rev Neurother. 2012;12:937–47.
19. Carleton RN, Norton MAPJ, Asmundson GJG. Fearing the unknown: A short version of the intolerance of uncertainty scale. J Anxiety Disord. 2007;21:105–17.
20. El Khoury-Malhame M, Bou Malhab S, Chaaya R, Sfeir M, El Khoury S. Coping during Socio-Political uncertainty. Front Psychiatry. 2023;14:1267603.
21. Bjertrup PJ, Bouhenia M, Mayaud P, Perrin C, Ben Farhat J, Blanchet K. A life in waiting: refugees' mental health and narratives of social suffering after European union border closures in March 2016. Soc Sci Med. 2018;215:53–60.
22. Parker G, Wilhelm K, Mitchell P, Austin MP, Roussos J, Gladstone G. The influence of anxiety as a risk to early onset major depression. J Affect Disord. 1999;52:11–7.
23. Rafieian M, Skokauskas N, Cheslack-Postava K, Hoven CW. The association between intolerance of uncertainty and depressive symptoms during COVID-19 in new York, USA. J Affect Disord. 2024;356:628–38.
24. Yılmaz FB, Satıcı SA, Okur S, Kütük H, Aktepe ZG. Intolerance of uncertainty, curiosity, generalized anxiety disorder, and subjective happiness in the time of earthquakes in Türkiye. Current Issues in Personality Psychology 2024.
25. Quaedflieg CWEM, Smeets T. Stress vulnerability models. In: Gellman MD, Turner JR, editors. Encyclopedia of behavioral medicine. New York, NY: Springer; 2013. pp. 1897–900.
26. Tabbara R. L'Orient Today. Statistics show Dramatic Rise in Theft Crimes, Murders since Onset of Financial Crisis. https://today.lorientlejour.com/articl

e/1283208/statistics-show-dramatic-rise-in-theft-crimes-murders-since-onset-of-financial-crisis.html 2021.
27. The Lebanese Army. The Army Command– Directorate of Orientation. Results of Security Measures during the Past Month of October. https://www.lebarmy.gov.lb/en/content/results-security-measures-during-past-month-october 2021.
28. Boukhary RA, Hallit R, Postigo A, Malaeb D, Dabbous M, Sakr F, Khatib SE, Fekih-Romdhane F, Hallit S, Obeid S. The effect of gratitude on death anxiety is fully mediated by optimism in Lebanese adults following the 2023 earthquake. BMC Psychol. 2024;12:2.
29. Fekih-Romdhane F, Helmy M, Alhuwailah A, Shuwiekh HAM, Naser AY, Maalej E, Obeid S, Cheour M, Hallit S. Mediating effect of depression and acute stress between exposure to Israel-Gaza war media coverage and insomnia: A multinational study from five Arab countries. BMC Public Health. 2024;24:1498.
30. Magramo C, Edwards A, Vogt A, Sangal. Kathleen. Pagers Explode Across Lebanon in Attack Targeting Hezbollah Members. https://www.cnn.com/world/live-news/lebanon-pagers-attack-hezbollah/index.html 2024.
31. Obeid S, Bitar Z, Malaeb D, Sakr F, Dabbous M, Hallit S, Fekih-Romdhane F. Psychometric Properties of the Feeling of Unsafety Scale– Arabic (FUSA) in General Population Adults. Preprint available on Research Square. 2024. https://doi.org/10.21203/rs.3.rs-4937928/v1
32. Chaaya R, Hallit R, Postigo A, Malaeb D, Sakr F, Dabbous M, Alhuwailah A, Shuwiekh HAM, Obeid S, Fekih-Romdhane F, et al. Psychometric properties of the Arabic version of the intolerance of uncertainty scale: A multinational study. BMC Psychol. 2024;12:156.
33. Obeid S, Lahoud N, Haddad C, Sacre H, Akel M, Fares K, Salameh P, Hallit S. Factors associated with depression among the Lebanese population: results of a Cross-Sectional study. Perspect Psychiatr Care. 2020;56:956–67.
34. Khoury R, Ghantous Z, Ibrahim R, Ghossoub E, Madaghjian P, Karam E, Karam G, Fares N, Karam S. Anxiety, depression and Post-Traumatic stress disorder in patients on Hemodialysis in the setting of the pandemic, inflation, and the Beirut blast: A Cross-Sectional study. BMC Psychiatry. 2023;23:284.
35. Bou-Hamad I, Hoteit R, Harajli DH, Worries. Life satisfaction, and social Well-being concerns during the COVID-19 pandemic: insights from Lebanon. PLoS ONE. 2021;16:e0254989.
36. Cohen N, Arieli T. Field research in conflict environments: methodological challenges and snowball sampling. J Peace Res. 2011;48:423–35.
37. Fritz MS, MacKinnon DP. Required sample size to detect the mediated effect. Psychol Sci. 2007;18:233.
38. Melki IS, Beydoun HA, Khogali M, Tamim H, Yunis KA. Household crowding index: A correlate of socioeconomic status and Inter-Pregnancy spacing in an urban setting. J Epidemiol Community Health. 2004;58:476–80.
39. De Donder L, De Witte N, Dury S, Buffel T, Brosens D, Smetcoren A, Verté E, Van Regenmortel S, Verté D. Feelings of unsafety among older people: psychometric properties of the EFU-Scale. Procedia - Social Behav Sci. 2015;191:1095–101.
40. World Health Organization. The World Health Organization-Five Well-being Index (WHO-5). https://www.who.int/publications/m/item/WHO-UCN-MSD-MHE-2024.01 2024.
41. Fekih-Romdhane F, Cherif W, Alhuwailah A, Fawaz M, Shuwiekh HAM, Helmy M, Hassan IHM, Naser AY, Zarrouq B, Chebly M et al. Cross-Country Validation of the Arabic Version of the WHO-5 Well-being Index in Non- Clinical Young Adults from Six Arab Countries. https://www.researchsquare.com/article/rs-2988215/v1 2023.
42. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001;16:606–13.
43. Dagher D, Samaha S, Mhanna M, Azzi R, Mina A, Soufia M, Hallit S, Obeid S, Haddad G. Depressive symptoms among a sample of Lebanese adolescents: scale validation and correlates with disordered eating. Arch Pediatr. 2023;30:401–7.
44. Seedat S, Scott KM, Angermeyer MC, Berglund P, Bromet EJ, Brugha TS, Demyttenaere K, de Girolamo G, Haro JM, Jin R, et al. Cross-National associations between gender and mental disorders in the WHO world mental health surveys. Arch Gen Psychiatry. 2009;66:785–95.
45. Zhai X, Tong HHY, Lam CK, Xing A, Sha Y, Luo G, Meng W, Li J, Zhou M, Huang Y, et al. Association and causal mediation between marital status and depression in seven countries. Nat Hum Behav. 2024;8:2392–405.
46. Vera-Villarroel P, Cells-Atenas K, Pavez P, Lillo S, Bello F, Díaz N, López W. Money, age and happiness: association of subjective wellbeing with Socio-Demographic variables. Revista Latinoam De Psicología. 2012;44:155–63.
47. Lev-Ran S, Roerecke M, Le Foll B, George TP, McKenzie K, Rehm J. The association between Cannabis use and depression: A systematic review and Meta-Analysis of longitudinal studies. Psychol Med. 2014;44:797–810.
48. Cuijpers P, Smit F, Aalten P, Batelaan N, Klein A, Salemink E, Spinhoven P, Struijs S, Vonk P, Wiers RW, et al. The associations of common psychological problems with mental disorders among college students. Front Psychiatry. 2021;12:573637.
49. Dunst CJ, Hamby DW. Guide for calculating and interpreting effect sizes and confidence intervals in intellectual and developmental disability research studies. J Intell Dev Disabil. 2012;37:89–99.
50. Maslow AH. A theory of human motivation. Psychol Rev. 1943;50:370–96.
51. Zheng Z, Gu S, Lei Y, Lu S, Wang W, Li Y, Wang F. Safety needs mediate stressful events induced mental disorders. Neural Plast. 2016;2016:8058093.
52. Gepty AA, Hamilton JL, Abramson LY, Alloy LB. The combination of living in high crime neighborhoods and high rumination predicts depressive symptoms among adolescents. J Youth Adolesc. 2019;48:2141–51.
53. Guan N, Guariglia A, Moore P, Xu F, Al-Janabi H. Financial stress and depression in adults: A systematic review. PLoS ONE. 2022;17:e0264041.
54. Anbesaw T, Kassa MA, Yimam W, Kassaw AB, Belete M, Abera A, Abebe G, Yimer N, Melkam M, Ayano G. Factors associated with depression among War-Affected population in Northeast, Ethiopia. BMC Psychiatry. 2024;24:376.
55. Al-Khalil ZM, El Sheikh WG, Lababidi GH, Shehayeb EO, Ghanime PM, Talih FR, Tamim H, Kaafarani BR. Impact of socioeconomic and political stressors on mental health: A Cross-Sectional study on university students in Lebanon. BMC Med Educ. 2025;25:91.
56. Smith NA, Voisin DR, Yang JP, Tung EL. Keeping your guard up: hypervigilance among urban residents affected by community and Police violence. Health Aff. 2019;38:1662.
57. Hengen KM, Alpers GW. What's the risk?? Fearful individuals generally overestimate negative outcomes and they Dread outcomes of specific events. Front Psychol. 2019, *10*.
58. Kimble MO, Fleming K, Bennion KA. Contributors to hypervigilance in a military and civilian sample. J Interpers Violence. 2013;28:1672.
59. Kimble M, Boxwala M, Bean W, Maletsky K, Halper J, Spollen K, Fleming K. The impact of hypervigilance: evidence for a forward feedback loop. J Anxiety Disord. 2014;28:241–5.
60. Borja S, Storer H, De La Cruz PI, Mark Eddy J. Patterns of avoidance behavior in response to fear of victimization in the Mexican context: A latent class analysis. J Interpers Violence. 2024;39:2290–317.
61. Miranda R, Fontes M, Marroquín B. Cognitive Content-Specificity in future expectancies: role of hopelessness and intolerance of uncertainty in depression and GAD symptoms. Behav Res Ther. 2008;46:1151–9.
62. Nekić M, Mamić S. Intolerance of uncertainty and mindfulness as determinants of anxiety and depression in female students. Behav Sci. 2019;9:135.
63. Liao KY, Wei M. Intolerance of uncertainty, depression, and anxiety: the moderating and mediating roles of rumination. J Clin Psychol. 2011;67:1220–39.
64. Compare A, Zarbo C, Shonin E, Gordon WV, Marconi C. Emotional Regulation and Depression: A Potential Mediator between Heart and Mind. Cardiovascular Psychiatry and Neurology 2014, 2014, 324374.
65. James KA, Stromin JI, Steenkamp N, Combrinck MI. Understanding the relationships between physiological and psychosocial stress, cortisol and cognition. Front Endocrinol 2023, 14.
66. Tartt AN, Mariani MB, Hen R, Mann JJ, Boldrini M. Dysregulation of adult hippocampal neuroplasticity in major depression: pathogenesis and therapeutic implications. Mol Psychiatry. 2022;27:2689.
67. Padmanabhanunni A, Pretorius TB, Isaacs SA. Satisfied with life?? The protective function of life? satisfaction in The relationship between perceived stress and negative mental health outcomes. Int J Environ Res Public Health. 2023;20:6777.
68. Rehdanz K, Welsch H, Narita D, Okubo T. Well-being effects of a major natural disaster: the case of Fukushima. J Econ Behav Organ. 2015;116:500–17.
69. Cheung F, Kube A, Tay L, Diener E, Jackson JJ, Lucas RE, Ni MY, Leung GM. The impact of the Syrian conflict on population Well-Being. Nat Commun. 2020;11:3899.
70. Women UN, ABAAD CAREUNESCWA, UNFPA. A Rapid Gender Analysis of the Beirut Port Explosion: An Intersectional Examination. 2020.
71. Ladouceur R, Gosselin P, Dugas MJ. Experimental manipulation of intolerance of uncertainty: A study of a theoretical model of worry. Behav Res Ther. 2000;38:933–41.
72. Lin R, Xie S, Yan Y, Yan W. Intolerance of uncertainty and adolescent sleep quality: the mediating role of worry. Pers Indiv Differ. 2017;108:168–73.

73. Zhai K, Gao X, Wang G. The role of sleep quality in the psychological Well-being of final year undergraduatestudents in China. Int J Environ Res Public Health. 2018;15:2881.
74. Saghir Z, Syeda JN, Muhammad AS, Abdalla THB. The amygdala, sleep debt, sleep deprivation, and the emotion of anger: A possible connection?? Cureus. 2018;10:e2912.
75. Amone-P'Olak K, Elklit A. Interpersonal sensitivity as mediator of the relations between war experiences and mental illness in war-Affected youth in Northern Uganda: findings from the WAYS study. Traumatology. 2018;24:200.
76. Yang C, Xia M, Han M, Liang Y. Social support and resilience as mediators between stress and life satisfaction among people with substance use disorder in China. Front Psychiatry. 2018;9:436.
77. Hong J, Mreydem HW, Ali BTA, Saleh NO, Hammoudi SF, Lee J, Ahn J, Park J, Hong Y, Suh S, et al. Mediation effect of Self-Efficacy and resilience on the psychological Well-being of Lebanese people during the crises of the COVID-19 pandemic and the Beirut explosion. Front Psychiatry. 2022;12:733578.
78. Dugas MJ, Sexton KA, Hebert EA, Bouchard S, Gouin J, Shafran R. Behavioral experiments for intolerance of uncertainty: A randomized clinical trial for adults with generalized anxiety disorder. Behav Ther. 2022;53:1147–60.
79. Miller ML, McGuire JF. Targeting intolerance of uncertainty in treatment: A Meta-Analysis of therapeutic effects, treatment moderators, and underlying mechanisms. J Affect Disord. 2023;341:283–95.
80. Fayazbakhsh E, Mansouri A. Effectiveness of acceptance and commitment therapy on intolerance of uncertainty, experiential avoidance, and symptoms of generalized anxiety disorder in individuals with type II diabetes. Int Archives Health Sci. 2019;6:30.

Publisher's note