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Posttraumatic stress symptoms, alexithymia, and financial distress among adults in Beirut, Lebanon: a cross-sectional study amid overlapping crises

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Abstract

Background

Lebanon has experienced prolonged economic, social, and traumatic crises that may contribute to persistent psychological distress. This study examined the prevalence and interrelationships of probable posttraumatic stress disorder (PTSD), alexithymia, and financial distress among adults living in Beirut.

Methods

A cross-sectional study was conducted between July and December 2023 across all administrative zones of Beirut. A total of 388 adults were recruited using convenience sampling. The mean age was 33 ± 14 years; 62.6% were female, 55.4% were single, 52.1% held a bachelor's degree, and 75% were non-healthcare workers. PTSD was assessed using the PTSD Checklist for DSM-5 (PCL-5), alexithymia using the Toronto Alexithymia Scale (TAS-20), and financial distress using the InCharge Financial Distress/Financial Well-Being (IFDFW) scale.

Results

The mean PTSD score was 29.42 ± 20.59, with a prevalence of probable PTSD was 30.2%. PTSD prevalence differed significantly by Beirut zone ($p = 0.011$), reaching 46% in zone 1. Alexithymia was present in 37.6% of participants and was significantly associated with age, marital status, work industry, and residential zone ($p < 0.05$). High financial distress affected 44.1% of participants and was significantly associated with age, marital status, and zone ($p < 0.05$). PTSD was significantly associated with both alexithymia and financial distress ($p < 0.001$). In multivariable logistic regression, alexithymia showed the strongest independent association with probable PTSD. Compared with individuals with alexithymia, those with possible alexithymia (OR = 0.189; 95% CI: 0.100–0.355) and those without alexithymia (OR = 0.056; 95% CI: 0.027–0.118) had significantly lower odds of PTSD. Average (OR = 0.456; 95% CI: 0.261–0.796) and low financial distress (OR = 0.334; 95% CI: 0.129–0.867) were also associated with reduced PTSD risk.

Conclusion

PTSD, alexithymia, and financial distress are highly prevalent and strongly interconnected in Beirut's population. These findings highlight the urgent need for integrated mental health and socioeconomic interventions to reduce long-term psychological consequences in crisis-affected urban settings.

Introduction

Since 2019, Lebanon has endured multiple overlapping crises, including a severe financial collapse, the Beirut Port Blast, and the COVID-19 pandemic [1]. The Beirut blast, one of the largest non-nuclear explosions in history, resulted in extensive casualties, widespread infrastructural damage, and the displacement of thousands of families. Simultaneously, Lebanon was already experiencing profound economic deterioration, with food inflation reaching 441% by October 2020, further intensifying socioeconomic instability. Prolonged exposure to such cumulative stressors has been associated with long-term psychological consequences, including post-traumatic stress disorder (PTSD), emotional dysregulation, and financial distress [2].

PTSD is a complex disorder that arises after exposure to traumatic events and is prevalent in populations affected by disasters. Alexithymia, the difficulty in identifying and expressing emotions, is closely associated with PTSD and may act both as a risk factor for and a consequence of trauma [3, 4]. Financial distress, including economic hardship and job instability, can worsen chronic stress, intensify PTSD symptoms, and limit access to mental health resources, further contributing to alexithymia [5].

Despite the growing literature on posttraumatic stress disorder, alexithymia, and socioeconomic hardship in Lebanon, these factors have largely been examined separately, and limited evidence has explored how they coexist and interact within populations exposed to prolonged and overlapping crises. Understanding these interrelationships is particularly important in Beirut, where the psychological consequences of the 2020 Port explosion have unfolded alongside sustained economic instability and broader social stressors. Therefore, this study aimed to examine the prevalence and interrelationships of probable PTSD, alexithymia, and financial distress among adults living in Beirut, and to identify sociodemographic, occupational, and exposure-related factors associated with probable PTSD. We hypothesized that greater alexithymia and financial distress would be associated with higher odds of probable PTSD, reflecting the combined influence of emotional vulnerability and socioeconomic adversity on population mental health in a crisis-affected urban setting.

Materials and Methods

Study Design, Setting, and Population

This cross-sectional study was conducted between July and December 2023. A total of 573 individuals were screened for eligibility, of whom 185 were excluded after applying predefined criteria, most commonly due to non-residency in Beirut. Based on World Population Review estimates, Beirut's population in 2023 was approximately 2,421,354 with a minimum required sample size of 385 participants [6].

Participants were recruited using a convenience sampling approach, with voluntary participation and no financial incentives. Eligible participants were adults aged 18 years or older who were residing in Beirut during the study period and who agreed to participate and complete the study questionnaire. Participants were required to provide informed consent before enrollment. Individuals were excluded if

they were not residents of Beirut, declined to complete the questionnaire, reported heavy alcohol consumption, defined as ≥ 8 drinks per week for women or ≥ 15 drinks per week for men, or were currently using antidepressant medications because of their potential influence on emotional and psychological assessments. Participants with incomplete questionnaires were also excluded from the final analysis [7, 8].

Data Collection and Measures

Data were collected using a self-administered questionnaire requiring approximately 15 minutes to complete. The survey comprised five sections, including three previously validated scales available in Arabic and English.

The first section collected sociodemographic data, including age, sex, educational level, employment field, marital status, nationality, residence, alcohol consumption, and history of diagnosed mental disorders. The second section assessed exposure to the Beirut Port explosion, including participants' presence in Beirut at the time of the blast and their location classified according to damage-based zones defined by the Municipality of Beirut in collaboration with UN-Habitat. These zones reflect the spatial distribution of blast impact across the city. Participants who were present in Beirut but located outside the two primary affected zones at the time of the explosion were categorized separately as Zone α.

Posttraumatic stress symptoms were assessed using the PTSD Checklist for DSM-5 (PCL-5), a 20-item self-report measure rated on a 5-point Likert scale (0–4), with total scores ranging from 0 to 80. A cutoff score of 38 was used to indicate probable PTSD. The scale demonstrated excellent internal consistency in the present study (Cronbach's α = 0.965), and validated Arabic version was employed [9–11].

Alexithymia was measured using the 20-item Toronto Alexithymia Scale (TAS-20), with responses rated on a 5-point Likert scale and total scores ranging from 20 to 100. Established cutoffs were used to classify possible and severe alexithymia [12]. The scale showed high internal reliability (Cronbach's α = 0.921), and a validated Arabic version previously tested in Arab populations was utilized [13].

Financial distress and well-being were assessed using the InCharge Financial Distress/Financial Well-Being Scale, an 8-item instrument rated on a 10-point scale, with higher scores indicating better perceived financial well-being [14]. Internal consistency was strong (Cronbach's α = 0.923). The Arabic version was produced using a forward–backward translation procedure by independent professional translators.

Statistical Analysis

The analysis was done using the statistical package for the social sciences (SPSS version 28.0). Descriptive data was reported as mean ± standard deviation for continuous data, and as numbers and percentages for categorical data. We used the Chi-Square test to assess the association between the categorical variables. Kruskal-Wallis test was used to assess the association between a categorical and

a continuous variable. A logistic regression test was done to assess the correlation between PTSD and other categorical variables. A p-value of < 0.05 was considered significant.

Results

Participant's Sociodemographic characteristics

The study sample comprised 388 participants with a mean age of 33 ± 14 years (range 18–74). Most participants were female (62.6%, n = 243), single (55.4%, n = 215), held a bachelor's degree (52.1%, n = 202), and were non-healthcare workers (75%, n = 291) (Table 1).

PTSD Prevalence and Exposure Zone Differences

All 388 included participants completed the PCL-5. The mean PTSD score was 29.42 ± 20.59, and the prevalence of probable PTSD based on the PCL-5 cutoff was 30.2% (n = 117). No significant associations were observed between PTSD and age or other sociodemographic characteristics (Table 2). In contrast, PTSD prevalence differed significantly across Beirut exposure zones (p = 0.011). Zone 1 exhibited the highest proportion of PTSD cases (46%, n = 29), while Zones 2 and α showed lower and comparable prevalences of 27.7% (n = 38) and 26.6% (n = 50), respectively (Table 5).

Prevalence of Alexithymia and Its Association With Sociodemographic Factors and Beirut Blast Exposure

All 388 participants completed the TAS-20 scale. The mean total score was 57.32 ± 15.85, with 37.6% (n = 146) meeting criteria for alexithymia. Alexithymia was significantly associated with age (p = 0.001), with participants classified as alexithymic being younger (mean = 30 ± 11) compared to those with possible (35 ± 14) or no alexithymia (36 ± 15). Significant associations were also observed with marital status (p = 0.025), where divorced participants had the highest prevalence (53.6%, n = 15), and work industry (p = 0.002), with healthcare workers showing the highest prevalence (52.6%, n = 51). No significant associations were found with other sociodemographic characteristics (Table 3). Alexithymia prevalence also varied by Beirut exposure zones (p = 0.012). Zone 1 had the highest proportion of cases (55.6%, n = 35), while Zones 2 and α showed lower and similar prevalence rates of 32.1% (n = 44) and 35.6% (n = 67), respectively (Table 5).

Financial Distress and Well-Being

All 388 participants completed the InCharge Financial Distress/Financial Well-Being (IFDFW) scale. The mean total score was 4.38 ± 2.11, with most participants reporting average financial distress (45.4%, n = 176). Age was significantly associated with financial distress (p = 0.039), with participants experiencing high distress being slightly older (mean = 35 ± 13) than those with average (32 ± 13) or low distress (32 ± 15). Marital status was also significant (p = 0.025), with divorced participants showing the highest prevalence of high distress (71.4%, n = 20). No other sociodemographic characteristics were significantly associated (Table 4). Financial distress also differed by Beirut exposure zones (p = 0.032).

Zone 1 had the highest proportion of participants with high financial distress (58.7%, n = 37), followed by Zone 2 (46.7%, n = 64) and Zone α (37.2%, n = 70) (Table 5).

Associations between PTSD, alexithymia, financial distress and occupational exposure

PTSD was strongly associated with alexithymia and financial distress ($p < 0.001$). PTSD prevalence was highest among alexithymic participants (72.6%) and those with high financial distress (66.7%). Financial distress also increased with alexithymia severity, with 61.6% of alexithymic participants reporting high distress, compared to 38.9% with possible and 29.9% with no alexithymia (Table 6 and 7).

A multivariable binary logistic regression analysis was conducted to examine factors associated with the likelihood of having PTSD. The final model was statistically significant ($\chi^2(4) = 120.253$, $p < 0.001$), indicating that the included predictors reliably distinguished between participants with and without PTSD. The model explained 37.7% of the variance in PTSD status (Nagelkerke $R^2 = 0.377$). The Hosmer–Lemeshow test indicated good model fit ($\chi^2 = 3.202$, df = 6, $p = 0.783$). The final model correctly classified 79.4% of cases, with a sensitivity of 64.1% and a specificity of 86.0% (Table 8).

Alexithymia showed the strongest association with PTSD (Wald = 66.267, $p < 0.001$). Compared with individuals with alexithymia (reference group), those with possible alexithymia had significantly lower odds of PTSD (B = –1.667, $p < 0.001$, OR = 0.189, 95% CI: 0.100–0.355), as did those without alexithymia (B = –2.878, $p < 0.001$, OR = 0.056, 95% CI: 0.027–0.118).

Financial distress was also significantly associated with PTSD (Wald = 10.345, $p = 0.006$). Relative to participants experiencing high financial distress, those with average financial distress (B = –0.786, $p = 0.006$, OR = 0.456, 95% CI: 0.261–0.796) and those with low financial distress (B = –1.097, $p = 0.024$, OR = 0.334, 95% CI: 0.129–0.867) had significantly lower odds of PTSD (Table 8).

Working in the healthcare sector was independently associated with higher odds of PTSD (B = 0.896, $p = 0.005$, OR = 2.45, 95% CI: 1.30–4.61). The zone in which participants were present during the blast was not retained in the final model and was not a significant predictor of PTSD (Table 8).

Discussion

Post-traumatic stress disorder (PTSD) was identified in 30.2% of participants, with a mean symptom score of 29.42. No significant associations were observed between PTSD prevalence and age or other sociodemographic variables. These results provide context-specific insight into PTSD burden among the Lebanese population following the recent explosion and are consistent with evidence from settings marked by chronic, cumulative exposure to adversity rather than isolated traumatic events [15]. At the global level, PTSD prevalence demonstrates substantial variability. The World Health Organization estimates a lifetime prevalence of approximately 3.9% [16], while about 5.6% of trauma-exposed individuals develop the disorder [17]. Recovery trajectories are equally heterogeneous, with up to 40% of affected individuals showing improvement within one year [17]. Across the Arab region, reported

prevalence ranges from 8.5% to 35% among school-aged children and from 29.3% to 32.5% among adolescents with psychological or learning difficulties, with consistently higher rates observed in conflict-affected settings [18].

Within Lebanon, PTSD prevalence estimates are highly heterogeneous, ranging from 2% to 98%, largely reflecting differences in study populations and methodological approaches [19]. Reported rates include 8.5–14.7% during the civil war, 3.7% among adolescents with sensory disabilities, 21.6% following the "Grapes of Wrath" war, and 15.4–35.0% after the 2006 July War [20]. Notably, a prospective epidemiological study reported that 26% of Lebanese youth met PTSD criteria following exposure to the 2006 conflict. More recent evidence indicates particularly elevated prevalence among healthcare workers during the COVID-19 pandemic (35%) [21], internally displaced individuals following the 2024 war (64.8%) [22], and victims of traumatic events, among whom prevalence reached 75.8%, with nearly half classified as severe [23].

PTSD in Lebanon appears to result from overlapping crises rather than single events [15]. Recent traumas often act as a "tipping point," with limited time to recover, and symptoms persist even among Lebanese abroad [24, 25].

This study highlights notable associations between alexithymia and several sociodemographic factors. The mean TAS-20 score of 57.32 indicates a moderate presence of alexithymic traits, with 37.6% of participants meeting the criteria, a rate higher than previously reported in Lebanon (20.8%) [4] and in Germany (9.95%) [26], Finland (13%) [27], and Japan (7.8%) [28], suggesting a potential contextual influence of recent traumatic events in Lebanon. Consistent with prior research, younger participants exhibited higher alexithymia levels, possibly reflecting age-related improvements in emotion regulation and attention shifting [29, 30]. Divorced individuals also showed higher prevalence, reinforcing the interpersonal impact of alexithymia, which may contribute to relational difficulties [31].

Healthcare professionals demonstrated particularly elevated alexithymia, likely linked to the emotional demands of clinical work, especially in post-disaster settings, where emotional suppression may serve as a coping mechanism. Reduced empathy in individuals with alexithymia may exacerbate this effect, highlighting the need for targeted mental health interventions for healthcare staff [32, 33]. No significant associations were found with gender, education level, or current mental health diagnoses, suggesting these factors may be less influential or require further study. Future research could employ qualitative methods to explore subtle influences and examine high-risk subgroups.

Research consistently demonstrates a strong link between PTSD and alexithymia. Meta-analytic evidence indicates that alexithymia is associated with greater PTSD severity, particularly in the numbing and hyperarousal symptom clusters [34, 35]. Alexithymia may function as either a pre-existing vulnerability or a coping mechanism that develops in response to trauma, enabling suppression of overwhelming emotions [36]. The significant association observed in our study aligns with this evidence and underscores the relevance of assessing alexithymia in trauma-affected populations. High alexithymic traits hinder emotional awareness and the understanding of mental states, which can

compromise emotion regulation and reduce responsiveness to psychotherapy [37, 38]. (Ogrodniczuk et al., 2011; Putica et al., 2024). Notably, improvements in alexithymia have been linked to better outcomes in PTSD, dissociation, and interpersonal functioning, suggesting that interventions targeting emotional awareness may enhance trauma therapy efficacy [39].

Alexithymia is closely associated with neuroendocrine dysregulation, particularly within the hypothalamic-pituitary-adrenal (HPA) axis, the body's primary stress response system. Individuals with alexithymic traits often exhibit blunted cortisol responses to stress, reflecting a physiological form of emotional dampening that may prolong stress and hinder recovery [34]. Neuroimaging studies further reveal reduced activity in the anterior cingulate cortex and anterior insula, regions critical for emotional awareness and interoception, which are impaired in high-alexithymia individuals [39]. Experimental evidence also suggests that alexithymia intensifies intrusive memory formation and diminishes emotional recognition, highlighting a mechanism through which it may maintain PTSD symptoms. These neurobiological findings provide a foundation for understanding the co-occurrence of alexithymia and trauma-related disorders, emphasizing the need for interventions targeting both emotional processing and underlying physiological pathways.

Financial well-being strongly influences mental health, especially amid prolonged crises. Human Rights Watch reported a median household income of US$122 in Lebanon, with 70% of households struggling to meet basic needs and 22% facing food insecurity. Following the Beirut blast, mental health demand rose, compounded by unemployment above 30% and hyperinflation of essential goods. In our sample, older and divorced participants experienced higher financial distress, consistent with evidence linking economic strain to rising divorce rates and vulnerability among these groups [15, 40].

Stable employment and financial security have been identified as protective factors against PTSD, with full-time employees exhibiting lower symptom severity compared to part-time or unemployed individuals [41]. Conversely, financial instability markedly increases risk: women who lost their jobs during the pandemic were nearly five times more likely to show probable PTSD, and unemployed participants screening positive for probable PTSD faced higher odds of comorbid conditions[42–44]. Economic strain can exacerbate depressive symptoms in PTSD, underscoring the importance of integrating financial support with mental health interventions [42–44].

Structural inequities and prolonged economic hardship further amplify psychological vulnerability. Poverty and disaster-related financial losses have cumulative impacts on parents and children and are associated with both higher prevalence and greater severity of PTSD [45–47]. In Lebanon, the Beirut blast, compounded by an ongoing economic crisis, intensified PTSD symptoms among students and residents, with financial difficulties correlating with greater symptom severity [48, 49]. Lower income levels consistently predict increased PTSD rates following traumatic events [50–53, 45].

Our findings highlight a significant association between alexithymia and financial distress. Reduced emotional awareness and expression can impair coping with economic challenges, increasing vulnerability to PTSD [27, 54, 55]. Alexithymia and financial distress are major contributing factors

leading to the development of PTSD among Beirut citizens in Lebanon. According to Beirut Blast Mental Health Study, Participants who had a high financial distress were at three times higher risk to develop PTSD in comparison to those financially stable [43, 54].Financial crisis, unemployment, and inflation lead to the exacerbation of trauma and reduced coping (Frasquilho et al., 2015;). Alexithymia showed as the highest predictor of PTSD, increasing the likelihood of PTSD to fourteen times [3, 34, 36, 37]. Due to the consecutive crises happening, people suffering from Alexithymia aren't able to process the emotional distress they are passing through, which in turn leads to chronic manifestations of PTSD [36, 41]. The coexistence of Alexithymia and financial distress increased the susceptibility of PTSD, reflecting a psychological and socioeconomic damage to the Lebanese population [4]. These findings emphasize the urgent need for interventions that target emotional stabilization and economic stability to adjust the long term impact of the trauma [34, 44].

In the multivariable analysis, employment in the healthcare sector was independently associated with a higher likelihood of PTSD. This finding is in line with a substantial body of literature reporting elevated PTSD rates among healthcare professionals working in high-pressure environments, particularly during mass casualty incidents and large-scale disasters [15, 57, 58]. In the aftermath of the Beirut blast, healthcare workers were confronted not only with the immediate psychological impact of the explosion but also with exceptional clinical workloads, extended working hours, and repeated exposure to severely injured and deceased patients. Such sustained and cumulative stressors are known to increase vulnerability to trauma-related disorders [57, 59].

Importantly, the higher prevalence of alexithymia observed among healthcare workers in our sample may have further contributed to this increased risk. Difficulties in identifying and expressing emotions may impair adaptive coping and emotional processing following trauma, thereby intensifying PTSD symptoms [60]. The coexistence of occupational stress, emotional suppression, and limited psychological recovery time likely places healthcare professionals at particular risk in post-disaster settings. Together, these findings underscore the need for systematic mental health screening, early psychological support, and institutional interventions tailored specifically to healthcare workers following large-scale traumatic events.

This study has several notable strengths. It addresses an important and underexplored topic by examining the interrelationship between PTSD, alexithymia, and financial distress in a population exposed to overlapping and prolonged crises, providing context-specific evidence from Beirut. The use of well-validated and reliable instruments (PCL-5, TAS-20, and IFDFW), available in Arabic and English, enhances the methodological rigor and cultural appropriateness of the findings. The relatively large sample size and inclusion of participants from multiple Beirut exposure zones allowed for meaningful comparisons and strengthened the robustness of the statistical analyses. Additionally, the use of multivariable logistic regression enabled identification of independent predictors of PTSD while controlling for potential confounders.

However, several limitations should be considered when interpreting the results. The cross-sectional design precludes causal inferences regarding the directionality of associations between PTSD, alexithymia, and financial distress. Convenience sampling may introduce selection bias and limit the generalizability of the findings to the broader Lebanese population. Data were self-reported, which may be subject to recall bias or social desirability bias, particularly in the assessment of psychological symptoms and financial well-being. The exclusion of individuals with heavy alcohol use or those taking antidepressant medications may have led to an underestimation of PTSD prevalence. Finally, important factors such as prior trauma exposure, social support, coping strategies, and ongoing life stressors were not assessed and may have influenced the observed associations.

Conclusion

This study identified a substantial burden of probable PTSD, alexithymia, and financial distress among adults living in Beirut amid prolonged and overlapping crises. Alexithymia and financial distress were strongly associated with probable PTSD, highlighting the close relationship between emotional vulnerability, socioeconomic strain, and population mental health. These findings support the need for integrated public-health strategies that combine mental-health screening and psychological support with attention to socioeconomic vulnerability, particularly among groups at increased risk. Given the cross-sectional design, causal relationships cannot be established, and longitudinal studies are needed to clarify the direction and persistence of these associations over time.

Declarations

Competing interests

None declared.

Patient consent for publication

Not required

Ethics approval

The study was approved by the Institutional Review Board at Beirut Arab University. The research was conducted in accordance with the ethical principles of the Declaration of Helsinki. All participants provided informed consent before participation in the study.

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Author Contribution

Author Contributions OEG and MZ conceived and designed the study. OEG, MTEK, AES, LK, MK, YI, MJ, and DJ participated in data collection and field coordination. DW, MZ, OEG and MC performed the statistical analyses and interpreted the data. OEG, MTEK, AES, LK, MK, YI, MJ, NS and DJ drafted the initial version of the manuscript. DW, MZ, OEG and MC provided methodological guidance and critically reviewed the statistical analysis. All authors contributed to the interpretation of the results.

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Data Availability

Data and code supporting the results of this study are available upon reasonable request from the authors.

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