

The Impact of the Beirut Explosion on the Mental Health of Lebanese Healthcare Providers: A Scoping Review

Review began 11/07/2024
Review ended 11/18/2024
Published 11/22/2024

© Copyright 2024

Helou et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI: 10.7759/cureus.74240

Mariana Helou ¹, Danielle Abou Khater ¹, Fadi El Ters ¹, Kaissar Yammine ²

¹. Department of Emergency Medicine, Lebanese American University School of Medicine, Beirut, LBN ². Department of Orthopedic Surgery, Lebanese American University Medical Center, Beirut, LBN

Corresponding author: Mariana Helou, mariana.helou@lau.edu.lb

Abstract

Lebanon has faced a series of crises, starting with the economic collapse in 2019, followed by the COVID-19 pandemic, and the Beirut blast on August 4, 2020. These events have left the population vulnerable to psychological distress. Our study aims to assess the psychological impact of the Beirut explosion on Lebanese healthcare providers. We conducted an electronic database search, resulting in the inclusion of 21 relevant manuscripts. Various psychological issues were reported among healthcare workers (HCWs), with burnout prevalence rates of 37.2% for disengagement and 51.5% for exhaustion. Additionally, feelings of heaviness, fear, exhaustion, and anxiety were common. Approximately 60% of HCWs experienced moderate to severe stress, and half reported moderate to severe anxiety and depression. Furthermore, 44% were at high risk of developing post-traumatic stress symptoms. Lebanese HCWs have faced significant psychological trauma in recent years, underscoring the need for mental health awareness campaigns and targeted training for HCWs.

Categories: Public Health

Keywords: beirut explosion, healthcare workers, mental health, psychological distress, public mental health

Introduction And Background

Lebanon, a small middle-income country in the Middle East, has faced a series of consecutive crises within a one-year period, including prolonged political instability, massive riots, and the unprecedented devaluation of its currency in October 2019 [1,2]. The financial crisis that began in late 2019 escalated throughout 2020 and continues to have a profound impact today [3]. This crisis has significantly disrupted all sectors, particularly the healthcare sector [3].

The political instability in Lebanon has been compounded by inadequate regulations and concerns over the safety of residents, resulting in a major deterioration in the psychological well-being of the population [4]. Healthcare workers (HCWs) have been similarly affected by the financial crisis, with rising inflation, resource scarcity, insecurity, and increased workloads contributing to mental health challenges, ranging from anxiety to burnout [5,6]. The income of physicians has also been significantly impacted, further exacerbating the stress they face [7].

On March 11, 2020, the WHO declared COVID-19 a global pandemic [8]. The virus reached Lebanon in early 2020, and within three months, the increasing number of cases overwhelmed the healthcare system [1]. At that time, Lebanon was already grappling with the aforementioned economic crisis and lacked sufficient resources to effectively manage the pandemic [9]. The mental health of young people was particularly affected, with an increase in cases of depression, anxiety, and insomnia [8]. The isolation measures implemented to control the spread of the virus also had significant psychological effects on both patients and HCWs [10]. Several studies have highlighted the mental health toll of these measures, showing elevated levels of anxiety, depression, and fear among HCWs [10]. A study conducted in a tertiary care center in Lebanon revealed that half of the participants, including physicians and nurses, reported a high risk of acute distress [9].

On August 4, 2020, Lebanon was struck by a devastating explosion at the Beirut port, caused by the detonation of approximately 2,750 tons of ammonium nitrate. This blast claimed the lives of 235 people, injured thousands, and displaced 300,000, leaving much of the capital city in ruins. The explosion has made the Lebanese population highly vulnerable to psychological trauma. Several studies have discussed the psychological impact of the blast on the population, with post-traumatic stress disorder (PTSD) [11-15], depression [13-15], anxiety [13,15], and even eating disorders [11] being reported. A study in 2022, involving 703 participants, used the SCOFF questionnaire to screen for eating disorders and the IES-R questionnaire for PTSD. It found that 42% of participants had a positive PTSD score, with a significant correlation between exposure to the explosion and PTSD symptoms. Furthermore, 32% of participants screened positive for eating disorders, with significant associations found between eating disorders and factors such as

How to cite this article

Helou M, Abou Khater D, El Ters F, et al. (November 22, 2024) The Impact of the Beirut Explosion on the Mental Health of Lebanese Healthcare Providers: A Scoping Review. *Cureus* 16(11): e74240. DOI 10.7759/cureus.74240

relationship status, education level, mental illness history, and degree of exposure to the explosion [11]. A correlation was also noted between PTSD and eating disorder scores. Another study, conducted three months after the blast on 996 Lebanese residents, revealed a link between negative religious coping and higher levels of PTSD symptoms, particularly among females, residents of Beirut, those who had been injured, or those who knew someone injured in the explosion [12].

This study aims to assess the psychological disturbances experienced by Lebanese healthcare providers in response to the Beirut blast.

Review

Methods

Search Strategy

The electronic databases of the Cochrane Library, Medline, Embase, and Google Scholar were searched using the following keywords, combined with Boolean terms: [Beirut AND (explosion OR blast) AND (nurse OR physician OR resident OR fellow OR postgraduate OR undergraduate)]. Articles published between January 2020 and May 2022 were considered. Additionally, governmental and nongovernmental reports were reviewed. No language limitations were applied. A total of 21 manuscripts were included in this report. Institutional Ethics Committee approval was not sought, as the study design falls under the review category.

Study Criteria

All study designs, except case reports, were accepted for inclusion.

Results

A total of 21 manuscripts were initially identified for the study. After reviewing the titles and abstracts, 14 manuscripts were deemed suitable for inclusion in our review.

Burnout

A study conducted on postgraduate medical trainees (PGMTs) in a medical facility in Lebanon, which included 20 residency programs, found that the prevalence rates of burnout were 37.2% for disengagement and 51.5% for exhaustion. These rates varied significantly across different years of training, with the highest levels observed in postgraduate year (PGY) 3 and the lowest in PGY 7. No gender differences were found in burnout rates. Additionally, 65% of residents expressed hesitation in reporting their burnout, with the primary contributing factors being working hours, salary, and work conditions [16]. Another study in Lebanon, which surveyed 188 PGMTs, reported a prevalence of 68.6% for personal burnout, 63.3% for work-related burnout, and 35.1% for patient-related burnout [17]. A significant gender difference was observed in personal burnout, with females exhibiting higher rates.

Anxiety and Stress

The prevalence rate of moderate to severe stress is 58.1% among HCWs and 69% among medical students. The prevalence of moderate to severe anxiety is 48.7% and 46.8%, respectively, with higher rates observed in women and those with low monthly incomes [18]. Following the Beirut Blast on August 4, 2020, the Lebanese population, particularly healthcare providers who were on the frontline, experienced significant psychological distress. Healthcare providers reported feelings of heaviness, anxiety, fear, exhaustion, and trauma [19,20]. They also described sensations of worry, tears, sadness, and sleepless nights [21]. Nurses, in particular, expressed feelings of helplessness, anger, fear of death, and persistent overthinking, often coupled with a depressive mood [22]. Some nurses relived the August 4 incident through flashbacks and panic attacks [22].

Depression

A cross-sectional study involving 374 medical students and HCWs revealed that approximately 70% of medical students and 60% of HCWs experienced moderate to severe stress [18]. Additionally, around 50% of the participants reported moderate to severe anxiety and depression, with these symptoms being more prevalent among women.

Post-Traumatic Stress Symptoms

A study conducted nine to 15 days after the Beirut Blast on 570 HCWs found that the prevalence of acute stress disorder was 38.34% [23], with nurses and females being at higher risk. Another study, conducted in December 2020 on 519 HCWs at a private hospital in Beirut, revealed that 44% were at high risk of developing post-traumatic stress symptoms [24]. Surgeons, emergency physicians, anesthesiologists, and

radiologists were identified as being at higher risk.

Discussion

The COVID-19 crisis, exacerbated by Lebanon's ongoing financial turmoil, overwhelmed both the government and the healthcare system. On August 4, 2020, a massive explosion at the port of Beirut further devastated the country. Forty percent of Beirut was demolished, including numerous homes, leaving 300,000 people homeless. Over 6,500 individuals were injured, and 200 lost their lives [25-27]. This overwhelming destruction strained hospitals, and the explosion of medical supplies and personal protective equipment further worsened the healthcare crisis [27]. Both material losses and physical damage were extensive [27]. Psychiatric disorders typically worsen following disasters [28], and despite the traumatic consequences of the explosion, many individuals were required to return to work the following day. This posed a significant challenge for HCWs, who were expected to suppress their emotions and traumas while contributing to the community's recovery [29]. Data on mental health disorders in Lebanon post-blast remain limited, though one study noted an increase in psychological symptoms among patients attending private hospital clinics [30]. Given that the explosion was deemed an act of terrorism, widespread feelings of anger and suffering emerged [31].

Burnout rates vary across countries. For instance, in Pakistan, 49.74% of PGMTs reported personal burnout [32], while in India, the rate was 51.8% [33]. In the United States, one study reported a burnout rate of 46.3%, while another found it to be 35.8% [34,35]. In Brazil, 48.6% of PGMTs reported burnout [36], and in France, the rate was 37.4% [37]. These differences are influenced by factors such as variations in measurement tools, PGMT specialties, and the local sociopolitical environment.

Burnout levels vary across medical specialties, with those involving higher exposure to emergencies and greater daily stress tending to report higher burnout levels. Additionally, several studies highlight higher burnout rates among female trainees. This may be attributed to the additional burdens faced by women, particularly those who are married or have children, as they often bear increased responsibilities both at home and in their professional roles.

Trainees often do not report burnout, possibly due to a belief that reporting will not lead to meaningful change. Studies consistently show that stress symptoms are more prevalent after man-made disasters than natural ones. The prevalence rate following the Beirut Blast was similar to that observed after the 9/11 World Trade Center attack, at 42% [38]. In contrast, the rate of PTSD among HCWs during pandemics ranged from 16.7% to 40% [39-41].

Due to Lebanon's inadequate mental health services and limited governmental funding, the Ministry of Public Health launched a mental health program providing psychological support and counseling for individuals impacted by the Beirut explosion [42].

Mental Health Policies

As highlighted in our results, Lebanon has faced three consecutive disasters. The first was the country's economic and political collapse, leading to inflation, rising unemployment, and poverty, with limited access to basic necessities. This crisis had a profound psychological impact on the Lebanese population. Amid the financial collapse, the COVID-19 pandemic emerged, exacerbating the situation. Due to the ongoing economic crisis, the burden of COVID-19 was heavier in Lebanon compared to other countries. In addition to the anxiety and fear surrounding the new virus, the population also faced concerns about their inability to access essential healthcare and provide for their families during lockdowns. The psychological well-being of the Lebanese people further deteriorated after the catastrophic explosion in Beirut.

In Lebanon, there are no comprehensive mental health support policies, and the country faces a shortage of psychiatrists and psychologists, with 90% of mental health issues being inadequately treated [7]. Studies have shown that 17% of Lebanon's population is affected by psychiatric conditions, such as anxiety, stress, depression, and other mental health disorders [43,44].

Overall, Lebanon's financial collapse, compounded by the COVID-19 pandemic, significantly increased stress and anxiety levels among its population [45]. After the lockdowns, individuals reported a deterioration in their mental health [46]. Following the Beirut blast, most individuals experienced daily worry and anxiety, with a persistent sense of threat [47]. Many of these individuals recognized their mental health struggles and sought mental health services [48]. Furthermore, a study of young people in Lebanon revealed that 11.5% had experienced suicidal ideation [49]. Notably, suicide rates in Lebanon were the highest in 2020 and 2021 [50-52].

Mental health services in Lebanon are not widely accessible, and when available, they are primarily concentrated in the capital, Beirut. Community-based services are scarce, and HCWs receive little training to manage mental health cases. Only 5% of the country's general health budget is allocated to mental health [1], with most funds directed towards chronic patients in private hospitals. A 2015 WHO report highlighted

these challenges, revealing that there are approximately 15 mental health professionals per 100,000 people, whereas the recommended ratio is at least 4.45 skilled workers per 1,000 people [53]. Additionally, there is a lack of awareness among the Lebanese population regarding psychological issues, the importance of mental well-being, and when to seek help. Financial constraints and limited insurance coverage for mental health care lead many individuals to prioritize physical health issues over their mental health.

International support plays a crucial role in advancing mental health initiatives in Lebanon. Recently, several projects have been launched, including the National Mental Health Program (NMHP), which provides psychological support to individuals affected by the Beirut Blast [54]. Other initiatives have also been initiated, some still in their early stages, and others targeting specific groups such as Syrian refugees. However, it is evident that further support and coordination are necessary, both at the national and international levels, to address the ongoing mental health challenges in Lebanon effectively.

Conclusions

Lebanon has faced numerous challenges over the past decade. In a country grappling with crisis, mental health support is crucial but has not received the attention it requires. There is an urgent need for awareness campaigns about mental health, as well as training sessions for HCWs to better address these issues. Additionally, international funding and projects are essential to support mental health initiatives and ensure the well-being of the population.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Mariana Helou, Danielle Abou Khater, Fadi El Ters, Kaissar Yammine

Acquisition, analysis, or interpretation of data: Mariana Helou, Danielle Abou Khater, Fadi El Ters, Kaissar Yammine

Drafting of the manuscript: Mariana Helou, Danielle Abou Khater, Fadi El Ters, Kaissar Yammine

Critical review of the manuscript for important intellectual content: Mariana Helou, Kaissar Yammine

Supervision: Kaissar Yammine

Disclosures

Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Farran N: Mental health in Lebanon: tomorrow's silent epidemic. *Ment Health Prev.* 2021, 24:200218. [10.1016/j.mhp.2021.200218](https://doi.org/10.1016/j.mhp.2021.200218)
2. Corriero AC, Aborode AT, Reggio M, Shatila N: The impact of COVID-19 and the economic crisis on Lebanese public health: food insecurity and healthcare disintegration. *Ethics Med Public Health.* 2022, 24:100802. [10.1016/j.jemep.2022.100802](https://doi.org/10.1016/j.jemep.2022.100802)
3. Lobkowitz L, Lahoud J, Bou-Orm I: Addressing the COVID-19 emergency during the ongoing political and economic crisis in Fragile Lebanon: a call to action. *Confl Health.* 2021, 15:66. [10.1186/s13031-021-00403-3](https://doi.org/10.1186/s13031-021-00403-3)
4. Al-Hajj S, Pawliuk C, Smith J, Zheng A, Pike I: History of injury in a developing country: a scoping review of injury literature in Lebanon. *J Public Health (Oxf).* 2021, 43:e24-44. [10.1093/pubmed/fdaa043](https://doi.org/10.1093/pubmed/fdaa043)
5. Shallal A, Lahoud C, Zervos M, Matar M: Lebanon is losing its front line. *J Glob Health.* 2021, 11:03052. [10.7189/jogh.11.03052](https://doi.org/10.7189/jogh.11.03052)
6. Lebanon: events of 2020. (2020). Accessed: August 9, 2021: <https://www.hrw.org/world-report/2021/country-chapters/lebanon>.
7. Islam Z, Gangat SA, Mohanan P, Rahmat ZS, El Chbib D, Marfani WB, Essar MY: Mental health impacts of Lebanon's economic crisis on healthcare workers amidst COVID-19. *Int J Health Plann Manage.* 2022, 37:1160-5. [10.1002/hpm.3324](https://doi.org/10.1002/hpm.3324)
8. Younes S, Safwan J, Rahal M, Hammoudi D, Akiki Z, Akel M: Effect of COVID-19 on mental health among the young population in Lebanon. *Encephale.* 2022, 48:371-82. [10.1016/j.encep.2021.06.007](https://doi.org/10.1016/j.encep.2021.06.007)
9. Bizri M, Kassir G, Tamim H, Kobeissy F, Hayek SE: Psychological distress experienced by physicians and nurses at a tertiary care center in Lebanon during the COVID-19 outbreak. *J Health Psychol.* 2022, 27:1288-300. [10.1177/1359105321991630](https://doi.org/10.1177/1359105321991630)

10. Msheik El Khoury F, Talih F, Khatib MF, Abi Younes N, Siddik M, Siddik-Sayyid S: Factors associated with mental health outcomes: results from a tertiary referral hospital in Lebanon during the COVID-19 pandemic. *Libyan J Med.* 2021, 16:1901438. [10.1080/19932820.2021.1901438](https://doi.org/10.1080/19932820.2021.1901438)
11. Bachir Y, El-Hachem C, Richa S, Bou Khalil R: The risk of eating disorders following the August 4th, 2020 explosion in Beirut and its relationship with trauma exposure and PTSD symptoms. *Asian J Psychiatr.* 2023, 89:105749. [10.1016/j.ajp.2023.105749](https://doi.org/10.1016/j.ajp.2023.105749)
12. Grey I, Thomas J, Mansour Jamaledine J, Yaktine T, Cheung Chung M: Religious coping and levels of posttraumatic stress disorder symptomatology after the Beirut explosion. *Psychol Trauma.* 2024, 16:39-48. [10.1037/tra0001529](https://doi.org/10.1037/tra0001529)
13. Grey I, Makki Z, Kahale C, Abi Habib R, Tohme P: The influence of multiple community level traumatic event types on mental health outcomes. *Psychol Rep.* 2023, 532941251204796. [10.1177/00532941251204796](https://doi.org/10.1177/00532941251204796)
14. Al Hariri M, Zgheib H, Abi Chebl K, et al.: Assessing the psychological impact of Beirut Port blast: a cross-sectional study. *Medicine (Baltimore).* 2022, 101:e31117. [10.1097/MD.00000000000031117](https://doi.org/10.1097/MD.00000000000031117)
15. Tohme P, Grey I, El-Tawil MT, El Maouch M, Abi-Habib R: Prevalence and correlates of mental health difficulties following the beirut port explosion: the roles of mentalizing and resilience. *Psychol Trauma.* 2024, 16:30-8. [10.1037/tra0001328](https://doi.org/10.1037/tra0001328)
16. Yacoubian A, Demerouti E, Degheili JA, El Hajj A: A survey-based study about burnout among postgraduate medical trainees: implications for leaders in healthcare management. *Front Public Health.* 2023, 11:1209191. [10.3389/fpubh.2023.1209191](https://doi.org/10.3389/fpubh.2023.1209191)
17. Yacoubian A, Degheili JA, Der-Boghossian A, Najdi J, Andraos R, Zeineldine S: Burnout among postgraduate medical trainees in Lebanon: potential strategies to promote wellbeing. *Front Public Health.* 2022, 10:1045300. [10.3389/fpubh.2022.1045300](https://doi.org/10.3389/fpubh.2022.1045300)
18. Abed AE, Razzak RA, Hashim HT: Mental health effects of COVID-19 within the socioeconomic crisis and after the Beirut blast among health care workers and medical students in Lebanon. *Prim Care Companion CNS Disord.* 2021, 23:10.4088/PCC.21m02977
19. Abdul-Nabi SS: Chronicles of an emergency medicine resident in Lebanon. *J Emerg Med.* 2021, 61:602-6. [10.1016/j.jemermed.2021.07.027](https://doi.org/10.1016/j.jemermed.2021.07.027)
20. Abdul-Nabi SS, Sawaya RD: Airway breathing circulation: an emergency medicine resident's experience of the Beirut explosion. *Acad Emerg Med.* 2021, 28:483-6. [10.1111/acem.14147](https://doi.org/10.1111/acem.14147)
21. Jabbour R, Harakeh M, Dakessian Sailan S, et al.: Nurses' stories from Beirut: the 2020 explosive disaster on top of a pandemic and economic crises. *Int Nurs Rev.* 2021, 68:1-8. [10.1111/inr.12675](https://doi.org/10.1111/inr.12675)
22. Fawaz M, Itani M: The psychological experiences of Lebanese ground zero front-line nurses during the most recent COVID-19 outbreak post Beirut blast: a qualitative study. *Int J Soc Psychiatry.* 2022, 68:754-61. [10.1177/00207640211004989](https://doi.org/10.1177/00207640211004989)
23. Karam E, Saab D, Al Barathie J, Karam AN, Karam G, Bryant R: Predictors and severity of probable acute stress disorder following the Beirut Port Blast. *Eur J Psychotraumatol.* 2022, 13:2040232. [10.1080/20008198.2022.2040232](https://doi.org/10.1080/20008198.2022.2040232)
24. Bou Sanayeh E, El Chamieh C, Saade MC, Maalouf RG, Bizri M: Post-traumatic stress symptoms experienced by healthcare workers in Lebanon four months following Beirut's ammonium nitrate explosion: a survey-based study. *Arch Public Health.* 2022, 80:156. [10.1186/s13690-022-00911-5](https://doi.org/10.1186/s13690-022-00911-5)
25. Mansour HA, Bitar E, Fares Y, et al.: The Beirut Port explosion: injury trends from a mass survey of emergency admissions. *Lancet.* 2021, 398:21-2. [10.1016/S0140-6736\(21\)01246-0](https://doi.org/10.1016/S0140-6736(21)01246-0)
26. Helou M, El-Hussein M, Aciksari K, Salio F, Della Corte F, von Schreeb J, Ragazzoni L: Beirut explosion: the largest non-nuclear blast in history. *Disaster Med Public Health Prep.* 2022, 16:2200-1. [10.1017/dmp.2021.328](https://doi.org/10.1017/dmp.2021.328)
27. Abouzeid M, Habib RR, Jabbour S, Mokdad AH, Nuwayhid I: Lebanon's humanitarian crisis escalates after the Beirut blast. *Lancet.* 2020, 31:1580-2. [10.1016/S0140-6736\(20\)31908-5](https://doi.org/10.1016/S0140-6736(20)31908-5)
28. Morganstein JC, Ursano RJ: Ecological disasters and mental health: causes, consequences, and interventions. *Front Psychiatry.* 2020, 11:1. [10.3389/fpsy.2020.00001](https://doi.org/10.3389/fpsy.2020.00001)
29. El-Khoury J, Medawar B: Beirut, Lebanon. *Lancet Psychiatry.* 2021, 8:104. [10.1016/S2215-0366\(20\)30561-7](https://doi.org/10.1016/S2215-0366(20)30561-7)
30. Al-Hajj S, Mokdad AH, Kazzi A: Beirut explosion aftermath: lessons and guidelines. *Emerg Med J.* 2021, 38:958-9. [10.1136/emered-2020-210880](https://doi.org/10.1136/emered-2020-210880)
31. Kerbage H, Elbejjani M: Mental health in the aftermath of the Beirut blast: community healing and the quest for justice. *Psychiatr Serv.* 2021, 72:234-5. [10.1176/appi.ps.202000666](https://doi.org/10.1176/appi.ps.202000666)
32. Majeed F, Liaqat N, Hussain MM, Iqbal A, Hashim I, Saleem M: Burnout among postgraduate residents using Copenhagen burnout inventory. *J Ayub Med Coll Abbottabad.* 2022, 34:463-7. [10.55519/JAMC-03-9594](https://doi.org/10.55519/JAMC-03-9594)
33. Fernando BM, Samaranyake DL: Burnout among postgraduate doctors in Colombo: prevalence, associated factors and association with self-reported patient care. *BMC Med Educ.* 2019, 19:373. [10.1186/s12909-019-1810-9](https://doi.org/10.1186/s12909-019-1810-9)
34. Kannampallil TG, Goss CW, Evanoff BA, Strickland JR, McAlister RP, Duncan J: Exposure to COVID-19 patients increases physician trainee stress and burnout. *PLoS ONE.* 2020, 15:e0237301. [10.1371/journal.pone.0237301](https://doi.org/10.1371/journal.pone.0237301)
35. Kaplan CA, Chan CC, Feingold JH, et al.: Psychological consequences among residents and fellows during the COVID-19 pandemic in New York City: implications for targeted interventions. *Acad Med.* 2021, 96:1722-31. [10.1097/ACM.0000000000004362](https://doi.org/10.1097/ACM.0000000000004362)
36. Steil A, Pereira Tokeshi AB, Bernardo LS, et al.: Medical residents' mental distress in the COVID-19 pandemic: an urgent need for mental health care. *PLoS ONE.* 2022, 17:e0266228. [10.1371/journal.pone.0266228](https://doi.org/10.1371/journal.pone.0266228)
37. Treluyer L, Tourneux P: Burnout among paediatric residents during the COVID-19 outbreak in France. *Eur J Pediatr.* 2021, 180:627-33. [10.1007/s00431-020-03907-x](https://doi.org/10.1007/s00431-020-03907-x)
38. Lowell A, Suarez-Jimenez B, Helpman L, et al.: 9/11-related PTSD among highly exposed populations: a systematic review 15 years after the attack. *Psychol Med.* 2018, 48:537-53. [10.1017/S0033291717002033](https://doi.org/10.1017/S0033291717002033)
39. Johnson SU, Ebrahimi OV, Hoffart A: PTSD symptoms among health workers and public service providers during the COVID-19 outbreak. *PLoS ONE.* 2020, 15:e0241032. [10.1371/journal.pone.0241032](https://doi.org/10.1371/journal.pone.0241032)

40. Salazar de Pablo G, Vaquerizo-Serrano J, Catalan A, et al.: Impact of coronavirus syndromes on physical and mental health of health care workers: systematic review and meta-analysis. *J Affect Disord.* 2020, 275:48-57. [10.1016/j.jad.2020.06.022](https://doi.org/10.1016/j.jad.2020.06.022)
41. Lo T, De Stefano L, Lu S, et al.: Post-traumatic stress disorder in resident physicians . *Cureus.* 2019, 11:e4816. [10.7759/cureus.4816](https://doi.org/10.7759/cureus.4816)
42. Directory of mental health professionals for mental health support for persons affected by Beirut explosion . Accessed: November 10, 2020: <https://www.moph.gov.lb/en/Pages/6/38392/directory-mentalhealth-professionals-response>.
43. El Othman R, Touma E, El Othman R, et al.: COVID-19 pandemic and mental health in Lebanon: a cross-sectional study. *Int J Psychiatry Clin Pract.* 2021, 25:152-63. [10.1080/13651501.2021.1879159](https://doi.org/10.1080/13651501.2021.1879159)
44. Arafat SM, Shoib S, Kar SK, El Hayek S: Psychiatry in Lebanon. *Lancet Psychiatry.* 2020, 7:932. [10.1016/S2215-0366\(20\)30415-6](https://doi.org/10.1016/S2215-0366(20)30415-6)
45. Salameh P, Hajj A, Badro DA, Abou Selwan C, Aoun R, Sacre H: Mental health outcomes of the CoViD-19 pandemic and a collapsing economy: perspectives from a developing country. *Psychiatry Res.* 2020, 294:113520. [10.1016/j.psychres.2020.113520](https://doi.org/10.1016/j.psychres.2020.113520)
46. Grey I, Arora T, Thomas J, Saneh A, Tohme P, Abi-Habib R: The role of perceived social support on depression and sleep during the COVID-19 pandemic. *Psychiatry Res.* 2020, 293:113452. [10.1016/j.psychres.2020.113452](https://doi.org/10.1016/j.psychres.2020.113452)
47. Embrace. Post Beirut's blast update . (2020). Accessed: November 10, 2020: <https://www.embracelebanon.org/images/Post-Beirut-Blast-Update-Report-Aug-Nov.pdf>.
48. Lebanon Economic Monitor, Spring 2021: Lebanon Sinking (to the Top 3) . (2021). Accessed: May 31, 2021: <https://www.worldbank.org/en/country/lebanon/publication/lebanon-economic-monitor-spring-2021-lebanon-sinking-to-the-....>
49. Baroud E, Rojolah LA, Ghandour LA, et al.: Risk and protective factors for depressive symptoms and suicidality among children and adolescents in Lebanon: Results from a national survey. *J Affect Disord Rep.* 2020, 2:100036. [10.1016/j.jadr.2020.100036](https://doi.org/10.1016/j.jadr.2020.100036)
50. Alarming increase of suicides in Lebanon . (2020). Accessed: November 1, 2024: <https://www.the961.com/increase-suicides-lebanon/>.
51. Bou Khalil R: The psychological wellbeing of the Lebanese society lies between incremental suicide rates and financial stress. *Asian J Psychiatr.* 2019, 42:85-6. [10.1016/j.ajp.2019.04.002](https://doi.org/10.1016/j.ajp.2019.04.002)
52. Marazziti D, Avella MT, Mucci N, Della Vecchia A, Ivaldi T, Palermo S, Mucci F: Impact of economic crisis on mental health: a 10-year challenge. *CNS Spectr.* 2021, 26:7-13. [10.1017/S1092852920000140](https://doi.org/10.1017/S1092852920000140)
53. WHO-AIMS Report on Mental Health System in Lebanon 2015 . (2015). Accessed: November 1, 2021: <https://www.moph.gov.lb/en/Pages/0/9109/who-aims-report-on-mental-health-system-in-lebanon>.
54. Beirut Explosion: Situation Report #9. (2021). Accessed: August 9, 2021: https://cdn1.internationalmedicalcorps.org/wp-content/uploads/2021/02/IntlMedCorps-BeirutExplosion_SitRep09.pdf.