



Prevalence of post-traumatic stress disorder and depressive symptoms among civilians residing in armed conflict-affected regions: a systematic review and meta-analysis

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ABSTRACT

Background Globally, populations afflicted by armed conflict are known to have high rates of mental health disorders.

Aims This meta-analysis aims to estimate the prevalence of post-traumatic stress disorder (PTSD) and depressive symptoms among civilians residing in armed conflict-affected regions.

Methods This meta-analysis was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses. A literature search employing MEDLINE(R), Embase Classic+Embase, APA PsycINFO, Ovid Healthstar, Journal@Ovid Full Text, Cochrane, PTSDpubs and CINAHL was conducted from inception until 19 March 2024 to identify relevant studies. Quality assessment was performed using the Joanna Briggs Institute Critical Appraisal Checklist for Prevalence Studies, and a Comprehensive Meta-Analysis was used to conduct the statistical analysis.

Results The search yielded 38 595 articles, of which 57 were considered eligible for inclusion. The included studies comprised data from 64 596 participants. We estimated a prevalence of 23.70% (95% CI 19.50% to 28.40%) for PTSD symptoms and 25.60% (95% CI 20.70% to 31.10%) for depressive features among war-afflicted civilians. The subgroup analysis based on time since the war and the country's economic status revealed the highest prevalence for both PTSD and depressive symptoms was present during the years of war and in low/middle-income countries.

Conclusions The results of this study provide conclusive evidence of the detrimental impacts of armed conflict on mental health outcomes. Hence, it is crucial to emphasise the significance of both physical and mental health in the aftermath of war and take appropriate humanistic measures to overcome challenges in the management of psychiatric illnesses.

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WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Armed conflicts have long been associated with increased rates of mental health disorders, particularly post-traumatic stress disorder (PTSD) and depression. While previous studies have explored the prevalence of these disorders among specific populations such as militants and refugees, there remains a gap in understanding the extent of the burden on civilian populations residing in conflict-affected regions.

WHAT THIS STUDY ADDS

⇒ This systematic review and meta-analysis provides robust evidence of the high prevalence of PTSD and depressive symptoms among civilians living in war-torn areas. By synthesising data from 57 studies comprising 64 596 participants, this study found the pooled prevalence rates of 23.70% for PTSD and 25.60% for depression. It evaluated the impact of factors such as time since the war and the economic status of the country on mental health outcomes in these populations.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The findings underscore the urgent need for comprehensive mental health interventions tailored to the unique needs of civilians in conflict-affected regions. Healthcare providers must be equipped with culturally sensitive diagnostic tools and treatment modalities. At the same time, policymakers should prioritise mental health as a public health concern and allocate resources for trauma-informed care facilities. International collaboration is crucial to ensure access to essential mental health services and advocate for the protection of civilians during times of conflict. Further research is needed to address gaps in understanding and evaluate the effectiveness of interventions aimed at mitigating the long-term psychological consequences of armed conflict.

INTRODUCTION

Over the years, military combat, wartime tragedies and political upheaval have escalated in ferocity. These forms of organised violence account for a substantial share of the disease burden globally, both in terms of physical morbidity and psychosocial effects.¹ These violent epochs provide a conducive environment for the development of various psychopathologies. As such, chronic, unpredictable stress in war-torn areas can span all domains of life, making those affected vulnerable to mental health disorders.²

According to the Uppsala Conflict Data Program, a global decline in mortality attributed to organised violence was observed between 2014 and 2019. However, this trend was significantly reversed in 2021, when a staggering 46% rise led to over 119 100 deaths globally, in contrast to the 81 700 deaths in the previous year. The growing hostilities in Afghanistan, Ethiopia and Yemen were mainly accountable for the preceding upsurge.³ Recent reports demonstrate nearly 55 000 people succumbing as a consequence of organised violence just in the first half of 2022.⁴

Alongside causing substantial mortality, armed conflicts also provoke mass migrations and displacements. By May 2022, more than 100 million individuals have been compelled to flee from their hometowns because of an ongoing conflict, as compared with 89.3 million by the end of 2021.⁵ Among displaced individuals, 53.2 million were internally displaced, 32.5 million were refugees, 4.9 million were asylum seekers and 5.3 million needed international protection.⁵

In recent times, the psychological well-being of people residing in war-affected countries has attracted increasing attention because these regions are frequently linked to greater levels of psychosocial distress and leave populations more susceptible to psychiatric disorders.⁶ According to estimates from the World Health Organization (WHO), more than 20% of individuals residing in conflict-affected areas have some form of mental illness, with 10% of cases being moderate to severe.^{7,8} Several studies have suggested a higher prevalence among conflict-affected populations than non-exposed populations.⁹

Depressive (also used interchangeably with depression) and post-traumatic stress disorder (PTSD) symptoms have been the major focus of epidemiological studies on mental health problems among war survivors.¹⁰ PTSD is characterised by four symptom clusters, which include psychological distress at exposure to traumatic events, avoidance symptoms, cognitive or mood changes, and baseline arousal.¹¹ Depression is often divided into five subcategories, all of which share the characteristic symptoms of a persistent sense of melancholy, emptiness or irritability, coupled with somatic, psychic and cognitive changes that have a significant impact on an individual's functionality and overall well-being.¹² Meta-analyses from war-afflicted regions show a high incidence of PTSD and depressive symptomatology, with pooled estimates ranging from 15.3% to 30.6% for PTSD and 10.8% to 30.8% for depression.^{7,10,13} It is imperative to target and

treat major depressive disorder (MDD) and PTSD at onset to reach not only the resolution of core symptoms but also the ability to reach pre-morbid functionality.¹⁴

The militant population has been studied frequently and is at a higher risk of developing psychiatric symptoms due to heightened combat exposure and first-hand psychological trauma. However, several reports have found that civilians residing in conflict zones are constantly under chronic stress and are particularly susceptible to after-effects just as much as militant personnel.⁶ Thus, an accurate estimation of the number of civilians suffering from depression and PTSD, which could influence present and future mental health policies in war-torn areas, is a critical first step in determining the extent of the issue.

Although several studies have estimated war-associated mortality and physical morbidity, there is still a scarcity of research on the potential effects of armed conflict on mental health and related psychosocial parameters. Moreover, mental health parameters of veterans are overly represented among epidemiological meta-analyses, leading to a dearth of data synthesis for affected civilians. This appears especially crucial considering data from the United Nations Security Council that emphasises that 90% of war victims are civilians, innocent people who should be protected during times of war.⁵ Hence, this systematic review and meta-analysis aimed to estimate the prevalence of two major psychiatric symptomatologies (ie, PTSD and depression) among adult civilians residing in war-afflicted regions.

METHODS

We conducted this systematic review and meta-analysis in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) guidelines, and the PRISMA checklist has been added as online supplemental appendix 1.¹⁵ The protocol was registered a priori with the International Prospective Register of Systematic Reviews (CRD42023416096).

Data sources and search strategy

The present study aimed to estimate the pooled prevalence of PTSD and depressive symptoms in war or armed conflict-affected regions. For this purpose, two authors (SHA and AZ) independently conducted a thorough literature search across major health databases (ie, MEDLINE(R), Embase Classic+Embase, APA PsycINFO, Ovid Healthstar, Journal@Ovid Full Text, Cochrane, PTSDpubs and CINAHL) from inception until 19 March 2024. Relevant keywords were obtained via the Medical Subject Heading browser tool alongside synonyms; alternate spellings were employed and included “Depression” “Depressive Symptoms” “Emotional Depression” “Major Depressive Disorder” “MDD” “Major Depression” “Acute Post-Traumatic Stress Disorder” “Chronic Post-Traumatic Stress Disorder” “Delayed Onset Post-Traumatic Stress Disorder” “Neuroses, Post-Traumatic” “PTSD” “Post-Traumatic Stress Disorders” “Stress Disorder Post

Traumatic” “Posttraumatic Stress Symptoms” “War” “Warzone” “Civil War” “Warfare” “Genocide” “Holocaust” and “Armed Conflict”. The bibliographies of included studies were also thoroughly evaluated to acquire comprehensive search results. Furthermore, relevant published systematic reviews and meta-analyses were shortlisted, and their citations were screened to identify any potentially missed articles. Duplicates were removed manually using the Zotero citation manager.

Selection criteria

We included cross-sectional and cohort studies assessing the prevalence of PTSD and depressive symptoms in the adult, that is, over 18 years, civilian populations witnessing armed conflict and residing in the war-affected region for the duration of exposure. The outcomes could be assessed using both interviews and questionnaires such as the Hopkins Symptom Checklist-25, Clinician-Administered PTSD Scale, General Health Questionnaire-28, Posttraumatic Stress Disorder Checklist, and so on. Of note, these outcomes were limited in measuring relevant symptoms of PTSD and depression and could only act as a proxy for these diagnoses but not the clinical diagnoses themselves. Studies evaluating prevalence in displaced individuals were only included if the participants were classified as internally displaced population, that is, residing within the same country during the time of conflict. Furthermore, articles were not limited by the scale of armed conflict, including both civil and international wars. Lastly, only articles published in the English language were included.

We did not include original articles evaluating the prevalence among children, military individuals, combatants, refugees, second or third-generation survivors of war, and civilians from non-war-involved countries. Similarly, survivors of terrorist attacks (in an otherwise stable country), non-war trauma exposure and those enrolled in medical interventions like clinical trials were also not included. Overall, the PECOS criteria for the review are the following:

1. Population: adult (18+ years) civilian population residing in the war-affected region for the duration of exposure.
2. Exposure: armed conflict or war, defined as a conflict resulting in at least 1000 war-related deaths in 1 calendar year, in which at least one side is the government of a state.
3. Control: none or baseline.
4. Outcome: prevalence of PTSD and/or depressive symptoms.
5. Study: cross-sectional and cohort studies.

Data extraction and quality assessment

Two reviewers (SHA and AZ) independently screened the title and abstract of articles, and ultimately, full-length articles were assessed against the selection criteria. Following a comprehensive literature search and study selection, two authors (AZ and MZ) independently

extracted the following details into two Excel sheets: first author’s name, study year, design, number of participants, type and country of conflict, baseline characteristics, time since the war, epidemiological assessment method employed and relevant prevalence. The quality of included studies was assessed qualitatively using the Joanna Briggs Institute Critical Appraisal Checklist for Prevalence Studies.¹⁶ The appraisal tool evaluates each study across the following domains: sample frame, participant sampling, sample size, data collection, study variables, statistical analysis and response rate. It comprises nine questions, where each component is assessed independently and reported as either yes (low risk), no (high risk), unclear or not applicable. Any discrepancies were resolved by discussion with independent reviewers (MYJ and MC).

Outcome measure

The primary outcomes of our meta-analysis were deemed as the pooled prevalence of PTSD and depressive symptoms among the war-affected civilian population.

Statistical analysis

We used Comprehensive Meta-Analysis Software V.3.0 (Biostat, Englewood, New Jersey, USA)¹⁷ to estimate the pooled prevalence of interested outcomes separately and create forest plots. Due to postulated differences among studies, a random-effects model was employed.¹⁸ To evaluate heterogeneity, Q -value, τ^2 and I^2 were employed.¹⁹ Sensitivity analysis using the leave-one-out method was also performed to see if all the studies contributed roughly equally.^{20, 21} Lastly, to assess the difference between observed effect size (effect size we see in included studies) and true effect size (the effect size we would see in comparable populations) in a random-effects model, a prediction interval was computed to estimate the differences observed at a population level.²²

Furthermore, we performed subgroup analyses based on time since the war and the country’s economic status. Studies were classified with respect to data collection, that is, short term (if they collected data within 10 years of war), intermediate (data collection between 11 and 20 years after the war) and long term (data collection following more than 20 years). Similarly, studies were classified according to their economic standing, depending on the World Bank’s classification, using general national income (GNI) per capita. Countries were classified as low income if they had a GNI capita less than \$1085, middle income if the GNI capita ranged between \$1086 and \$13 205, and high income if the capita exceeded \$13 205.²³ If data were unavailable during years of war, the World Bank’s classification during the data collection period was used.

To identify any potential publication bias, we used Begg’s funnel plot to measure asymmetry, whereas Duval and Tweedie’s trim-and-fit method was employed to estimate the number of trimmed/added studies and their

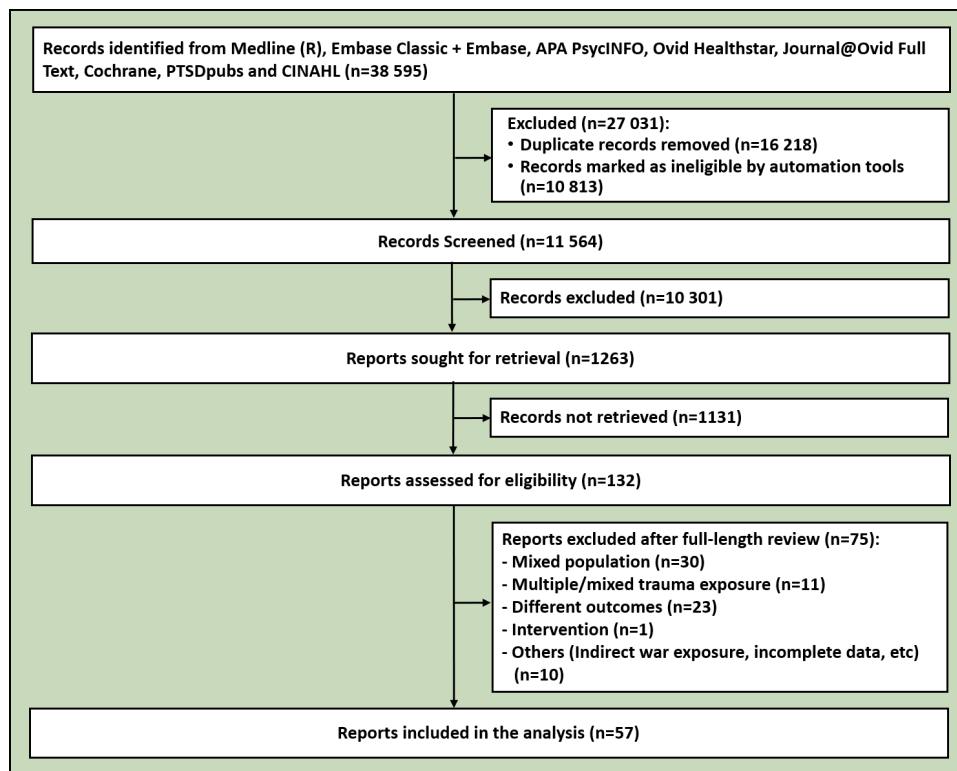


Figure 1 Preferred reporting items for systematic review and meta-analyses flowchart for included studies.

impact on outcomes.²⁴ All analyses were two-sided using $p < 0.05$ to indicate statistical significance.

RESULTS

Literature search

The initial literature search revealed 28 674 articles published until 19 October 2022. However, an updated literature search was performed to identify 38 595 studies published from inception until 19 March 2024. After duplicate removal, 11 564 articles were screened for eligibility. Following screening by title and abstract, 132 studies were assessed full length. After a thorough assessment, 57 articles were deemed eligible for inclusion.^{25–31}

The PRISMA flow chart, shown in [figure 1](#), summarises the literature search; the reasons for exclusion are in the online supplemental appendix 2.

Baseline characteristics and quality assessment

Our review included data from 57 studies, with a total of 64 596 participants meeting our predefined inclusion criteria. Participants from all adult age groups were included, with ages ranging from 18 to over 86 years. The studies evaluated adults from across the globe, as shown in online supplemental material 3, with 85.96% (49 of 57) of studies reporting data from low/middle-income countries (LMICs), while 12.28% (7 of 57) recruited from high-income countries, and one study did not specify the country of conflict. The time to data collection since the war varied from information collected during the war to over 70 years post-war. A total of 17.54% (10 of 57)

of studies collected data during an ongoing conflict, while 43.86% (25 of 57) collected data within the first 10 years, that is, referred to as short term. Similarly, 15.79% (9 of 57) and 14.04% (8 of 57) of articles reported prevalence in the intermediate and long term, that is, 11–20 years and beyond 20 years, respectively. Time since the war was not specified in two studies,^{43 69} while three studies^{39 40 61} reported outcomes at overlapping intervals. The baseline characteristics and outcomes of individual studies have been described in online supplemental materials 4 and 5, respectively.

Most of the included studies were identified as having a low risk of bias, with the majority opting for appropriate study frames (91.23%), sampling appropriate population (73.68%), well-explained study settings (100%), using valid methods for identification of conditions (98.24%), measured outcomes in a standard, reliable manner (98.24%) and conducted the appropriate statistical analysis (98.24%). However, 19 studies (33.33%) were rated either high risk or unclear for adequate sample size. Similarly, we observed that 22 studies (38.60%) did not report response rates appropriately. The quality assessment results have been summarised in the online supplemental material 6.

Prevalence of PTSD symptoms

In our review, 48 studies reported the prevalence of PTSD symptoms, including data from 40 004 participants. The pooled prevalence was found to be 23.70%

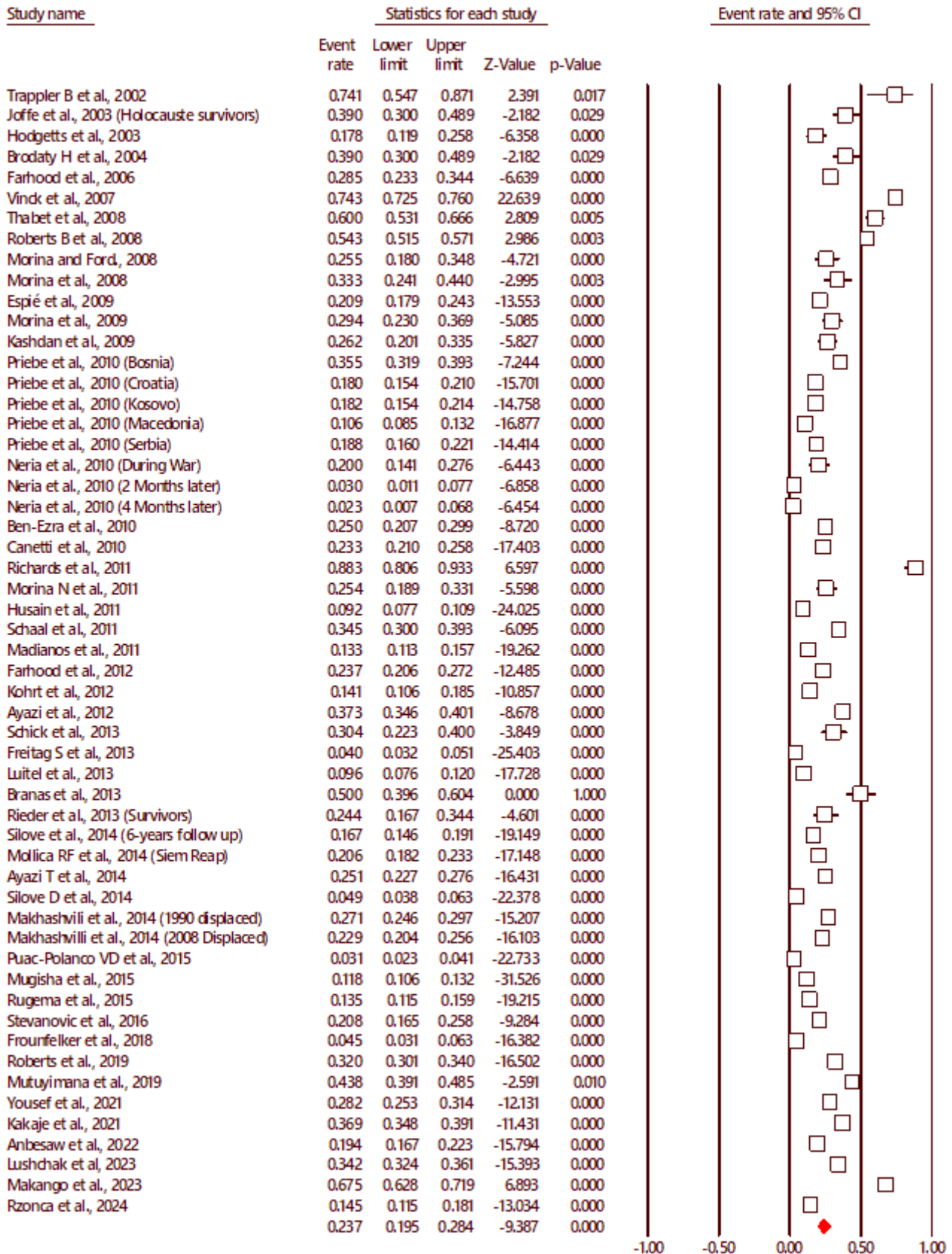


Figure 2 Post-traumatic stress disorder symptoms pooled prevalence.

(95% CI 19.50% to 28.40%), as shown in [figure 2](#). The prediction interval for the prevalence of PTSD symptoms was estimated as 5.00%–66.00%, as shown in the Online supplemental appendix 7. Excluding the studies by Richards *et al*⁴³ and Roberts *et al*,⁶⁹ 46 studies were included in the subgroup analysis based on time since the war. The highest prevalence was observed during the war, with 33.90% (95% CI 16.30% to 57.50%) screening positive, followed by long, intermediate and short term as 24.60% (95% CI 13.80% to 39.90%), 20.70% (95% CI 12.90% to 31.50%) and 20.20% (95% CI 16.30% to 24.60%), respectively (online supplemental appendix 8).

Similarly, except for Trappler *et al*²⁶ (excluded because the country was not specified), 47 studies were included in the subgroup analysis based on the involved country's economic standing, and a higher prevalence was identified among LMICs as 25.40% (95% CI 20.90% to 30.60%), relative to 11.40% (95% CI 4.90% to 24.10%) in high-income countries (online supplemental appendix 9). The analysis revealed a moderate heterogeneity ($Q=75.50$, $p=0.016$, $I^2=28.48\%$, $\tau^2=0.83$). The sensitivity analysis did not yield any grossly unequal contribution of a single study toward the overall effect size. Begg's funnel plot was also plotted, as shown in the online supplemental appendix 10, and it depicted a symmetrical spread of studies, with no study being trimmed from either right or left.

Prevalence of depressive symptoms

A total of 37 studies reported the prevalence of depressive symptoms, with data from 51 766 participants included. The pooled prevalence of 25.60% (95% CI 20.70% to 31.10%) was estimated among war-torn civilians, as shown in [figure 3](#). The prediction interval for the prevalence of depressive symptoms was estimated as 5.00%–68.00% (online supplemental appendix 11). Excluding the studies by Richards *et al*⁴³ and Roberts *et al*⁶⁹ (excluded because the time from war to data collection was not specified), 35 studies were included in the subgroup analysis based on time since the war. The highest prevalence was observed during the war, with 33.80% (95% CI 19.80% to 51.40%) of adults diagnosed, followed by short, intermediate and long term as 25.30% (95% CI 18.60% to 33.40%), 23.70% (95% CI 17.40% to 31.40%) and 17.50% (95% CI 8.10% to 33.80%), respectively, as depicted in online supplemental appendix 12.

Similarly, a subgroup analysis comprising 37 studies was performed based on the involved country's economic standing. A higher prevalence was identified among LMICs at 27.00% (95% CI 21.50% to 33.20%), relative to 18.30% (95% CI 9.50% to 32.40%) in high-income countries, as shown in the online supplemental appendix 13. The analysis revealed a moderate heterogeneity ($Q=53.43$, $p=0.020$, $I^2=23.27\%$, $\tau^2=0.80$). The sensitivity analysis

revealed a grossly equal contribution of all studies toward pooled effect size. Begg's funnel plot was also plotted, as shown in the online supplemental appendix 14, and an asymmetry was observed, with seven studies being trimmed from the right side and none from the left. The adjusted prevalence following trim and fill was estimated as 20.57% (95% CI 15.73% to 26.43%).

DISCUSSION

Main findings

Our analysis of 64 596 adults who had PTSD and depressive symptoms in war-afflicted regions is strong evidence of the correlation between war and mental health illnesses. To our knowledge, this is one of the few studies estimating the symptomatology burden among war-afflicted civilians. Our extant meta-analysis suggests that these disparate symptoms of PTSD and depression (a proxy for clinical diagnoses of PTSD and MDD) point towards a significant unmet need of millions of people affected by man-made disasters.

Consistent with other meta-analyses, our study also found similar pooled estimates of PTSD and depressive symptoms. Hoppen *et al* reported pervasiveness of 26.51% for PTSD symptoms and 23.31% for depression in adult survivors of the recent wars from 1989 to 2019 globally.¹³ Similarly, Mesa-Vieira *et al* found cluster symptoms of PTSD to be predominant (31%) in prevalence, followed by depressive features (25%) and anxiety-related features (14%) among migrants exposed to armed conflict.¹ In contrast, our results had a greater pooled prevalence of depression followed by PTSD symptoms among included participants.

We also performed subgroup analysis based on time since the war and the involved country's economic standing to evaluate its association with the incidence of mental health outcomes. The result of the study by Neria *et al* that assessed the mental health consequences of the Israel–Gaza 2008–2009 war among young Israeli civilians reported a sharp decrement in the symptomatology of PTSD over time such that the prevalence rate dropped from 20.00% during the war to 3.00% and 2.20% after 2 and 4 months of the ceasefire, respectively.⁴⁰ It was hypothesised that the overall prevalence of PTSD and depressive disorders may decrease with time, with the highest being reported during the conflict and the lowest in the long term. However, in our analysis, the results for PTSD symptoms were not consistent with the hypothesis, as the long-term prevalence turned out to be higher than the short-term interval. This could be due to the abundant elderly population in this time interval who might have faced greater trauma from other origins over their lifespan. Moreover, the elderly population is more susceptible to adverse age-related health conditions, which may contribute to the existing psychological stress. As reported by Eytan *et al*, poor health outcomes due to a lack of medical facilities and variations in job requirements

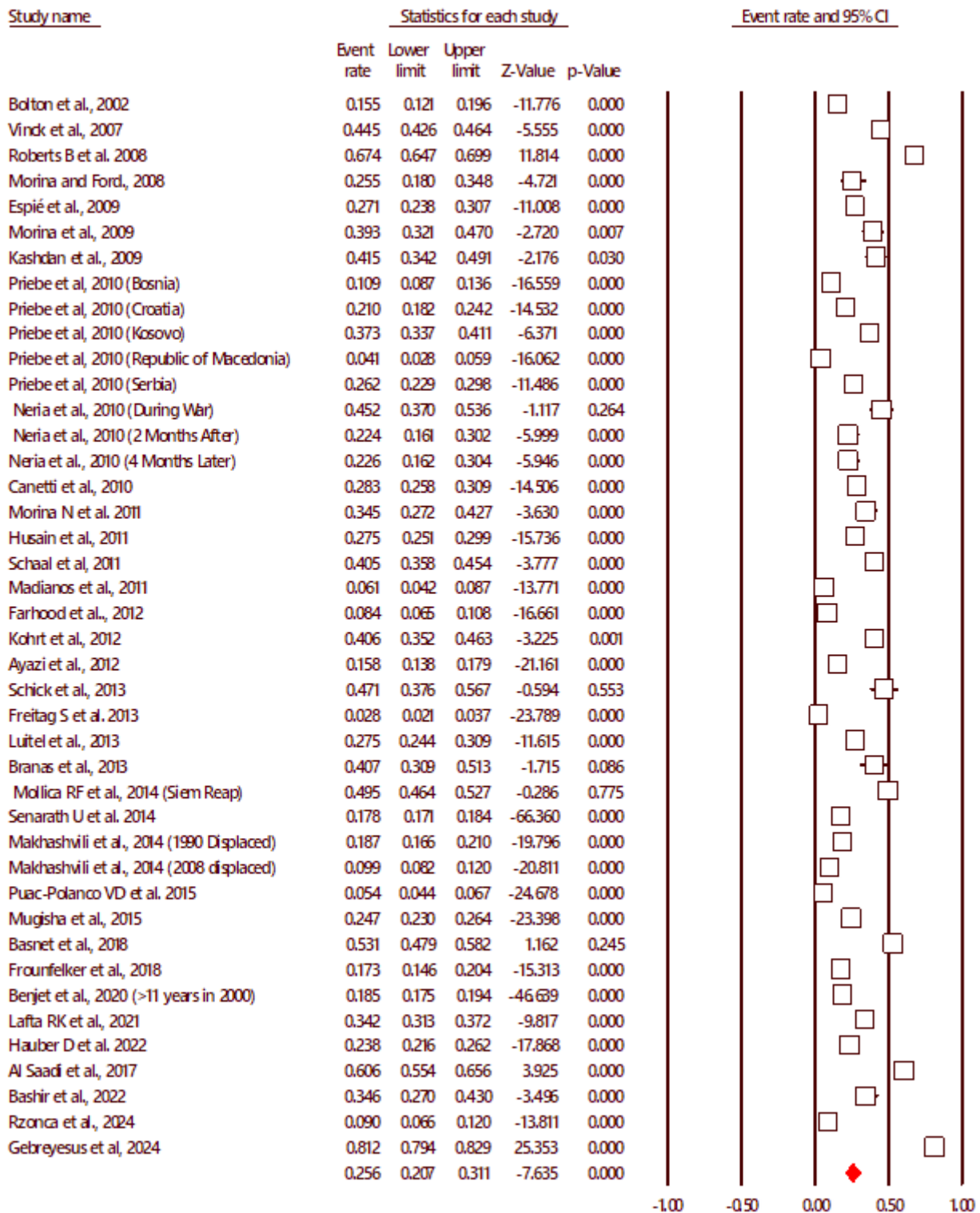


Figure 3 Depressive symptoms pooled prevalence.

following armed conflict may significantly contribute to chronic PTSD symptoms.⁸² Another explanation could be due to sustained traumatic experiences. Trauma response is a ‘subjective’ response to rapidly changing chronic unpredictable stress and can often result even though the primary insult is over. As such, it could be that post-war

circumstances, including sociopolitical upheavals and economic compromises, could act as a perpetual trauma with a gradual surge in PTSD symptoms.

The results of the subgroup analysis based on the country’s economic status revealed the dominance of both PTSD and depressive symptoms among LMICs, in

contrast to high-income countries. Similar to our results, the study by Hoppen *et al* revealed higher PTSD and depressive symptoms among war-affected LMICs.¹³ This is due to numerous challenges causing mental distress in LMICs that include poor infrastructure, unemployment, financial instability and food insecurity, which are further aggravated consequently by these conflicts. Moreover, the lack of healthcare facilities and trained professionals compromises satisfactory disease management. In a community-based survey in Rwanda,²⁵ Bolton *et al* observed a lack of globally approved management strategies for depression, with medications and one-on-one therapy considered extremely costly and budget-unfriendly. Moreover, the efficacy of Western-style psychotherapy and regimens has not yet been proven in non-Western or LMIC populations.²⁵

Our analysis revealed some heterogeneity across both PTSD and depressive symptoms. Other than disparity across the economic standing of involved countries and time since the war, the use of different diagnostic tools, varying trauma severity experienced by participants, differences across sample size (ranging from 27 to 12 841), study designs (cross-section, cohort) and varying target populations (ranging from university students to older adults) could have potentially contributed to the observed heterogeneity.

Several factors may predispose specific populations to develop mental illnesses despite similar trauma exposures. Luitel *et al* stated that the female gender, older age, inaccessibility of clothes and more perceived negative impact of the conflict in the community were strongly correlated with features of anxiety, depression and PTSD. Furthermore, the study found a significant relationship between disability, measured by the WHO Disability Assessment, and mental disorders.⁵³ Another study reported that decreasing PTSD symptoms over time is associated with multiple elements, including younger or older age, male gender, lower education, social support, fewer traumatic experiences during the follow-up period, employment status and absence of psychiatric comorbidity, particularly with depression and other anxiety disorders and minor initial PTSD symptoms.⁸³

In contrast to the civilian population, a higher prevalence of mental health disorders may be observed among combatants and refugees because of greater trauma exposure. While most studies report a higher prevalence among militant groups,⁸⁴ Lim *et al* reported features of depression and anxiety significantly more prevalent among militant populations as compared with civilians, whereas no significant difference was observed for PTSD symptoms.⁶ This may be due to repetitive traumatic events experienced during training or different time zones, leading to gradual desensitisation and, ultimately, a mere emotional response.⁶

Implications

The findings of this meta-analysis underscore the critical need for comprehensive mental health interventions targeting civilians in war-affected regions. The incidence of mental health disorders among war-afflicted populations can be alleviated by routine screening to diagnose at-risk individuals and timely administration of culturally appropriate psychiatric interventions, including psychosocial support, counselling sessions, group therapy and pharmacotherapy. As the conflict leads to detrimental effects at the community level, destroying the families and social networks, community-based interventions must be promoted where family members, neighbours and caregivers can provide natural support to the affected individuals instead of external professionals such as counsellors.⁸⁵

If offered through a formal health and educational system, psychological interventions can attain greater coverage and sustainability.⁸⁶ In addition, governments and international non-government organisations must collaborate to ensure adequate supply provision and improve living conditions, reducing physical and psychological stresses. Similarly, global forums should be urged to highlight the unendurable toll that conflicts take on affected populations and advocate against such violent acts for a better and peaceful world. Lastly, further research is needed to address gaps in understanding, including longitudinal assessments and the effectiveness of interventions tailored to the unique needs of war survivors.

Limitations

Our study carried certain limitations. First, the epidemiological assessment methods for PTSD and depressive symptoms varied across included studies, with some employing questionnaires for data collection while others opting for mini-interviews. Similarly, no standardisation was observed across the questionnaires, tools and diagnostic cut-offs. Although all participants experienced armed conflict firsthand, the trauma levels varied across different studies. In the study of Branas *et al*,⁵⁴ 17.44% of the participants had firsthand experience of civil war, while Rugema *et al*⁶⁴ reported that 35.4% of women and 37.5% of men experienced traumatic episodes during the genocide period in Rwanda. Similarly, the varying severity and duration of the wars were not considered and might have impacted the outcomes. All of these factors could have contributed to the observed heterogeneity as well. Lastly, due to a lack of phenomenological consensus across the definitions of war, terrorism and armed conflict, a few studies might have been missed.

CONCLUSION

The adverse effects of armed conflict on physical morbidity and mortality have been diversely studied. However, the impacts on mental health outcomes have not been evidenced as strongly. Certain studies have evaluated the prevalence of mental illnesses in war-affected regions, but the majority targeted specific populations like militants, refugees, and so on. With civilians being the most affected population, it is integral to determine the sequelae of this group. The high

prevalence of PTSD and depression highlights the need for appropriate measures to diagnose and manage affected individuals timely. As LMICs are more susceptible, the urgency for the scaling up of mental healthcare is essential for reducing the magnitude of post-conflict mental health morbidity. Additionally, more studies with adequate sample sizes and response rates with true population representatives must be conducted to determine pre-conflict and post-conflict differences, susceptible populations and geographical variations to institute tailored interventions. Lastly, efforts must be upscaled to promote peace and resolve political conflicts via dialogues.

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REFERENCES

- Mesa-Vieira C, Haas AD, Buitrago-Garcia D, et al. Mental health of migrants with pre-migration exposure to armed conflict: a systematic review and meta-analysis. *Lancet Public Health* 2022;7:e469–81.
- Strekalova T, Liu Y, Kiselev D, et al. Chronic mild stress paradigm as a rat model of depression: facts, artifacts, and future perspectives. *Psychopharmacology (Berl)* 2022;239:663–93.
- Davies S, Petterson T, Öberg M. Organized violence 1989–2021 and drone warfare. *Journal of Peace Research* 2022;59:593–610.
- UCDP newsletter #5: organized violence in 2022. Available: <https://ucdp.uu.se/downloads/newsletter/issue5.html> [Accessed 11 Jun 2023].
- More than 100 million people are forcibly displaced. Available: <https://www.unhcr.org/refugee-statistics/insights/explainers/100-million-forcibly-displaced.html> [Accessed 11 Jun 2023].
- Lim ICZY, Tam WWS, Chudzicka-Czupala A, et al. Prevalence of depression, anxiety and post-traumatic stress in war- and conflict-afflicted areas: a meta-analysis. *Front Psychiatry* 2022;13:978703.
- Charlson F, van Ommeren M, Flaxman A, et al. New WHO prevalence estimates of mental disorders in conflict settings: a systematic review and meta-analysis. *The Lancet* 2019;394:240–8.
- Vos T, Abajobir AA, Abate KH, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the global burden of disease study 2016. *The Lancet* 2017;390:1211–59.
- Londoño A, Romero P, Casas G. The association between armed conflict, violence and mental health: a cross sectional study comparing two populations in Cundinamarca Department, Colombia. *Confl Health* 2012;6:12.
- Morina N, Stam K, Pollet TV, et al. Prevalence of depression and posttraumatic stress disorder in adult civilian survivors of war who stay in war-afflicted regions. A systematic review and meta-analysis of epidemiological studies. *J Affect Disord* 2018;239:328–38.
- Bryant RA. Post-traumatic stress disorder: a state-of-the-art review of evidence and challenges. *World Psychiatry* 2019;18:259–69.
- Chand SP, Hasan A. Depression. Available: <https://www.ncbi.nlm.nih.gov/books/NBK430847/> [Accessed 11 Jun 2023].
- Hoppen TH, Priebe S, Vetter I, et al. Global burden of post-traumatic stress disorder and major depression in countries affected by war between 1989 and 2019: a systematic review and meta-analysis. *BMJ Glob Health* 2021;6:e006303.
- McIntyre RS, Lee Y, Mansur RB. Treating to target in major depressive disorder: response to remission to functional recovery. *CNS Spectr* 2015;20 Suppl 1:20–30.
- Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71.
- JBI's tools assess trust, relevance & results of published papers: enhancing evidence synthesis. Available: <https://jbi.global/critical-appraisal-tools> [Accessed 11 Jun 2023].
- Comprehensive meta-analysis software (CMA). Available: <https://www.meta-analysis.com/> [Accessed 11 Jun 2023].
- Borenstein M, Hedges LV, Higgins JPT, et al. A basic introduction to fixed-effect and random-effects models for meta-analysis. *Res Synth Methods* 2010;1:97–111.
- Langan D. Assessing heterogeneity in random-effects meta-analysis. 2022. Available: https://doi.org/10.1007/978-1-0716-1566-9_4 [Accessed 11 Jun 2023].
- Patsopoulos NA, Evangelou E, Ioannidis JP. Sensitivity of between-study heterogeneity in meta-analysis: proposed metrics and empirical evaluation. *International Journal of Epidemiology* 2008;37:1148–57.
- Leave-one-out meta-analysis. Available: <https://www.stata.com/stata17/leave-one-out-meta-analysis/> [Accessed 11 Aug 2023].
- Borenstein M, Hedges LV, Higgins JPT, et al. *Introduction to meta-analysis*. Wiley, 2009.
- New World Bank country classifications by income Level:2022-2023. 2022. Available: <https://blogs.worldbank.org/opendata/new-world-bank-country-classifications-income-level-2022-2023> [Accessed 11 Aug 2023].
- Shi LY, Lin LF. The trim-and-fill method for publication bias: practical guidelines and recommendations based on a large database of meta-analyses. *Medicine (Baltimore)* 2019;98:e15987.
- Bolton P, Neugebauer R, Ndogoni L. Prevalence of depression in rural Rwanda based on symptom and functional criteria. *J Nerv Ment Dis* 2002;190:631–7.
- Trappler B, Braunstein JW, Moskowitz G, et al. Holocaust survivors in a primary care setting: fifty years later. *Psychol Rep* 2002;91:545–52.
- Joffe C, Brodaty H, Luscombe G, et al. The Sydney holocaust study: posttraumatic stress disorder and other psychosocial morbidity in an aged community sample. *J Trauma Stress* 2003;16:39–47.
- Hodgetts G, Broers T, Godwin M, et al. Post-traumatic stress disorder among family physicians in Bosnia and Herzegovina. *Fam Pract* 2003;20:489–91.
- Brodaty H, Joffe CF, Luscombe G, et al. Vulnerability to post-traumatic stress disorder and psychological morbidity in aged holocaust survivors. *Int J Geriatr Psychiatry* 2004;19:968–79.
- Farhood L, Dimassi H, Lehtinen T. Exposure to war-related traumatic events, prevalence of PTSD, and general psychiatric morbidity in a civilian population from Southern Lebanon. *J Transcult Nurs* 2006;17:333–40.
- Vinck P, Pham PN, Stover E, et al. Exposure to war crimes and implications for peace building in northern Uganda. *JAMA* 2007;298:543–54.

- 32 Thabet AA, Abu Tawahina A, El Sarraj E, *et al.* Exposure to war trauma and PTSD among parents and children in the Gaza strip. *Eur Child Adolesc Psychiatry* 2008;17:191–9.
- 33 Roberts B, Ocaña KF, Browne J, *et al.* Factors associated with post-traumatic stress disorder and depression amongst internally displaced persons in northern Uganda. *BMC Psychiatry* 2008;8:38.
- 34 Morina N, Ford JD. Complex sequelae of psychological trauma among Kosovar civilian war victims. *Int J Soc Psychiatry* 2008;54:425–36.
- 35 Morina N, Stangier U, Risch AK. Experiential avoidance in civilian war survivors with current versus recovered posttraumatic stress disorder: a pilot study. *Behav Change* 2008;25:15–22.
- 36 Espié E, Gaboulaud V, Baubert T, *et al.* Trauma-related psychological disorders among Palestinian children and adults in Gaza and West Bank, 2005–2008. *Int J Ment Health Syst* 2009;3:21.
- 37 Morina N, Ford JD, Risch AK, *et al.* Somatic distress among Kosovar civilian war survivors: relationship to trauma exposure and the mediating role of experiential avoidance. *Soc Psychiatry Psychiatr Epidemiol* 2010;45:1167–77.
- 38 Kashdan TB, Morina N, Priebe S. Post-traumatic stress disorder, social anxiety disorder, and depression in survivors of the Kosovo war: experiential avoidance as a contributor to distress and quality of life. *Journal of Anxiety Disorders* 2009;23:185–96.
- 39 Priebe S, Bogic M, Ajdukovic D, *et al.* Mental disorders following war in the Balkans: a study in 5 countries. *Arch Gen Psychiatry* 2010;67:518–28.
- 40 Neria Y, Besser A, Kiper D, *et al.* A longitudinal study of posttraumatic stress disorder, depression, and generalized anxiety disorder in Israeli civilians exposed to war trauma. *Journal of Traumatic Stress* 2010;23:322–30.
- 41 Ben-Ezra M, Palgi Y, Shira A. Late effect of the second Lebanon war: level of exposure and rates of comorbidity of posttraumatic stress symptoms and depressive symptoms among Israelis from northern and central Israel. *Eur J Psychiatr* 2010;24:158–66.
- 42 Canetti D, Galea S, Hall BJ, *et al.* Exposure to prolonged socio-political conflict and the risk of PTSD and depression among Palestinians. *Psychiatry* 2010;73:219–31.
- 43 Richards A, Ospina-Duque J, Barrera-Valencia M, *et al.* Posttraumatic stress disorder, anxiety and depression symptoms, and psychosocial treatment needs in Colombians internally displaced by armed conflict: a mixed-method evaluation. *Psychological Trauma: Theory, Research, Practice, and Policy* 2011;3:384–93.
- 44 Morina N, Reschke K, Hofmann SG. Long-term outcomes of war-related death of family members in Kosovar civilian war survivors. *Death Stud* 2011;35:365–72.
- 45 Husain F, Anderson M, Lopes Cardozo B, *et al.* Prevalence of war-related mental health conditions and association with displacement status in postwar Jaffna district, Sri Lanka. *JAMA* 2011;306:522–31.
- 46 Madianos MG, Sarhan AL, Koukia E. Posttraumatic stress disorders comorbid with major depression in West Bank, Palestine: a general population cross sectional study. *Eur J Psychiatr* 2011;25:19–31.
- 47 Schaal S, Dusingizemungu J-P, Jacob N, *et al.* Rates of trauma spectrum disorders and risks of posttraumatic stress disorder in a sample of orphaned and widowed genocide survivors. *European Journal of Psychotraumatology* 2011;2.
- 48 Farhood LF, Dimassi H. Prevalence and predictors for post-traumatic stress disorder, depression and general health in a population from six villages in South Lebanon. *Soc Psychiatry Psychiatr Epidemiol* 2012;47:639–49.
- 49 Ayazi T, Lien L, Eide AH, *et al.* What are the risk factors for the comorbidity of posttraumatic stress disorder and depression in a war-affected population? A cross-sectional community study in South Sudan. *BMC Psychiatry* 2012;12:175.
- 50 Kohrt BA, Hruschka DJ, Worthman CM, *et al.* Political violence and mental health in Nepal: prospective study. *Br J Psychiatry* 2012;201:268–75.
- 51 Schick M, Morina N, Klaghofer R, *et al.* Trauma, mental health, and intergenerational associations in Kosovar families 11 years after the war. *European Journal of Psychotraumatology* 2013;4.
- 52 Freitag S, Braehler E, Schmidt S, *et al.* The impact of forced displacement in world war II on mental health disorders and health-related quality of life in late life - a German population-based study. *Int Psychogeriatr* 2013;25:310–9.
- 53 Luitel NP, Jordans MJD, Sapkota RP, *et al.* Conflict and mental health: a cross-sectional epidemiological study in Nepal. *Soc Psychiatry Psychiatr Epidemiol* 2013;48:183–93.
- 54 Branäs CC, Dinardo AR, Polanco VDP, *et al.* An exploration of violence, mental health and substance abuse in post-conflict Guatemala. *Health* 2013;05:825–33.
- 55 Rieder H, Elbert T. Rwanda – lasting imprints of a genocide: trauma, mental health and Psychosocial conditions in survivors, former prisoners and their children. *Confl Health* 2013.
- 56 Silove D, Liddell B, Rees S, *et al.* Effects of recurrent violence on post-traumatic stress disorder and severe distress in conflict-affected Timor-Leste: a 6-year longitudinal study. *Lancet Glob Health* 2014;2:e293–300.
- 57 Mollica RF, Brooks R, Tor S, *et al.* The enduring mental health impact of mass violence: a community comparison study of Cambodian civilians living in Cambodia and Thailand. *Int J Soc Psychiatry* 2014;60:6–20.
- 58 Ayazi T, Lien L, Eide A, *et al.* Association between exposure to traumatic events and anxiety disorders in a post-conflict setting: a cross-sectional community study in South Sudan. *BMC Psychiatry* 2014;14:6.
- 59 Senarath U, Wickramage K, Peiris SL. Prevalence of depression and its associated factors among patients attending primary care settings in the post-conflict northern province in Sri Lanka: a cross-sectional study. *BMC Psychiatry* 2014;14:85.
- 60 Silove D, Ivancic L, Rees S, *et al.* Clustering of symptoms of mental disorder in the medium-term following conflict: an epidemiological study in Timor-Leste. *Psychiatry Res* 2014;219:341–6.
- 61 Makhshvili N, Chikovani I, McKee M, *et al.* Mental disorders and their association with disability among internally displaced persons and returnees in Georgia. *J Trauma Stress* 2014;27:509–18.
- 62 Puac-Polanco VD, Lopez-Soto VA, Kohn R, *et al.* Previous violent events and mental health outcomes in Guatemala. *Am J Public Health* 2015;105:764–71.
- 63 Mugisha J, Muyinda H, Wandiembe P, *et al.* Prevalence and factors associated with Posttraumatic Stress Disorder seven years after the conflict in three districts in northern Uganda (the Wayo-Nero Study). *BMC Psychiatry* 2015;15:170.
- 64 Rugema L, Mogren I, Ntaganira J, *et al.* Traumatic episodes and mental health effects in young men and women in Rwanda, 17 years after the genocide. *BMJ Open* 2015;5:e006778.
- 65 Stevanović A, Francišević T, Vermetten E. Relationship of early-life trauma, war-related trauma, personality traits, and PTSD symptom severity: a retrospective study on female civilian victims of war. *European Journal of Psychotraumatology* 2016;7:30964.
- 66 Al Saadi T, Zaher Addeen S, Turk T, *et al.* Psychological distress among medical students in conflicts: a cross-sectional study from Syria. *BMC Med Educ* 2017;17:173.
- 67 Basnet S, Kandel P, Lamichhane P. Depression and anxiety among war-widows of Nepal: a post-civil war cross-sectional study. *Psychol Health Med* 2018;23:141–53.
- 68 Frounfelker R, Gilman SE, Betancourt TS, *et al.* Civilians in World War II and DSM-IV mental disorders: results from the World Mental Health Survey Initiative. *Soc Psychiatry Psychiatr Epidemiol* 2018;53:207–19.
- 69 Roberts B, Makhshvili N, Javakhishvili J, *et al.* Mental health care utilisation among internally displaced persons in Ukraine: results from a nation-wide survey. *Epidemiol Psychiatr Sci* 2019;28:100–11.
- 70 Mutuyimana C, Sezibera V, Nsabimana E, *et al.* PTSD prevalence among resident mothers and their offspring in Rwanda 25 years after the 1994 genocide against the Tutsi. *BMC Psychol* 2019;7:84.
- 71 Benjet C, Axinn WG, Hermsilla S, *et al.* Exposure to armed conflict in childhood vs older ages and subsequent onset of major depressive disorder. *JAMA Netw Open* 2020;3:e2019848.
- 72 Lafta RK, Merza AK. Women's mental health in Iraq post-conflict. *Med Confl Surviv* 2021;37:146–59.
- 73 Yousef L, Ebrahim O, AlNahr MH, *et al.* War-related trauma and post-traumatic stress disorder prevalence among Syrian university students. *European Journal of Psychotraumatology* 2021;12:1954774.
- 74 Kakaje A, Al Zohbi R, Hosam Aldeen O, *et al.* Mental disorder and PTSD in Syria during wartime: a nationwide crisis. *BMC Psychiatry* 2021;21:2.
- 75 Hauber D, Zank S. WWII trauma impacts physical and mental health in the oldest old: results from a German population-based study. *Aging Ment Health* 2022;26:834–42.
- 76 Anbesaw T, Zenebe Y, Asmamaw A, *et al.* Post-traumatic stress disorder and associated factors among people who experienced traumatic events in Dessie town, Ethiopia, 2022: a community based study. *Front Psychiatry* 2022;13:1026878.
- 77 Bashir A, Khurshid S, Altaf M, *et al.* Assessment of anxiety and depression among adult population of Kashmir, India: a cross-sectional study. *J Clin Diagn Res* 2022;16:25–9.
- 78 Lushchak O, Velykodna M, Bolman S, *et al.* Prevalence of stress, anxiety, and symptoms of post-traumatic stress disorder among Ukrainians after the first year of Russian invasion: a nationwide cross-sectional study. *Lancet Reg Health Eur* 2024;36:100773.

- 79 Makango B, Alemu ZA, Solomon T, *et al.* Prevalence and factors associated with post-traumatic stress disorder among internally displaced people in camps at Debre Berhan, Amhara Region, Ethiopia: a cross-sectional study. *BMC Psychiatry* 2023;23:81.
- 80 Rzońca P, Podgórski M, Łazarewicz M, *et al.* The prevalence and determinants of PTSD, anxiety, and depression in Ukrainian civilian physicians and paramedics in wartime—an observational cross-sectional study six months after outbreak. *Psychiatry Res* 2024;334:115836.
- 81 Gebreyesus A, Niguse AT, Shishay F, *et al.* Prevalence of depression and associated factors among community hosted internally displaced people of Tigray; during war and siege. *BMC Psychiatry* 2024;24:3.
- 82 Eytan A, Guthmiller A, Durieux-Paillard S, *et al.* Mental and physical health of Kosovar Albanians in their place of origin: a post-war 6-year follow-up study. *Soc Psychiatry Psychiatr Epidemiol* 2011;46:953–63.
- 83 Priebe S, Gavrilovic J, Bremner S, *et al.* Course of post-traumatic stress disorder following war in the Balkans: 1-year follow-up study. *Psychol Med* 2013;43:1837–47.
- 84 Moreno-Chaparro J, Piñeros-Ortiz S, Rodríguez-Ramírez L, *et al.* Mental health consequences of armed conflicts in adults: an overview. *Actas Esp Psiquiatr* 2022;50:68–91.
- 85 Kamali M, Munyuzangabo M, Siddiqui FJ, *et al.* Delivering mental health and psychosocial support interventions to women and children in conflict settings: a systematic review. *BMJ Glob Health* 2020;5:e002014.
- 86 Tol WA, Barbui C, Galappatti A, *et al.* Mental health and psychosocial support in humanitarian settings: linking practice and research. *Lancet* 2011;378:1581–91.



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