



Review article

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

Nexhmedin Morina^{a,b,*}, Kimberly Stam^b, Thomas V. Pollet^c, Stefan Priebe^d

^a Institute of Psychology, University of Münster, Münster, Germany

^b Department of Psychology, University of Amsterdam, Amsterdam, The Netherlands

^c Department of Psychology, Northumbria University, Newcastle upon Tyne, UK

^d Unit for Social and Community Psychiatry, Queen Mary University of London, UK



ARTICLE INFO

Keywords:

War survivors

Depression

Posttraumatic stress disorder

Meta-analysis

ABSTRACT

Background: Epidemiological surveys on depression and posttraumatic stress disorder (PTSD) among civilian war survivors in war-afflicted regions have produced heterogeneous prevalence estimates of these conditions. **Methods:** To determine the prevalence of both depression and PTSD in civilian war survivors in the area of conflict, we conducted a systematic search of Medline, PsycInfo, and Pilots databases. We included epidemiological studies that had used structured clinical interviews. We conducted random effects meta-analyses on prevalence proportions as well as univariate mixed model meta-regressions. **Results:** We included 33 studies that assessed prevalences of depression ($k = 18$) and/or PTSD ($k = 30$). Across all studies, pooled point prevalences of 0.27 and 0.26 were found for depression and PTSD, respectively. Ten percent of participants fulfilled criteria for both disorders. Surveys with a higher mean age of participants reported higher prevalence of depression. Furthermore, samples with higher rates of unemployment and higher percentages of women reported higher prevalence of PTSD, whereas samples with a higher number of participants living with a partner reported lower prevalence of PTSD. **Limitations:** The findings are limited by poor psychometric reporting practices. **Conclusions:** Our findings suggest that both depression and PTSD are highly prevalent in war survivors who stayed in the area of conflict. Yet, future research on this topic need to focus on psychometric properties of instruments used to assess psychopathology among war survivors. Notwithstanding this limitation, there is an urgent need for large-scale mental health programs that are appropriate for war-affected countries with limited resources and address depression as much as PTSD.

1. Introduction

Since the end of the Cold War in 1989, more than half of the countries in the world have been affected by armed conflicts (Marshall & Cole, 2014) with a direct impact on the lives of millions of people. For various reasons, research on the mental sequelae of war experience has often investigated refugees in high-income countries. The overwhelming majority of war survivors, however, are civilians who live in areas of (former) conflict in low-and middle-income countries (LMICs; Brundtland, 2000). Most epidemiological studies on mental disorders in war survivors have focused on posttraumatic stress disorder (PTSD) and depression. If untreated, both depression and PTSD can become chronic, and contribute significantly to the global burden of disease

(Kessler, 2012; Morina et al., 2014; Sabes-Figuera et al., 2012). Furthermore, comorbid depression and PTSD is characterized by significantly higher levels of psychopathological distress, including suicide risk, than either condition alone (Morina et al., 2013). A significant step in understanding the scope of the problem in war-afflicted countries is a reliable estimate of civilian war survivors with depression and PTSD that may inform current and future mental health policies in war-affected countries. This is particularly relevant for LMICs given their limited mental health services and impediments in adapting interventions to the mental health needs of their population (Saxena et al., 2007). In 2009, Steel et al. (2009) published a meta-analysis of surveys on the prevalences of PTSD and depression among populations exposed to mass conflict and displacement that included surveys in conflict-

* Corresponding author.

E-mail address: morina@uni-muenster.de (N. Morina).

<https://doi.org/10.1016/j.jad.2018.07.027>

Received 28 February 2018; Received in revised form 21 May 2018; Accepted 8 July 2018

0165-0327/ © 2018 Elsevier B.V. All rights reserved.

affected populations. The reported prevalences for PTSD and depression in the included publications varied greatly, from 0% to 99% for PTSD and 3% to 85.5% for depression, and the weighted prevalences were 30.6% for PTSD and 30.8% for depression. The authors, however, did not report prevalences of these disorders separately from surveys with war survivors who stayed in the areas of conflict. Furthermore, they used a rather wide definition of mass conflict to include surveys in their meta-analysis. For example, they included the survey by Stein et al. (2008), which was conducted with 4351 individuals in South Africa and did not necessarily include exposure to human rights violations as an inclusion criterion for the study. Surveys that include individuals without a history of exposure to mass conflict may skew the pooled prevalence of mental disorders in conflict-affected populations.

To our knowledge, no previous publication has focused on deriving a robust prevalence estimate of depression and PTSD among civilian war survivors. We aimed to determine, through a systematic review and meta-analysis, prevalences of depression and PTSD in adult civilians who have experienced war-related events and still live in areas of (former) conflict. We also explored study-level factors (e.g., type of sampling or gender) that might be associated with the occurrence of these two conditions (Steel et al., 2009).

2. Method

2.1. Identification and selection of studies

The aims and methods of this meta-analysis were registered with the PROSPERO database (CRD42016032720, <http://www.crd.york.ac.uk/prospéro>). A survey was included if the country in which it was conducted was listed as war-affected by the Uppsala Conflict Data Program. The program defines wars as conflicts that generate 1,000 or more battle-related deaths in one calendar year (Pettersson & Wallensteen, 2015; Uppsala Conflict Data Program, 2016). The first and the second authors located relevant epidemiological studies in the computerized bibliographic databases Medline, PsycINFO, and PILOTS (PILOTS is managed by the United States National Center for PTSD). The search was conducted in September 2017 in titles, abstracts and key concepts using the following terms relating to the four categories: 1) Depression (“major depression/ OR depress*.ti,ab,id. OR MDD.ti,ab,id”); 2) PTSD (“posttraumatic stress disorder/ OR posttraumatic stress.ti,ab,id. OR post-traumatic stress.ti,ab,id. OR posttraumatic syndrome*.ti,ab,id. OR post traumatic syndrome*.ti,ab,id. OR PTSD”); 3) General mental health (“mental disorders/ OR mental health.ti,ab,id.”), and 4) War victims (“genocide/ OR holocaust/ OR war/ OR (war OR wars OR warfare).ti,ab,id. OR “prisoners of war”/ OR mass conflict*.ti,ab,id. OR post-conflict*.ti,ab,id. OR political conflict*.ti,ab,id. OR armed conflict*.ti,ab,id. OR terrorism/ OR torture/ OR persecution.ti,ab,id. OR civilian*.ti,ab,id. OR ethnic cleansing.ti,ab,id”). The search was conducted such that at least one term in the categories depression, PTSD or general mental health had to be reported in titles, abstracts or key concepts in the respective database, along with one term for war victims.

Publications had to meet the following criteria: 1) a sample size of 50 or more participants with exposure to war-related events who were living in the area of former conflict at the time the survey was conducted; 2) participants had experienced war-related events within 25 years prior to conducting the survey; 3) at least 80% of the participants were older than 18 years; 4) depression and/or PTSD was measured with a structured psychiatric interview based on the Diagnostic and Statistical Manual of Mental Disorders (DSM; American Psychiatric Association, 1980) or International Classification of Diseases (e.g., ICD; World Health Organization, 1992) criteria for these conditions. Exclusion criteria were: 1) study participants had received mental health interventions; and 2) the sample consisted of combatants in armed forces or refugees. Similarly to Steel et al. (2009), studies conducted with Israeli participants were excluded because they usually involved a

small group of the population who were exposed to specific terrorist attacks and are therefore not representative for the general population.

Relevant data from eligible publications were extracted using a self-constructed codebook. The first and the second authors extracted the relevant data using the codebook. If a publication reported on more than one sample because the study was carried out in more than one country (e.g., Priebe et al., 2010), or because the study was conducted with different groups of war survivors (such as bereaved and non-bereaved survivors as in Morina et al. (2011)), a separate codebook was filled in for each sample that fulfilled our criteria. For a given study, only samples that fulfilled the inclusion criteria for the meta-analysis were included. For example, the study by Basoglu et al. (2005) included a sample of war survivors from Bosnia as well as samples with refugees in Croatia and Bosnia. Consequently, only the data from the sample in Bosnia were included.

The codebook contained items that related to methodological factors, demographic factors, and trauma- and disorder-related factors. The following variables were used as study-level predictors and were assessed using the codebook: type of sampling (population based or critical population or mixed), gender (proportion women), age, partnership (cohabiting and married vs. not living together), employment status, country where study conducted, response rate (study participants/potential participants), education (percentage of those who had reported no education or elementary education), time since most traumatic war-related event (or if this information was not reported, then time since end of war), exposure to the five most common traumatic experiences, and average number of war-related traumatic events. To be included into the meta-analysis, publications needed to report prevalence rates of depression and/or PTSD. As all but one study reported point prevalences (Alhasnawi et al., 2009), only studies reporting point prevalences were entered. We defined a LMIC according to the World Bank's classification of a country with a gross national income per capita of less than US\$12 235 in 2016 (World Bank, 2018).

2.2. Quality assessment

Two raters (the first and second authors) independently rated the quality of the included trials. This was done by developing a scale tailored to the particular requirements for the current review following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (von Elm et al., 2007) and based on previous literature (Sanderson et al., 2007; Wang et al., 2017). Specifically, the scale enabled us to evaluate (1) participants selection procedure, (2) participation rate, (3) psychometric properties of the instrument used to diagnose PTSD or depression in the language in which the study was conducted, (4) psychometric properties of the instrument used to diagnose PTSD or depression in the language in which the instrument was originally developed (given that the instrument was translated from some other language), (5) interviewers' training, and (6) interrater reliability. We classified quality in each domain as low (0), moderate (1), or high (2).

2.3. Statistical analysis

We conducted random effects meta-analyses on prevalence proportions (Barendregt et al., 2013) for depression and PTSD. Analyses were conducted in R 3.4.1 (R Core Team, 2015) with the packages meta v.4.8–4 (Schwarzer et al., 2015; Schwarzer, 2016) and metafor v.2.2–0 (Viechtbauer, 2015; Viechtbauer, 2010). The analyses were conducted on the Freeman-Tukey double arcsine transformed proportions using the inverse variance method (Barendregt et al., 2013; Miller, 1978). Agresti-Coull confidence intervals were constructed for individual studies in the forest plots (Agresti & Coull, 1998). Between-study variance (τ^2) was estimated via Restricted Maximum Likelihood (Schwarzer et al., 2015). Homogeneity of effect sizes was studied via the Q -statistic and the I^2 -statistic, which indicates the degree of

heterogeneity in percentages. The potential for publication bias was inspected visually via the funnel plot (Sterne et al., 2011) and Egger's test (Egger et al., 1997). In addition, we used the trim-and-fill procedure (Duval & Tweedie, 2000) to examine what the estimated prevalences would be, after adjusting for potential publication bias.

To examine whether the observed heterogeneity could be explained by variables of interest, we conducted a series of univariate mixed model meta-regressions.²⁴ Ten predictor variables were examined separately (in the listed order): training of the interviewers in assessing PTSD and/or depression (yes/no), response rate of potential participants, mean time since trauma, mean number of traumatic events, continent in which the study was conducted, percentage of female participants, mean age, employment, living with a partner, percentage of participants with at least primary education, and co-occurrence of PTSD and major depression. These predictors were evaluated by the change in Cochran's heterogeneity Q-statistic and the concomitant p-value. In light of the relatively low power associated with the current set of studies, we used $p = .1$ as significance threshold (Hedges & Pigott, 2001).

3. Results

3.1. Selection and inclusion of studies

A total of 34 surveys fulfilled the criteria and were included into the meta-analysis (see Fig. 1 and Table 1). All publications were written in English. Of these, 30 reported on the prevalence of PTSD and 18 on depression. Five of the included studies were conducted either in more than one country (de Jong et al., 2001; Priebe et al., 2010) or with distinctive samples such as bereaved war survivors were compared with

non-bereaved war survivors (Morina et al., 2011; Morina et al., 2011; Morina & Emmelkamp, 2012) This resulted in 38 and 24 samples, in which PTSD and depression were respectively assessed (see Table 1). All studies were conducted in LMICs.

The most frequently used diagnostic interview for both depression and PTSD was the MINI International Neuropsychiatric Interview (Sheehan et al., 1998) (see Table 1). With the exception of the survey conducted by Somasundaram and Sivayokan (1994), the assessment of PTSD was in accordance with the definitions and criteria of the DSM-IV. The 30 studies that assessed PTSD, included 28 samples that were recruited via a random or probability recruitment design, eight samples recruited from a critical population that shared a common feature (e.g., war-related bereavement), and two samples recruited using mixed sampling designs. Random or probability sampling had also mostly been applied in surveys assessing depression (14 out of 18 studies), whereas three studies had been conducted with critical populations and one had relied on mixed sampling design. The information about mean number of war-related events was missing with regard to 35.1% and 29.2% of samples where PTSD and depression were respectively assessed. Furthermore, the authors used different measures to assess war-related events. This resulted in different definitions of traumatic events. For example, some publications reported on types of traumatic events (i.e., being exposed several times to the same traumatic event would count as one traumatic event) and other publications reported on overall number of traumatic events (i.e., being exposed for example six times to the same traumatic event would count as six events). Given these limitations, we decided to not use the number of traumatic events as a predictor variable. With regard to the nature of exposure to war-related events, several events were prevalent across many surveys. These include the murder or death of family or friends that was

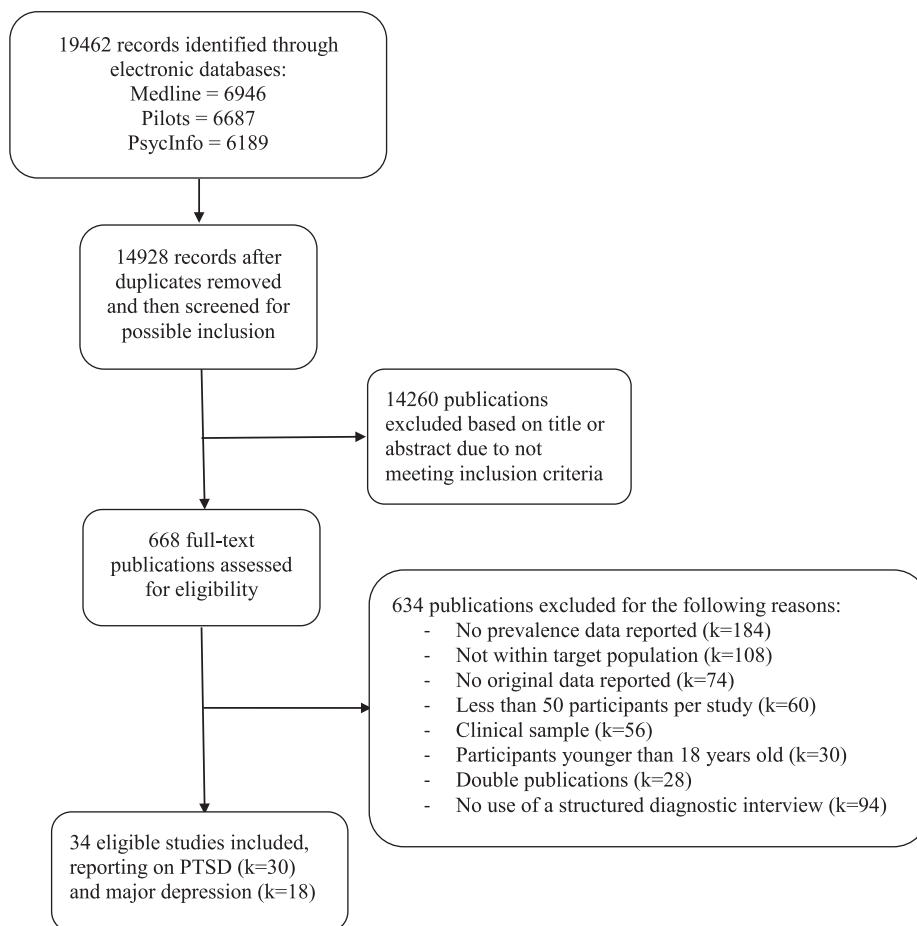


Fig. 1. Flowchart of study selection.

Table 1
Characteristics of included studies.

Publication	N	Country	Years since trauma	5 Main war-related events (percentages)	Case finding instrument	
					PTSD	MD
Ayazi et al. (2012)	1200	Sudan	5	None reported	n.a.	MINI
Basoglu et al. (2005)	565	Bosnia & Herzegovina	7	1. Combat situation (% n.r.) 2. Torture (% n.r.) 3. Death family/friends (% n.r.) 4. & 5. n.r.	SCID	SCID
Betancourt et al. (2016)	563	Sierre Leone	13	1. Expelled from home under threat (20.8%) 2. Destruction of property (20.3%) 3. Beating or torture of others (12.9%) 4. Murder or death family/friends (8.5%) 5. Threatened under use of guns (7.3%)	PSS-I	n.a.
Canetti et al. (2010)	1196	Palestine	Ongoing	1. Political violence (37%) 2. Death family/friends (34.7%) 3. Serious accident, fire, or explosion (17.2%) 4. Expelled from home under threat (% n.r.) 5. Imprisonment (% n.r.)	PSS-I	n.a.
De Jong et al. (2001)	653	Algeria	6	1. Youth domestic violence (55.3%) 2. Torture (8.4%) 3. Death family/friends (7.8%) 4. & 5. n.r.	CIDI	n.a.
	610	Cambodia	8	1. Youth domestic violence (36.3%) 2. Death family/friends (17.5%) 3. Torture (9%) 4. & 5. n.r.		
	585	Palestine	Ongoing	1. Youth domestic violence (36.6%) 2. Torture (15%) 3. Death family/friends (4.6%) 4. & 5. n.r.		
Elhabiby et al. (2015)	74	Darfur	n.r.	1. Death family/friends (25.7%) 2. – 5. n.r.	SCID	SCID
Eytan et al. (2004)	996	Kosovo	2	1. Combat situation (85.9%) 2. Lack of food or water (68.1%) 3. Being close to one's own death (63.4%) 4. Lack of shelter (56.9%) 5. Witnessed murder or death of strangers (36.6%)	MINI	n.a.
Farhood et al. (2010)	118	Lebanon	5.7	1. Imprisonment (% n.r.) 2. – 5. n.r.	CAPS	n.a.
Fodor et al. (2015)	465	Rwanda	n.r.	1. Genocide (100%) 2. Murder or death family/friends (70%) 3. Destruction of property (48.2%) 4. Witnessed murder or death of strangers (45.8%) 5. Forced to flee one's home (34.8%)	n.a.	MINI
Hashemian et al. (2006)	153	Iran	16	None reported	CAPS	n.a.
Johnson et al. (2008)	1661	Liberia	4	1. Rape/sexual abuse 2. – 5. n.r.	PSS-I	n.a.
Kozaric-Kovacic et al. (2000)	368	Croatia	2.5	1. Combat situation (82.6%) 2. Being close to one's own death (82.3%) 3. Destruction of property (74.5%) 4. Forced separation from family (72.3%) 5. Lack of food or water (72.3%)	SCID	n.a.
Morina and Ford (2008)	102	Kosovo	6	1. Combat situation (28%) 2. Expelled from home under threat (24%) 3. Death family/friends (12%) 4. Forced separation from loved ones (5%) 5. House search by armed forces (4%)	MINI	MINI
Morina et al. (2008)	84	Kosovo	6	1. Expelled from home under threat (91.7%) 2. Combat situation (79.8%) 3. Lack of food or water (78.3%) 4. Lack of shelter (58.3%) 5. Death family/friends (56%)	MINI	
Morina et al. (2010a)	163	Kosovo	8	1. Expelled from home under threat (24.7%) 2. Combat situation (77.9%) 3. Lack of shelter (67.5%) 4. Lack of food or water (60.7%) 5. Witnessed murder/death of strangers (34.4%)	MINI	MINI
Morina et al. (2010b)	60	Kosovo	7.6	1. Death family/friends (100%) 2. Expelled from home under threat (86.7%) 3. Combat situation (81.7%) 4. Lack of shelter (78.3%) 5. Being close to one's own death (66.7%)	n.a.	MINI
Morina et al. (2011) bereaved	71	Kosovo	9	1. Expelled from home under threat (78.9%) 2. Combat situation (78.9%) 3. Lack of food or water (57.7%)	MINI	MINI

(continued on next page)

Table 1 (continued)

Publication	N	Country	Years since trauma	5 Main war-related events (percentages)	Case finding instrument	
					PTSD	MD
Non-bereaved	71	Kosovo	9	4. & 5. n.r. 1. Expelled from home under threat (63.4%) 2. Combat situation (60.6%) 3. Lack of food or water (49.3%) 4. & 5. n.r.	MINI	MINI
Morina et al. (2011) bereaved	179	Kosovo	10	1. Murder or death family/friends (100%) 2. Expelled from home under threat (93.3%) 3. Lack of shelter (92.2%) 4. & 5. n.r.	MINI	MINI
Non-bereaved	175	Kosovo	10	1. Expelled from home under threat (86.3%) 2. Lack of shelter (82.9%) 3. Lack of food or water (73.1%) 4. & 5. n.r.		
Morina et al. (2012) widowed mothers	100	Kosovo	10	1. Expelled from home under threat (81.7%) 2. Lack of shelter (74.7%) 3. Combat situation (60.6%) 4. & 5. n.r.	MINI	MINI
Married mothers	106	Kosovo	10	1. Murder death family/friends (100%) 2. Expelled from home under threat (94%) 3. Lack of shelter (92%) 4. & 5. n.r.		
Mugisha et al. (2015)	2361	Uganda	7	None reported	MINI	MINI
Munyandamutsa et al. (2012)	962	Rwanda	14	1. Murder or death family/friends (40%) 2. – 5. n.r.	MINI	MINI
Priebe et al. (2010)	727	Croatia	13	1. Bombardment (93.6%) 2. Lack of shelter (76.9%) 3. Expelled from home under threat (47.2%) 4. Death family/friends (39.7%) 5. Combat situation (30.3%)	MINI	MINI
	648	Kosovo	8	1. Combat situation (71.1%) 2. Expelled from home under threat (70.4%) 3. Lack of shelter (59%) 4. Lack of food or water (56.9%) 5. Bombardment 49.8%)		
	637	Serbia	13	1. Bombardment (84.45%) 2. Lack of shelter (51.13%) 3. Lack of food or water (36.88%) 4. Expelled from home under threat (38.24%) 5. Combat situation (40.11%)		
	640	Bosnia & Herzegovina	13	1. Bombardment (99.7%) 2. Combat situation (98.1%) 3. Lack of food or water (96.6%) 4. Lack of shelter (81.4%) 5. Death family/friends (69%)		
Rasmussen et al. (2007)	116	India	11,6	1. Torture (52.5%) 2. – 5. n.r.	CAPS	SCID
Rieder and Elbert (2013)	172	Rwanda	16	1. Witnessed murder or death of strangers (19.3%) 2. Physical violence (15.3%) 3. Seeing dead or mutilated bodies (10.9%) 4. Threatened under use of guns 5. n.r.	PSS-I	n.a.
Roth et al. (2014)	125	Rwanda	14	1. Expelled from home under threat (95%) 2. Physical violence (94%) 3. Witnessed armed attack (87%) 4. Forced to hide (69%) 5. Rape/sexual abuse (27%)	PSS-I	n.a.
Rugema et al. (2015)	917	Rwanda	17	1. Murder or death of family/friends (36.4%) 2. – 5. n.r.	MINI	MINI
Schaal et al. (2011)	400	Rwanda	13	1. Expelled from home under threat (90%) 2. Attack/assault with a deadly weapon (90%) 3. Witnessed murder or death of strangers (52%) 4. Rape/sexual abuse (21%) 5. Murder or death of family/friends (15.5%)	PSS-I	n.a.
Schaal et al. (2012)	383	Rwanda	15	None reported	PSS-I	n.a.
Seino et al. (2008)	1172	Afghanistan	5	1. Bombardment (18.8%) 2. Mine explosion (12.3%) 3. Disabled family member because of conflict (9.5%) 4. Murder or death of family/friends (8.3%) 5. Disappearance/kidnapping of a dear person (6.6%)	SCID	n.a.
Sheikh et al. (2015)	258	Nigeria	2	1. Death family/friends (93.5%) 2. Ill without access to medical care (91.6%) 3. Family beaten (74.7%) 4. Witnessed death (74.5%)	n.a.	CIDI

(continued on next page)

Table 1 (continued)

Publication	N	Country	Years since trauma	5 Main war-related events (percentages)	Case finding instrument	
					PTSD	MD
Somasundaram and Sivayokan (1994)	98	Sri Lanka	4	5. n.r. 1. Expelled from home under threat (69%) 2. Lack of food or water (55%) 3. Murder or death of family/friends (49%) 4. Threatened under use of guns (38%) 5. Injury to a relative (38%)	SIQ	SIQ
Veling et al. (2013)	93	D. R. of Congo	ongoing	1. Combat situation (99%) 2. Major natural disaster (72%) 3. Maltreatment by police or army (58%) 4. Kidnapped and threatened under use of guns (53%) 5. Torture (67.5%)	CIDI	n.a.
Yasan et al. (2009)	708	Turkey	9.8	1. Combat situation (67.5%) 2–5. n.r.	CAPS	n.a.
Zungu-Dirwayi et al. (2004)	134	South Africa	n.r.	1. Murder or death of family/friends (44%) 2. Torture (43%) 3. Maltreatment by police or army (41%) 4. Kidnaped (20%) 5. n.r.	MINI	MINI

Note: CAPS = Clinician-Administered PTSD Scale. CIDI = Composite International Diagnostic Interview. MD = Major Depression. MINI = MINI International Neuropsychiatric Interview. N = number of participants. N.a. = not applicable. N.r. = not reported. PSS-I = Posttraumatic Symptom Scale Interview. PTSD = Posttraumatic Stress Disorder. SCID = Structured Clinical Interview for DSM disorders. SIQ = Stress Impact Questionnaire.

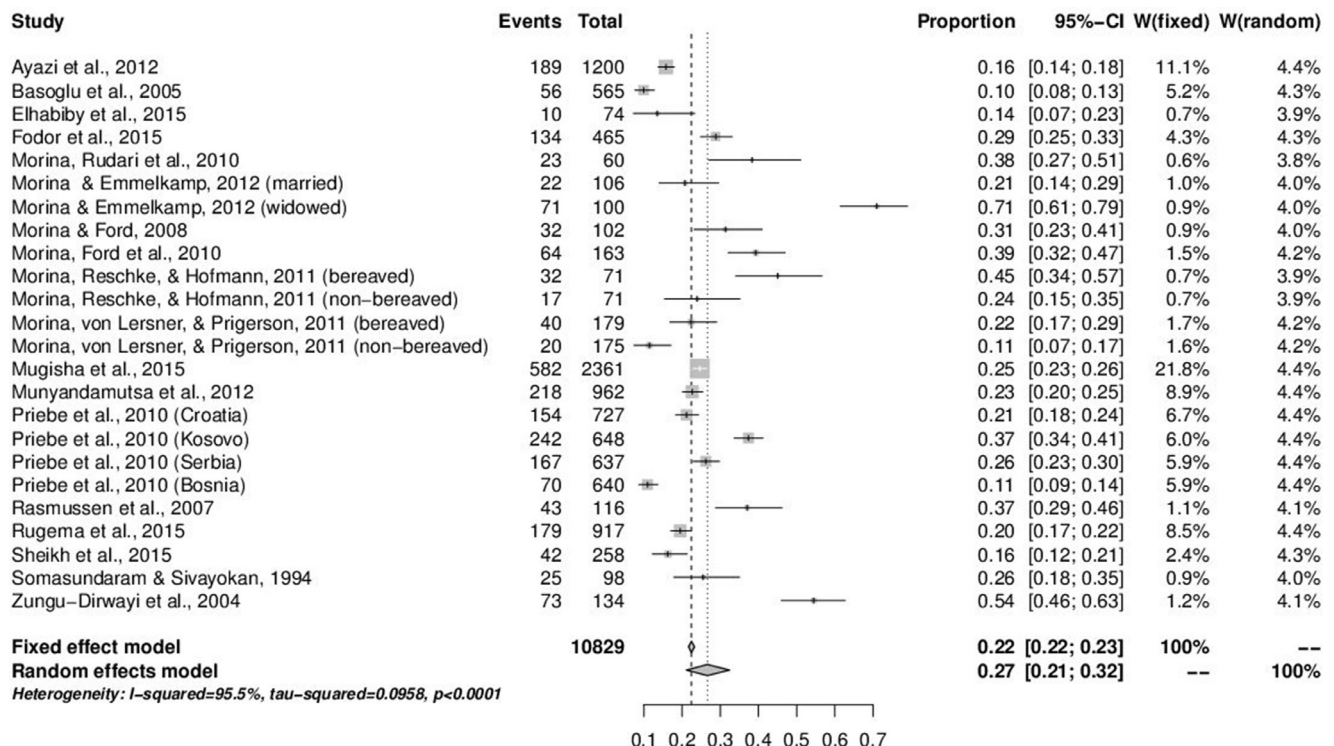


Fig. 2. Forest plot of major depression prevalences in individual studies.

reported in 21 of the samples or combat situations, which was reported in 16 of the samples. In addition, four of the included publications did not report on the specific types of traumatic events and 14 other publications failed to provide a list of the five most prevalent traumatic events. Accordingly, we decided to not use exposure to types of war-related events as a predictor variable.

4. Studies on prevalence of major depression

4.1. Characteristics of included studies

The 18 included studies reported on a total sample of 10,829

participants from 12 different countries in Africa, Asia, and Europe. The mean age of study participants was 39.6 (*SD* = 8.8) and 60.5% of participants were female. The assessment took place after a mean of 9.6 years following conflict (*SD* = 3.7, range: 2–17 years). See Table 1 for further information.

4.2. Prevalence of major depression

The forest plot in Fig. 2 depicts the prevalences and their confidence intervals. Prevalences of depression ranged from 10% (Basoglu et al., 2005) to 71% (Morina & Emmelkamp, 2012). Overall, in a random effects model, the prevalence for depression was 0.27 (95%

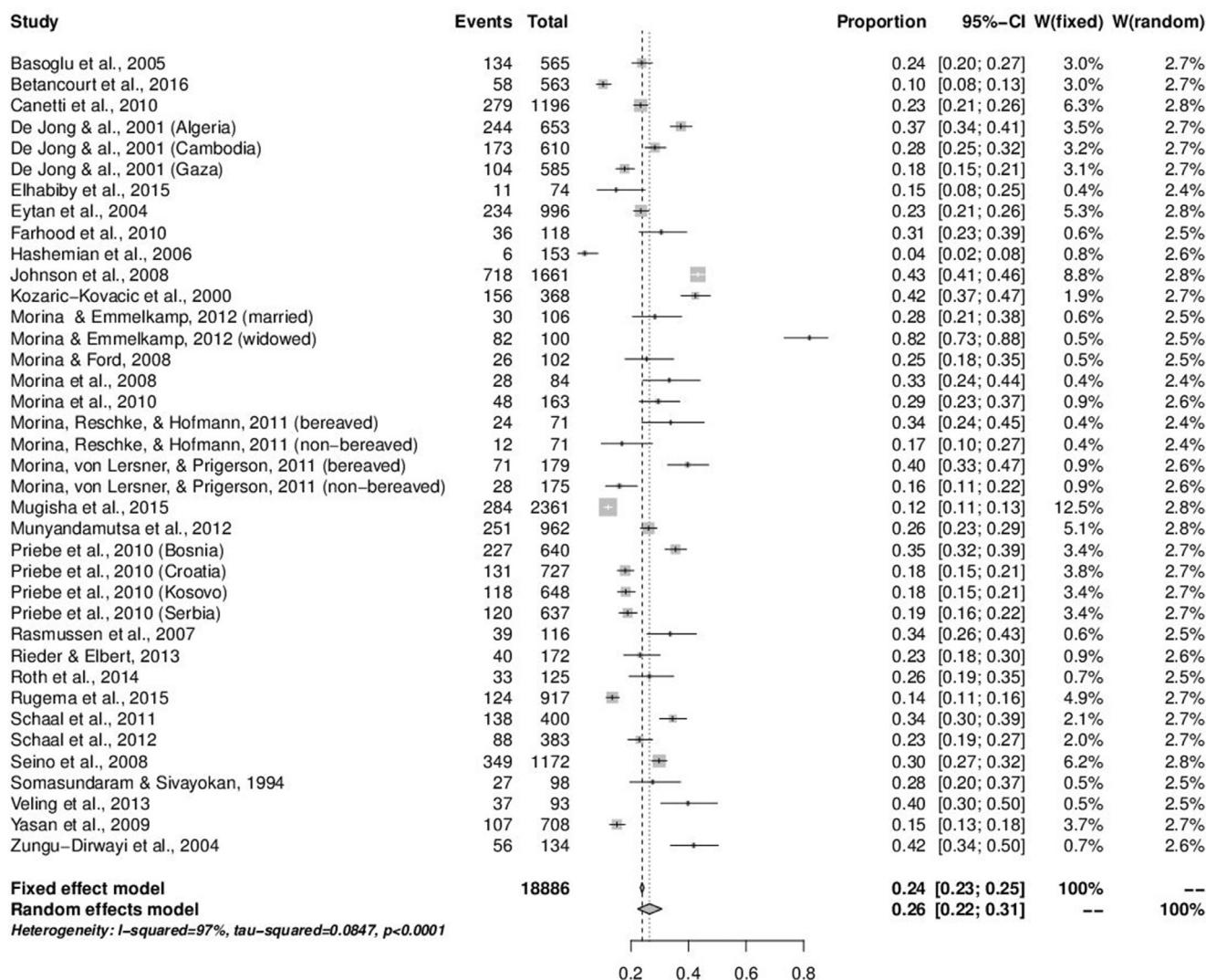


Fig. 3. Forest plot of posttraumatic stress disorder prevalences in individual studies.

CI = 0.21–0.32, $k = 24$, $I^2 = 95.5\%$, $Q = 512.67$, $df = 23$, $p < .001$). A linear regression test of funnel plot asymmetry indicated asymmetry (Egger's test, $p = .13$), with smaller studies reporting higher prevalences for depression. Fig. 4 provides the funnel plot for the surveys assessing prevalence of depression. The trim and fill procedure would add five studies and the adjusted prevalence is 0.2137 (95% CI = 0.1548 - 0.2792, $I^2 = 96.3\%$, $Q = 748.57$, $df = 28$, $p < .001$).

4.3. Meta-analytic regression

The meta-regression analyses showed that the following variable did not significantly explain heterogeneity in the prevalence of major depression: years since trauma ($Q = 0.06$, $df = 1$, $p = .81$), training in assessing major depression ($Q = 0.58$, $df = 1$, $p = .45$), the response rate of potential participants ($Q = 0.16$, $df = 1$, $p = .69$), the continent in which the study was conducted ($Q = 0.62$, $df = 2$, $p = .73$), gender ($Q = 0.76$, $p = .38$), work ($Q = 0.85$, $df = 1$, $p = .36$), education ($Q = 0.0005$, $df = 1$, $p = .98$), living with a partner ($Q = 1.56$, $df = 1$, $p = .21$), and percentage of individuals with major depression and comorbid PTSD ($Q = 2.41$, $df = 1$, $p = .12$). However, samples with a higher mean age reported higher prevalence of major depression ($Q = 6.54$, $p = .01$).

5. Studies on prevalence of PTSD

5.1. Characteristics of included studies

The 30 included surveys provided data from a pooled sample of 18,886 participants from 20 different countries in Africa, Asia, and Europe. The mean age of participants was 38.8 ($SD = 8.4$) and 59.7% of participants were female. The assessment took place on average 8.8 years after the conflict ($SD = 4.8$, range: 0–17 years). See Table 1 for further information.

5.2. Prevalence of PTSD

Prevalences of PTSD ranged from 4% (Hashemian et al., 2006) to 85% (Morina & Emmelkamp, 2012). Overall, in a random effects model, the PTSD prevalence was 0.26 (95% CI = 0.23–0.31, $k = 38$, $I^2 = 97\%$, $Q = 1244.46$, $df = 37$, $p < .001$; see Fig. 3). A linear regression test suggested asymmetry (Egger's test, $p = .21$), with smaller studies reporting higher prevalences for PTSD (see Fig. 5). The trim and fill procedure would add twelve studies and the adjusted prevalence is 0.1985 (95%CI = 0.1552 - 0.2456, $I^2 = 98.1\%$, $Q = 2560.20$, $df = 49$, $p < .001$).

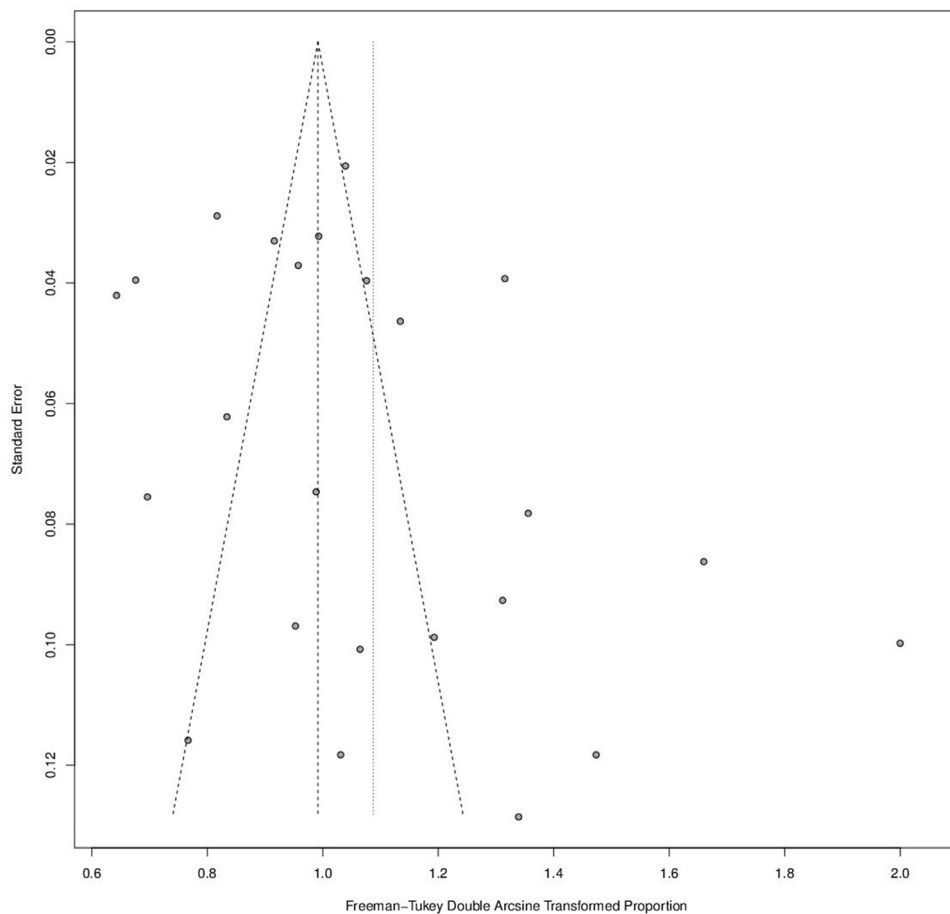


Fig. 4. Funnel plot of the studies assessing prevalence of depression.

5.3. Meta-analytic regression

The meta-analytic regressions showed that the following variables did not significantly explain heterogeneity in the prevalence of PTSD: training in assessing PTSD ($Q = 0.01, df = 1, p = .91$), the response rate of potential participants ($Q = 0.26, df = 1, p = .61$), the continent in which the study was conducted ($Q = 2.12, df = 2, p = .35$), age ($Q = 2.06, df = 1, p = .15$), education, years since trauma ($Q = 2.48, df = 1, p = .12$), percentage of individuals with PTSD, and comorbid depression ($Q = 1.25, df = 1, p = .26$). However, gender explained some heterogeneity ($Q = 4.36, df = 1, p = .04$), indicating that samples with more a higher percentage of women reported a higher prevalence of PTSD. Samples with a higher number of participants living with a partner reported lower prevalence of PTSD ($Q = 9.76, df = 1, p = .002$). Finally, samples with higher unemployment rates reported higher prevalence of PTSD ($Q = 3.31, df = 1, p = .07$).

6. Co-occurrence of PTSD and major depression

Ten percent of participants met criteria for comorbid depression and PTSD (95% CI = 0.07–0.13, $k = 10, I^2 = 92.4%$). Among participants with major depression, the prevalence of comorbid PTSD was 0.54 (95% CI = 0.40–0.68, $k = 10, I^2 = 97.1%$).

7. Quality assessment of the included surveys

The intraclass correlation coefficient (ICC) of the total score for all surveys combined was 0.95, 95% CI [0.94, 0.96], indicating very good interrater reliability. Of the 38 surveys assessing PTSD, 27 followed a random or probability sampling procedure and were rated with a

quality score of 2 (i.e., high quality), nine surveys recruited participants from a special population of war survivors that shared something in common (e.g., bereaved war survivors) or used mixed sampling procedures and thus were rated as having moderate quality (i.e., having a score of 1), and finally two were rated as having poor quality as the sample selection was ambiguous (Roth et al., 2014; Zungu-Dirwayi et al., 2004). With regards to depression, 16 out of 24 surveys followed a random or probability sampling procedure, seven surveys recruited participants from a special population of war survivors that shared something in common or used mixed sampling procedures, and one was rated as having poor quality (Zungu-Dirwayi et al., 2004).

All instruments used to diagnose PTSD and/or depression had originally been developed in English and been translated into the language of study participants. The authors did not report the psychometric properties of the translated instrument used to assess PTSD in 31 of the samples. In the remaining seven publications, the report either included only a general statement that psychometric properties of the given translated instrument are good or only internal consistency values were reported. With regards to the interviews applied to diagnose depression, none of the included publications reported on psychometric properties of the original or translated instrument in question beyond the report of internal consistency scores. That is, none of the included surveys reported satisfactory psychometric data about the interviews used to diagnose depression and/or PTSD. Accordingly, the reported quality of the instruments used in the included surveys was evaluated as poor.

Among the 38 surveys assessing PTSD, 34 reported that interviewers were trained in conducting clinical interviews to assess PTSD, whereas the remaining four did not provide this information. Of the 34 publications reporting on the training of interviewers, 24 did not provide information on the inter-rater reliability (IRR), whereas the remaining

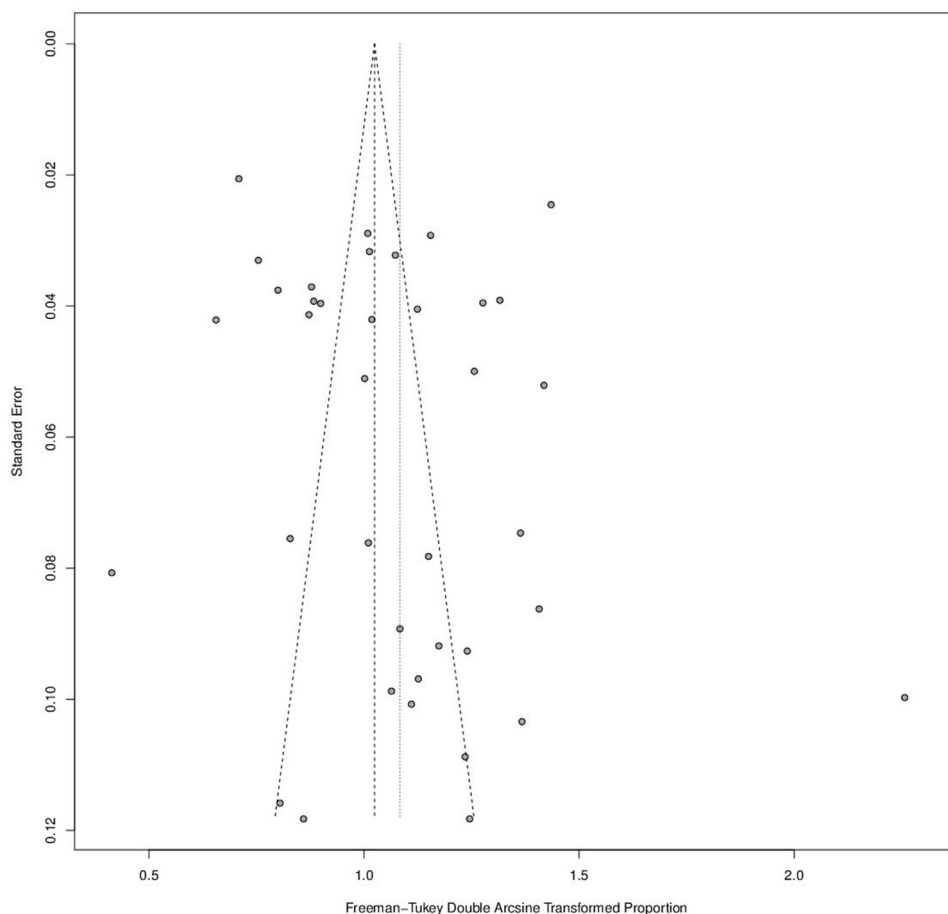


Fig. 5. Funnel plot of the studies assessing prevalence of posttraumatic stress disorder Please find also Fig. 1 in .jpg format.

ten publications either reported high IRR scores (i.e., IRR higher than 0.85%; $k = 9$) or moderate IRR scores (i.e., IRR = 0.70 – 0.85%; $k = 1$). On the other hand, all 24 surveys assessing depression reported that interviewers were trained in conducting clinical interviews to assess this condition. Of these, 14 did not provide information on the IRR, nine reported high IRR scores (i.e., IRR higher than 0.85%) and one reported moderate IRR scores (i.e., IRR = 0.70 – 0.85%).

8. Discussion

We aimed to examine a pooled estimate of prevalences of depression and PTSD in civilian war survivors living in war-afflicted regions. Across the 34 included studies, point prevalences of 0.27 and 0.26 were found for depression and PTSD, respectively. Furthermore, 54% of participants with depression fulfilled criteria for comorbid PTSD.

The current findings indicate that depression, similar to PTSD, is very prevalent among survivors of war who are still living in war-afflicted regions. This is particularly relevant considering the fact that many millions of war survivors live in LMICs, which are not adequately resourced by mental health services (Saxena et al., 2007). Whereas most of the existing research has focused on PTSD rather than depression, the findings of our meta-analysis indicate that future research needs to put more emphasis on psychological, socio-economical and physical factors associated with depression. Furthermore, the result that more than half of participants with depression met criteria for comorbid PTSD indicates that the implications of this co-occurrence need to be investigated further, particularly because comorbid depression and PTSD is associated with significantly higher mental distress than either condition alone (Morina et al., 2013). In addition, more research is needed to investigate the efficacy of existing psychological

interventions for depression in civilian war survivors, especially in LMICs (Bolton et al., 2003; Morina et al., 2017b). A recent systematic review of randomized controlled trials (RCTs) on depression and PTSD among adult survivors of mass violence in LMICs concluded that in the 18 RCTs conducted in this population, only one trial had treatment of depression as the main focus whereas PTSD was the main treatment focus in nine trials (Morina et al., 2017a).

In meta-regression analyses, higher unemployment rates, female gender, living without a partner were associated with higher prevalence of PTSD. This indicates that living with a partner and employment may be associated with developing or maintaining PTSD. Furthermore, women might be at a higher risk for developing PTSD. With regards to depression, mean age was the only variable significantly correlated with prevalence, with older samples having a higher prevalence of depression. Overall, the assessed variables only poorly explained the variance in the prevalence of PTSD or depression, perhaps partly due to the large diversity in terms of types and amount of war experiences and diverse post-war related factors (Miller & Rasmussen, 2014). An illustration for the latter might be the survey with the highest prevalences of both depression and PTSD, which was conducted with lone mothers widowed by war (Morina & Emmelkamp, 2012). Like all other samples in this review, this population must cope with their psychological difficulties resulted by their own war-related memories, but also needs to overcome the loss of their husbands, the burden of being without a husband and co-parent for practical and emotional support, and may be stressed by the responsibility of care for one or more children.

While our meta-analysis is the first publication focusing solely on war survivors living in the area of former conflict, several other meta-analyses have focused on prevalences of PTSD and depression among adult refugees and/or war-afflicted populations. Fazel et al. (2005)

included 25 surveys assessing these two conditions among refugees resettled in Western countries and reported prevalences of 9% and 5% for PTSD and depression, respectively. Lindert and colleagues reported prevalences of 44% and 36% for depression and PTSD, respectively, resulting from 35 studies with adolescent and adult refugees (Lindert et al., 2009). Slewa-Younan et al. (2015) based their meta-analysis on eight surveys with Iraqi asylum seekers or refugees resettled in Western countries and reported prevalences of 43% and 25% for depression and PTSD, respectively. Finally, Steel et al. (2009) included in their meta-analysis 161 surveys conducted with populations exposed to mass conflict and displacement and reported prevalences of 31% for both depression and PTSD, respectively. Our meta-analysis provides new insight into this issue by separately focusing on surveys with war survivors who stayed in the areas of conflict, by focusing solely on surveys that conducted clinical interviews to assess depression and PTSD, and by including recent surveys. While the meta-analyses mentioned above indicate that depression and PTSD are very prevalent among refugees, our findings show that these two conditions are also very prevalent among survivors of war who live in area of former conflict. This is of particular importance. The number of survivors of war living in the area of former conflict is by far larger than the number of refugees, indicating that millions of war survivors suffer from depression and/or PTSD. Yet, countries with a recent history of war usually lack sufficient mental health services and qualified practitioners to deliver psychological interventions to those in need (Morina et al., 2017b). Consequently, efficacious interventions that are capable of being scaled up to the point that they can be readily implemented in postwar societies despite the limited resources are urgently needed (Tol et al., 2011).

Several potential limitations are associated with this meta-analysis. First, the majority of the included publications did not report whether the diagnostic interviews used in the surveys were culturally validated and overall the reported quality was poor. Second, the included surveys showed large intersurvey variability. Finally, and as with any meta-analytic review, we might have missed relevant unpublished surveys on prevalences of depression and PTSD. It should be noted, however, that the large intersurvey variability with regard to the prevalences of depression (that ranged from 10–71%) and PTSD (that ranged from 4–85%) might indicate that journals are likely to publish epidemiological research regardless of the reported prevalences.

In conclusion, our findings indicate that millions of war survivors who live in war-afflicted regions suffer from depression and/or PTSD. Given the dearth of mental health services in many of these areas, there is an urgent need for new mental health programs in war-afflicted countries. Such programs need to be delivered on a large scale with limited resources and address depression as well as PTSD.

Contributors

NM designed the study and wrote the protocol. NM and KS wrote the codebook, conducted the search, and coded the studies. T.V.P. conducted the analyses. NM wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript. All authors have approved the final article.

Conflict of interest

The authors report no financial relationships with commercial interests.

Acknowledgments

This work was supported by a grant from the Netherlands Institute for Advanced Study (NIAS) given to N.M. & T.V.P. The NIAS had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

References

- Agresti, A., Coull, B., 1998. Approximate is better than "exact" for interval estimation of binomial proportions. *Am. Stat.* 52 (2), 119–126. <https://doi.org/10.2307/2685469>.
- Alhasnawi, S., Sadik, S., Rasheed, M., Baban, A., Al-Alak, M.M., Othman, A.Y., ... Aljadiry, M., 2009. The prevalence and correlates of DSM-IV disorders in the Iraq Mental Health Survey (IMHS). *World Psychiatry* 8 (2), 97–109.
- American Psychiatric Association, 1980. *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed.). American Psychiatric Association, Washington, D.C.
- Ayazi, T., Lien, L., Eide, A.H., Ruom, M.M., Hauff, E., 2012. 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* 12 (1), 175.
- Barendregt, J.J., Doi, S.A., Lee, Y.Y., Norman, R.E., Vos, T., 2013. Meta-analysis of prevalence. *J. Epidemiol. Commun. Health* 67 (11), 974–978. <https://doi.org/10.1136/jech-2013-203104>.
- Basoglu, M., Livanou, M., Crnobaric, C., Franciskovic, T., Suljic, E., Duric, D., Vranesic, M., 2005. Psychiatric and cognitive effects of war in former Yugoslavia: association of lack of redress for trauma and posttraumatic stress reactions. *J. Am. Med. Assoc.* 294 (5), 580–590. doi:294/5/580x0[p]10.1001/jama.294.5.580.
- Betancourt, T.S., Brennan, R.T., Vinck, P., VanderWeele, T.J., Spencer-Walters, D., Jeong, J., ... Pham, P., 2016. Associations between mental health and ebola-related health behaviors: a regionally representative cross-sectional survey in post-conflict sierra leone. *PLoS medicine* 13 (8), e1002073.
- Bolton, P., Bass, J., Neugebauer, R., Verdelli, H., Clougherty, K., Wickramaratne, P., ... Weissman, M., 2003. Group interpersonal psychotherapy for depression in rural Uganda - a randomized controlled trial. *J. Am. Med. Assoc.* 289 (23), 3117–3124. <https://doi.org/10.1001/jama.289.23.3117>.
- Brundtland, G.H., 2000. Mental health of refugees, internally displaced persons and other populations affected by conflict. *Acta Psychiatrica Scandinavica* 102 (3), 159–161.
- Canetti, D., Galea, S., Hall, B.J., Johnson, R.J., Palmieri, P.A., Hobfoll, S.E., 2010. Exposure to prolonged socio-political conflict and the risk of PTSD and depression among Palestinians. *Psychiatry* 73 (3), 219–231.
- De Jong, J.T., Komproe, I.H., Van Ommeren, M., El Masri, M., Araya, M., Khaled, N., ... Somasundaram, D., 2001. Lifetime events and posttraumatic stress disorder in 4 postconflict settings. *J. Am. Med. Assoc.* 286 (5), 555–562 doi:joc10164 [pii].
- Duval, S., Tweedie, R., 2000. Trim and fill: a simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics* 56 (2), 455–463. <https://doi.org/10.1111/j.0006-341X.2000.00455.x>.
- Egger, M., Smith, G., Schneider, M., Minder, C., 1997. Bias in meta-analysis detected by a simple, graphical test. *Brit. Med. J.* 315 (7109), 629–634.
- Elhabiby, M.M., Radwan, D.N., Okasha, T.A., ElDesouky, E.D., 2015. Psychiatric disorders among a sample of internally displaced persons in South Darfur. *Int. J. Social Psychiatry* 61 (4), 358–362.
- Eytan, A., Gex-Fabry, M., Toscani, L., Deroo, L., Loutan, L., Bovier, P.A., 2004. Determinants of postconflict symptoms in Albanian Kosovars. *J. Nervous Mental Dis.* 192 (10), 664–671 doi:00005053-200410000-00004 [pii].
- Farhood, L.F., Chaaya, M., Saab, B.R., 2010. Detainment and health: the case of the Lebanese hostages of war. *Int. J. Mental Health Nursing* 19 (2), 83–91.
- Fazel, M., Wheeler, J., Danesh, J., 2005. Prevalence of serious mental disorder in 7000 refugees resettled in western countries: a systematic review. *Lancet* 365 (9467), 1309–1314.
- Fodor, K.E., Pozen, J., Ntaganira, J., Sezibera, V., Neugebauer, R., 2015. The factor structure of posttraumatic stress disorder symptoms among Rwandans exposed to the 1994 genocide: A confirmatory factor analytic study using the PCL-C. *J. Anxiety Disord.* 32, 8–16. <http://dx.doi.org/10.1016/j.janxdis.2015.03.001>.
- Hashemian, F., Khoshnood, K., Desai, M.M., Falahati, F., Kasl, S.V., Southwick, S.M., 2006. Anxiety, depression, and posttraumatic stress in Iranian survivors of chemical warfare. *J. Am. Med. Assoc.* 296 (5), 560–566.
- Hedges, L.V., Pigott, T.D., 2001. The power of statistical tests in meta-analysis. *Psychol. Methods* 6 (3), 203–217. <https://doi.org/10.1037/1082-989X.6.3.203>.
- Johnson, K., Asher, J., Rosborough, S., Raja, A., Panjabi, R., Beadling, C., Lawry, L., 2008. Association of combatant status and sexual violence with health and mental health outcomes in postconflict Liberia. *J. Am. Med. Assoc.* 300 (6), 676–690.
- Kessler, R.C., 2012. The costs of depression. *Psychiatr. Clin. NA* 35 (1), 1–14. <https://doi.org/10.1016/j.psc.2011.11.005>.
- Kozaric-Kovacic, D., Ljubin, T., Grappe, M., 2000. Comorbidity of posttraumatic stress disorder and alcohol dependence in displaced persons. *Croatian Med. J.* 41 (2), 173–178.
- Lindert, J., von Ehrenstein, O.S., Priebe, S., Mielck, A., Brähler, E., 2009. Depression and anxiety in labor migrants and refugees—a systematic review and meta-analysis. *Social Sci. Med.* 69 (2), 246–257.
- Marshall, M.G., Cole, B.R., 2014. *Global Report 2014: Conflict, governance, and State Fragility*. Center for Systemic Peace, Vienna, VA.
- Miller, K.E., Rasmussen, A., 2014. War experiences, daily stressors and mental health five years on: Elaborations and future directions. *Intervention* 12, 33–42.
- Miller, J., 1978. The inverse of the Freeman-Tukey double arcsine transformation. *Am. Stat.* 32 (4). <https://doi.org/10.2307/2682942>. 138–138.
- Morina, N., Malek, M., Nickerson, A., Bryant, R.A., 2017a. Meta-analysis of psychological interventions for post-traumatic stress disorder and depression in adult survivors of mass violence in low- and middle-income countries. *Depression Anxiety*. <https://doi.org/10.1002/da.22618>.
- Morina, N., Malek, M., Nickerson, A., Bryant, R.A., 2017b. Psychological interventions for post-traumatic stress disorder and depression in young survivors of mass violence in low-and middle-income countries: meta-analysis. *Brit. J. Psychiatry* 210 (4),

- 247–254. <https://doi.org/10.1192/bjp.bp.115.180265>.
- Morina, N., Emmelkamp, P.M.G., 2012. Mental health outcomes of widowed and married mothers after war. *British Journal of Psychiatry* 200 (2), 158–159.
- Morina, N., Ajdukovic, D., Bogic, M., Franciskovic, T., Kucukalic, A., Lecic-Tosevski, D., ... Priebe, S., 2013. Co-occurrence of major depressive episode and posttraumatic stress disorder among survivors of war: how is it different from either condition alone? *J. Clin. Psychiatry* 74 (3), e212–e218. <https://doi.org/10.4088/JCP.12m07844>.
- Morina, N., Ford, J.D., 2008. Complex sequelae of psychological trauma among Kosovar civilian war victims. *Int. J. Social Psychiatry* 54 (5), 425–436. <https://doi.org/10.1177/0020764008090505>.
- Morina, N., Ford, J.D., Risch, A.K., Morina, B., Stangier, U., 2010a. Somatic distress among Kosovar civilian war survivors: relationship to trauma exposure and the mediating role of experiential avoidance. *Social Psychiatry Psychiatric Epidemiol.* 45 (12), 1167–1177. <https://doi.org/10.1007/s00127-009-0160-z>.
- Morina, N., Stangier, U., Risch, A.K., 2008. Experiential avoidance in civilian war survivors with current versus recovered posttraumatic stress disorder: a pilot study. *Behav. Change* 25 (1), 15–22.
- Morina, N., Emmelkamp, P.M.G., 2012. Mental health outcomes of widowed and married mothers after war. *Brit. J. Psychiatry* 200 (2), 158–159.
- Morina, N., Reschke, K., Hofmann, S.G., 2011a. Long-term outcomes of war-related death of family members in Kosovar civilian war survivors. *Death Stud.* 35 (4), 365–372.
- Morina, N., Rudari, V., Bleichhardt, G., Prigerson, H.G., 2010b. Prolonged grief disorder, depression, and posttraumatic stress disorder among bereaved Kosovar civilian war survivors: a preliminary investigation. *Int. J. Social Psychiatry* 56 (3), 288–297.
- Morina, N., Von Lersner, U., Prigerson, H.G., 2011b. War and bereavement: consequences for mental and physical distress. *PLoS One* 6 (7), e22140.
- Morina, N., Wicherts, J.M., Lobbrecht, J., Priebe, S., 2014. Remission from post-traumatic stress disorder in adults: A systematic review and meta-analysis of long term outcome studies. *Clin. Psychol. Rev.* 34 (3), 249–255. <https://doi.org/10.1016/j.cpr.2014.03.002>.
- Mugisha, J., Muyinda, H., Wandiembe, P., Kinyanda, E., 2015. 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* 15 (1), 170.
- Munyandamutsa, N., Mahoro Nkubamugisha, P., GexFabry, M., Eytan, A., 2012. Mental and physical health in Rwanda 14 years after the genocide. *Social Psychiatry Psychiatric Epidemiol.* 47 (11), 1753–1761.
- Pettersson, T., Wallensteen, P., 2015. Armed conflicts, 1946–2014. *J. Peace Res.* 52 (4), 536–550. <https://doi.org/10.1177/0022343315595927>.
- Priebe, S., Bogic, M., Ajdukovic, D., Franciskovic, T., Galeazzi, G.M., Kucukalic, A., ... Schützwohl, M., 2010. Mental disorders following war in the Balkans: a study in 5 countries. *Arch. Gen. Psychiatry* 67 (5), 518–528.
- R Core Team, 2015. R: A Language and Environment For Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria.
- Rasmussen, A., Rosenfeld, B., Reeves, K., Keller, A.S., 2007. The effects of torture-related injuries on long-term psychological distress in a Punjabi Sikh sample. *J. Abnormal Psychol.* 116 (4), 734–740.
- Rieder, H., Elbert, T., 2013. The relationship between organized violence, family violence and mental health: findings from a community-based survey in Muhanga, Southern Rwanda. *Eur. J. Psychotraumatol.* 4 (1), 21329.
- Roth, M., Neuner, F., Elbert, T., 2014. Transgenerational consequences of PTSD: risk factors for the mental health of children whose mothers have been exposed to the Rwandan genocide. *Int. J. Mental Health Syst.* 8 (1), 12.
- Rugema, L., Mogren, I., Ntaganira, J., Krantz, G., 2015. Traumatic episodes and mental health effects in young men and women in Rwanda, 17 years after the genocide. *BMJ Open* 5 (6) e006778. <http://dx.doi.org/10.1136/bmjopen-2014-006778>.
- Sabes-Figuera, R., McCrone, P., Bogic, M., Ajdukovic, D., Franciskovic, T., Colombini, N., ... Schützwohl, M., 2012. Long-term impact of war on healthcare costs: an eight-country study. *PLoS One* 7 (1), e29603. <https://doi.org/10.1371/journal.pone.0029603>.
- Sanderson, S., Tatt, I.D., Higgins, J.P., 2007. Tools for assessing quality and susceptibility to bias in observational studies in epidemiology: a systematic review and annotated bibliography. *Int. J. Epidemiol.* 36, 666–676.
- Saxena, S., Thornicroft, G., Knapp, M., Whiteford, H., 2007. Resources for mental health: scarcity, inequity, and inefficiency. *Lancet* 370 (9590), 878–889. [https://doi.org/10.1016/S0140-6736\(07\)61239-2](https://doi.org/10.1016/S0140-6736(07)61239-2).
- Schaal, S., Dusingizemungu, J., Jacob, N., Elbert, T., 2011. Rates of trauma spectrum disorders and risks of posttraumatic stress disorder in a sample of orphaned and widowed genocide survivors. *Eur. J. Psychotraumatol.* 2 (1), 6343.
- Schaal, S., Weierstall, R., Dusingizemungu, J., Elbert, T., 2012. Mental health 15 years after the killings in Rwanda: imprisoned perpetrators of the genocide against the Tutsi versus a community sample of survivors. *J. Traumatic Stress* 25 (4), 446–453.
- Schwarzer, G., 2016. General Package For Meta-Analysis (Version 4.4–0). CRAN.
- Schwarzer, G., Carpenter, J.R., Rücker, G., 2015. *Meta-analysis With R*. Cham: Springer.
- Seino, K., Takano, T., Mashal, T., Hemat, S., Nakamura, K., 2008. Prevalence of and factors influencing posttraumatic stress disorder among mothers of children under five in Kabul, Afghanistan, after decades of armed conflicts. *Health Qual. Life Outcomes* 6 (1), 29.
- Sheehan, D.V., Lecrubier, Y., Sheehan, K.H., Amorim, P., Janavs, J., Weiller, E., ... Dunbar, G.C., 1998. The mini-international neuropsychiatric interview (MINI): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J. Clin. Psychiatry* 59, 22–33.
- Sheikh, T.L., Abdulaziz, M., Agunbiade, S., Joseph, I., Ebiti, B., Adekeye, O., 2015. Correlates of depression among internally displaced persons after post-election violence in Kaduna, North Western Nigeria. *J. Affect. Disorders* 170, 46–51.
- Slewa-Younan, S., Guajardo, M.G.U., Heriseanu, A., Hasan, T., 2015. A systematic review of post-traumatic stress disorder and depression amongst Iraqi refugees located in western countries. *J. Immigrant Minority Health* 17 (4), 1231–1239.
- Somasundaram, D.J., Sivayokan, S., 1994. War trauma in a civilian population. *Brit. J. Psychiatry* 165 (4), 524–527.
- Steel, Z., Chey, T., Silove, D., Marnane, C., Bryant, R.A., van Ommeren, M., 2009. Association of torture and other potentially traumatic events with mental health outcomes among populations exposed to mass conflict and displacement: a systematic review and meta-analysis. *J. Am. Med. Assoc.* 302 (5), 537–549.
- Stein, D.J., Seedat, S., Herman, A., Moomal, H., Heeringa, S.G., Kessler, R.C., Williams, D.R., 2008. Lifetime prevalence of psychiatric disorders in South Africa. *Brit. J. Psychiatry* 192 (2), 112–117. <https://doi.org/10.1192/bjp.bp.106.029280>.
- Sterne, J.A.C., Sutton, A.J., Ioannidis, J.P.A., Terrin, N., Jones, D.R., Lau, J., ... Higgins, J.P.T., 2011. Recommendations for examining and interpreting funnel plot asymmetry in meta-analyses of randomised controlled trials. *BMJ* 343, d4002. <https://doi.org/10.1136/bmj.d4002>.
- Tol, W.A., Patel, V., Tomlinson, M., Baingana, F., Galappatti, A., Panter-Brick, C., ... van Ommeren, M., 2011. Research priorities for mental health and psychosocial support in humanitarian settings. *PloS Med.* 8 (9), e1001096. <https://doi.org/10.1371/journal.pmed.1001096>.
- Uppsala Conflict Data Program, 2016. UCDP conflict encyclopedia. 22.03Retrieved from www.ucdp.uu.se/database.
- Veling, W., Hall, B.J., Joosse, P., 2013. The association between posttraumatic stress symptoms and functional impairment during ongoing conflict in the Democratic Republic of Congo. *J. Anxiety Disord.* 27 (2), 225–230.
- Viechtbauer, W., 2015. Meta-analysis Package For R (Version 1.0-8). CRAN.
- Viechtbauer, W., 2010. Conducting meta-analyses in R with the metafor package. *J. Stat. Softw.* 36 (3), 1–48.
- von Elm, E., Altman, D.G., Egger, M., Pocock, S.J., Gøtzsche, P.C., Vandenbroucke, J.P., 2007. STROBE initiative. The strengthening of reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *Lancet* 370, 1453–1457.
- Wang, W., Fan, J., Huang, G., Zhu, X., Tian, Y., Tan, H., Su, L., 2017. Meta-analysis of prevalence of erectile dysfunction in mainland china: evidence based on epidemiological surveys. *Sexual Med.* 5, e19–e30.
- Bank, World, 2018. Data: how we classify countries [Online] Washington, DC: the World Bank. <http://data.worldbank.org/about/country-classifications> accessed 23 January 2018.
- World Health Organization, 1992. The ICD 10 Classification of Mental and Behavioural disorders: Clinical descriptions and Diagnostic Guidelines. Geneva: World Health Organization.
- Yasan, A., Saka, G., Ozkan, M., Ertem, M., 2009. Trauma type, gender, and risk of PTSD in a region within an area of conflict. *J. Traumatic Stress* 22 (6), 663–666.
- Zungu-Dirwayi, N., Kaminer, D., Mbanga, I., Stein, D.J., 2004. The psychiatric sequelae of human rights violations: a challenge for primary health care. *J. Nervous Mental Dis.* 192 (4), 255–259.