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SYSTEMATIC REVIEW & META-ANALYSIS

Association of female gender and post-traumatic stress disorder among conflict affected settings in sub Saharan Africa: A systematic review and meta-analysis

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Abstract

Background: The highest incidence of post-traumatic stress disorder (PTSD) has been observed in sub-Saharan African regions affected by conflict. Evidence remains inconsistent regarding gender inequalities between men and women in conflict-affected settings. The strength of the association varies across studies and may be explained by methodological differences, cultural influences, and the type of conflict. To provide a measurable assessment of the relationship between female gender and the development of PTSD, this systematic review and meta-analysis synthesizes research examining the association between female gender and PTSD among sub-Saharan populations affected by conflict.

Methods: The review was conducted in accordance with PRISMA guidelines. Electronic databases—including PubMed, Scopus, Web of Science, MEDLINE/PubMed, Embase, ScienceDirect, Google Scholar, and Google—were searched for eligible published studies reporting the prevalence of PTSD and its association with female gender among individuals affected by conflict in sub-Saharan Africa, up to January 2025. Data were extracted using Microsoft Excel. Meta-analysis was performed using STATA version 16. A random-effects model was used to estimate the pooled prevalence of PTSD and assess its association with female gender. Publication bias was evaluated using Egger's test and a funnel plot.

Results: A total of 28 published studies involving 15,636 participants were included. The pooled prevalence of PTSD among conflict-affected people in sub-Saharan Africa was 47.7% (95% CI: 39.41–56.03). Across the 28 studies, female gender was significantly associated with PTSD in 8 studies, with a pooled odds ratio (OR) of 1.81 (95% CI: 1.10–2.99).

Conclusions: This meta-analysis found a high prevalence of PTSD among conflict-affected populations in sub-Saharan Africa, and female gender was significantly associated with higher odds of PTSD. The findings suggest increased vulnerability of women in conflict settings. To address these disparities, gender-sensitive PTSD interventions should be prioritized in conflict-affected areas, including trauma-focused services for women.

Keywords: Conflict affected people, Female gender, Post-Traumatic Stress Disorder, Sub-Saharan Africa

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1 Introduction

Post-Traumatic Stress Disorder (PTSD) is a serious mental health condition that can develop after exposure to traumatic events, such as conflict, violence, or natural disasters [1]. The prevalence of PTSD is alarmingly high among populations affected by conflict due to widespread exposure to life-threatening events, displacement, loss of loved ones, and the destruction of communities and livelihoods [2]. These experiences often affect certain groups disproportionately, and women and men may show different patterns of vulnerability and symptom expression [3, 4].

PTSD is a major public health burden in sub-Saharan Africa (SSA), where civil unrest, terrorism, and protracted conflicts are common [5, 6]. Emerging evidence suggests that women in conflict-affected environments experience PTSD at a disproportionate rate compared with men. This is likely because of gender-specific trauma exposures, such as sexual abuse, forced relocation, and stressors related to caregiving for others [7, 8]. Conflict-affected women and internally displaced people are particularly vulnerable to mental health conditions such as depression and PTSD [9].

Common risk factors for PTSD in conflict-affected communities include gender-based violence [10], displacement and loss [11], social-economic vulnerabilities [12], and cultural and structural barriers [13]. If left untreated, PTSD can lead to chronic mental health problems [14], poor maternal and child health outcomes [15], substantial socio-economic burdens [16], and the reinforcement of gender inequalities [17].

Conflict-affected regions in SSA have been found to carry the highest global PTSD burden rates, with estimates ranging from 15% to 50% among conflict-affected populations [5]. Studies examining differences in PTSD incidence between men and women have produced inconsistent findings. Some studies report that the incidence of PTSD is significantly higher in women than in men, while others find no differences in the presence of PTSD between sexes, but instead observe differences in the severity of PTSD symptoms [18, 19].

Understanding these differences is essential for designing gender-sensitive mental health interventions in conflict-affected settings [20]. However, the strength of the association varies across studies and may be influenced by methodological factors, cultural contexts, and conflict typologies [21]. To provide a quantifiable assessment of risk and explore potential sources of variability, this systematic review and meta-analysis synthesizes existing research on the association between female gender and PTSD among SSA populations affected by conflict.

Despite growing recognition of the gendered nature of PTSD, there remains a lack of comprehensive data synthesis to clarify the extent of the association between female gender and PTSD in violence-affected populations. By examining the relationship between female gender and PTSD prevalence across different conflict-affected areas in SSA, this systematic review and meta-analysis aims to fill this gap.

2 Methods and Materials

2.1 Identification and Study Selection

A comprehensive literature search was conducted to identify published studies examining post-traumatic stress disorder (PTSD) and its association with female gender among conflict-affected populations in sub-Saharan Africa. The following electronic databases were searched: PubMed/MEDLINE, Embase, Scopus, Web of Science, ScienceDirect, PsycINFO, Google Scholar, and Google. Eligible studies published in English from database inception through January 2025 were included.

The review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines. The search strategy combined controlled vocabulary (e.g., Medical Subject Headings [MeSH], where applicable) and free-text keywords related to PTSD, conflict, war-affected populations, female gender, and sub-Saharan Africa, using Boolean operators AND and OR. In addition, the reference lists of eligible articles were manually screened to identify further relevant studies.

2.2 Eligibility Criteria

The aforementioned inclusion and exclusion criteria were used to evaluate the abstracts of the results of the search.

2.2.1. Inclusion Criteria

(1) **Study region:** Only studies conducted in sub-Saharan Africa were included.

(2) **Study design:** Only cross-sectional studies were included because they provide comparable estimates of the prevalence of post-traumatic stress disorder (PTSD) and allow consistent assessment of the association between female gender and PTSD across studies. Limiting the review to a single study design reduced methodological heterogeneity and improved the comparability of the pooled estimates.

(3) **Language:** Only articles published in English were included.

(4) **Population:** Studies involving conflict-affected populations in sub-Saharan Africa were eligible.

(5) **Publication status:** Only peer-reviewed published articles were included.

2.2.2. Exclusion Criteria

Studies were excluded if they were reviews, systematic reviews, meta-analyses, case reports, qualitative studies, conference abstracts, editorials, commentaries, or if full text was not available. Studies conducted outside sub-Saharan Africa, studies that did not report PTSD as an outcome, and studies involving populations not affected by conflict were also excluded. In addition, studies using designs other than cross-sectional were excluded to ensure methodological consistency and comparability across included studies.

2.3 Data Extraction

The required data were extracted independently by two authors using a standardized data extraction format developed in Microsoft Excel. For the first objective (the magnitude of PTSD), the extraction form included the first author's name, publication year, sub-Saharan African region, country, sample size, screening tool, response rate, and the prevalence of post-traumatic stress disorder and its association with gender. For the second objective (the relationship between female gender and PTSD), data were extracted from primary studies in which female gender was considered as a predictor of PTSD.

Two reviewers (DM and DS) independently screened titles and abstracts, assessed the full texts of potentially eligible studies, extracted the data, and evaluated the methodological quality of included studies. Discrepancies were resolved through discussion and consensus. If consensus could not be reached, a third reviewer (AA) was consulted to make the final decision.

2.4 Methodological Quality Assessment

For a cross-sectional investigation, the authors employed the Newcastle-Ottawa Scale (NOS) [22] Critical appraisal checklist. With a total score range of 0–10, the scale is used to rate the articles under three categories: (i) selection (score 0-5), (ii) comparability (score 0-2), and (iii) outcome (scoring 0-3) (Table 1). The selection category includes criteria including sample representativeness, sample size adequacy, non-response rate, and exposure data collection using a validated measuring method. According to the study design and methodology, as well as whether or not confounding factors were taken into account, the comparability category looks at how comparable participants in various outcome groups are.

The outcome category covers whether information on the outcome or outcomes was gathered by self-reporting, recordkeeping, or independent blind assessment. Whether or not the statistical tests employed to analyze the data were appropriate and were well documented are also included in the outcome category. The study quality was assessed using stars: 9–10 stars denoted "very good" quality, 7–8 stars denoted "good" quality, 5–6 stars denoted "satisfactory" quality, and 0–4 stars denoted "unsatisfactory" quality [22].

Table 1 Newcastle–Ottawa Scale (NOS) quality assessment of included studies

S.No.	Author (Year)	Selection (0–5)	Comparability (0–2)	Outcome (0–3)	Total score (0–10)	Quality
1	Madoro *et al.* (2020)	4	2	3	9	High
2	Birhan *et al.* (2023)	4	2	2	8	High
3	Kassaye *et al.* (2023)	5	2	2	9	High
4	Moges *et al.* (2023)	5	2	3	10	High
5	Teshoma *et al.* (2023)	4	2	3	9	High
6	Tadesse *et al.* (2024)	4	1	3	8	High
7	Gebreyesus *et al.* (2024)	5	2	2	9	High
8	Muhummmed *et al.* (2024)	4	2	2	8	High
9	Melkam *et al.* (2025)	5	2	3	10	High
10	Makango *et al.* (2023)	4	2	3	9	High
11	Masau *et al.* (2018)	4	1	3	8	High
12	Mustafa *et al.* (2021)	4	2	2	8	High
13	Sh Abukar *et al.* (2025)	5	2	3	10	High
14	Ali *et al.* (2023)	4	2	2	8	High
15	Halaly *et al.* (2024)	5	2	2	9	High
16	EH Mohamed *et al.* (2024)	4	1	3	8	High
17	Elhabiby *et al.* (2014)	5	2	3	10	High
18	A.kehalil *et al.* (2024)	4	2	2	8	High
19	Roberts *et al.* (2009)	5	2	3	10	High
20	Roberts *et al.* (2008)	4	2	3	9	High
21	Veling *et al.* (2013)	4	2	2	8	High
22	Sheikh *et al.* (2014)	5	2	2	9	High
23	Aluh *et al.* (2019)	4	1	3	8	High
24	Ibrahim *et al.* (2023)	4	2	2	8	High
25	Faronbi *et al.* (2021)	5	2	3	10	High
26	Nwoga *et al.* (2019)	4	2	3	9	High
27	Awa *et al.* (2024)	5	2	2	9	High
28	Olufadewa *et al.* (2024)	5	2	3	10	High

2.5 Outcome Measurements

Our systematic review and meta-analysis has two primary objectives. First, to estimate the pooled prevalence of post-traumatic stress disorder (PTSD) among conflict-affected populations. Second, to assess the combined association between female gender and PTSD. The number of conflict-affected individuals who tested positive for PTSD was divided by the total sample size included in each study, and the resulting proportion was multiplied by 100 to calculate PTSD prevalence. To examine the association between female gender and PTSD, we used 2×2 contingency tables to compute the odds ratio.

2.6 Quality Assessment

An adaptation of the Newcastle–Ottawa Scale for cross-sectional studies was used to assess the methodological quality of studies included in the review and meta-analysis [23]. This quality appraisal tool evaluates (i) the methodological quality of each study, (ii) the comparability of in-

cluded groups, and (iii) the quality of statistical analysis reported in the original publication.

Using the JBI quality appraisal approach, each author independently assessed the quality of the included research. Studies rated as medium or high quality (i.e., scoring ≥5 on a nine-point scale) were included in the analysis. The instrument contains a total of nine scoring items.

Any disagreements between reviewers were resolved by calculating the average of the two authors' ratings for each study. Two authors assessed the original papers independently following the same evaluation procedure.

Heterogeneity and publication bias

Heterogeneity was assessed using the inverse-variance method and quantified with the I^2 statistic. Heterogeneity was considered low, moderate, and high at I^2 values of 25%, 50%, and 75%, respectively [24]. Publication bias was evaluated visually using a funnel plot and statistically using Egger's test. A p-value of less than 0.05 [25] was used to indicate evidence of publication bias. In addition, trim-and-fill analyses were performed to address potential publication bias.

2.7 Statistical Procedure

The extracted data were entered into Microsoft Excel and then imported into STATA version 16.0 for analysis.

Text, tables, and forest plots were used to describe the characteristics and quality of the included studies. Heterogeneity among studies was assessed using the inverse-variance (I^2) statistic, with $I^2 > 50\%$ indicating significant heterogeneity [26].

A random-effects model was used to estimate the pooled prevalence of PTSD and the association between female gender and PTSD. Pooled estimates were presented using forest plots with corresponding 95% confidence intervals (CIs) and odds ratios (ORs).

Publication bias was assessed visually using a funnel plot and statistically using Egger's test. Sensitivity analysis was performed using the random-effects model to evaluate the influence of any single study on the overall pooled estimate. In addition, subgroup analyses were conducted by study region to reduce random variation across subgroups.

3 Results

3.1 Study identification

The literature search identified 4,622 records from electronic databases and other sources. Specifically, 4,090 records were retrieved from PubMed (n = 2,216), CABI (n = 1,296), Embase (n = 256), Scopus (n = 165), AJOL (n = 117), and CINAHL (n = 40). An additional 532 records were identified from other sources, including website searching (n = 189), Google Scholar (n = 245), and Google (n = 98). After removing 2,197 duplicate records, 2,425 unique records remained for title and abstract screening.

Of these, 2,336 records were excluded because they did not meet the eligibility criteria. The full texts of the remaining 89 articles were assessed for eligibility. Following full-text review, 61 studies were excluded for the following reasons: they did not report PTSD as an outcome (n = 21), full texts were unavailable (n = 11), the study population did not meet the eligibility criteria (n = 24), or the publication was a review, systematic review, or meta-analysis (n = 5).

Consequently, 28 studies met the inclusion criteria and were included in the systematic review and meta-analysis (Figure 1).

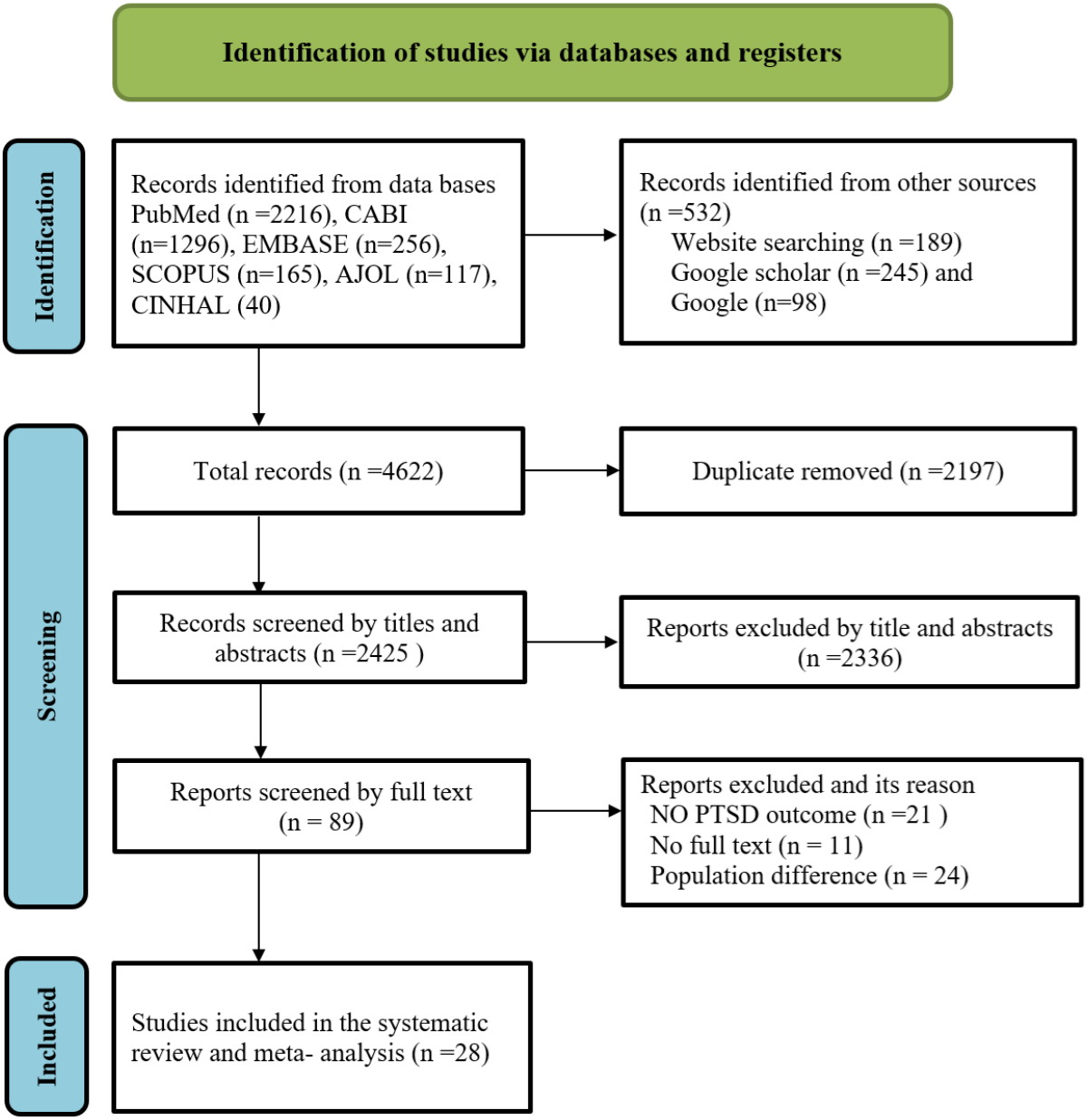


Figure 1 PRISMA flow diagram for the systematic review and meta-analysis of Gender difference and PTSD among Conflict affected people in sub-Saharan Africa

3.2 Characteristics of included studies

A total of 28 studies conducted on PTSD in conflict-affected communities in sub-Saharan Africa were included in this meta-analysis and systematic review. Among the included studies, 10 were from Ethiopia, 7 from Nigeria, 4 from Sudan, 3 from Somalia, 1 from Kenya, 1 from South Sudan, 1 from the DRC, and 1 from Uganda (Table 2).

Table 2 Characteristics of studies included in this meta-analysis and systematic review conducted on gender difference and its association with PTSD among conflict affected people in sub-Saharan Africa (Study design: CS)

Author (Year)	Country	Included	Outcome	Sample size	Response rate	prev	Female association
Madoro *et al.* (2020)	Ethiopia	625	365	636	98.3	58.4	Female
Birhan *et al.* (2023)	Ethiopia	585.6	33.672	600	97.6	34.5	Female
Kassaye *et al.* (2023)	Ethiopia	596.82	55.1544	609	98	56.28	
Moges *et al.* (2023)	Ethiopia	591.985	23.9355	601	98.5	24.3	
Teshoma *et al.* (2023)	Ethiopia	795.96	40.392	804	99	40.8	Female
Tadesse *et al.* (2024)	Ethiopia	412	34.7	412	100	34.7	Female
Gebreyesus *et al.* (2024)	Ethiopia	2064.787	57.5269	2071	99.7	57.7	
Muhummmed *et al.* (2024)	Ethiopia	397.94	40.4835	404	98.5	41.1	Female
Melkam *et al.* (2025)	Ethiopia	410	54.3	410	100	54.3	
Makango *et al.* (2023)	Ethiopia	406	274.05	410	99	67.5	
Masau *et al.* (2018)	Kenya	139	85.068	139	100	61.2	
Mustafa *et al.* (2021)	Somalia	401.128	31.8136	406	98.8	32.2	
Sh Abukar *et al.* (2025)	Somalia	364	60	364	100	60	
Ali *et al.* (2023)	Somalia	401	129.122	422	95	32.2	
Halaly *et al.* (2024)	Sudan	118	70.3	118	100	70.3	Female
EH Mohamed *et al.* (2024)	Sudan	143	25	143	100	25	
Elhabiby *et al.* (2014)	Sudan	73.98	11.02302	90	82.2	14.9	
A.kehalil *et al.* (2024)	Sudan	357.594	20.3862	642	55.7	36.6	
Roberts *et al.* (2009)	South Sudan	1242	449.604	1291	96.2	36.2	Female
Roberts *et al.* (2008)	Uganda	1209	656.487	1280	94.5	54.3	
Veling *et al.* (2013)	DRC	93	37.2	93	100	40	
Sheikh *et al.* (2014)	Nigeria	228	96.216	228	100	42.2	
Aluh *et al.* (2019)	Nigeria	1200	936	1200	100	78	
Ibrahim *et al.* (2023)	Nigeria	450	423.9	450	100	94.2	Female
Faronbi *et al.* (2021)	Nigeria	240	136.08	240	100	56.7	
Nwoga *et al.* (2019)	Nigeria	422.1	35.3626	450	93.8	37.7	
Awa *et al.* (2024)	Nigeria	471.42	71.683	486	97	73.9	
Olufadewa *et al.* (2024)	Nigeria	637	19.9	637	100	19.9	

3.3 The pooled prevalence of Post-traumatic stress disorder

Interpretation of the Forest Plot

Figure 2 presents the forest plot showing the prevalence of post-traumatic stress disorder (PTSD) among conflict-affected populations in sub-Saharan Africa. The prevalence estimates varied substantially across the 28 included studies, ranging from 14.9% (95% CI: 6.79–23.01) reported by Elhabiby *et al.* (2014) to 94.2% (95% CI: 92.04–96.36) reported by Ibrahim *et al.* (2023). Most studies reported PTSD prevalence between 30% and 70%, although several studies showed considerably lower or higher estimates, indicating substantial variability across study settings and populations.

Using a random-effects model, the pooled prevalence of PTSD was 47.7% (95% CI: 39.4%–56.0%), suggesting that nearly one-half of conflict-affected individuals in sub-Saharan Africa experience PTSD. The pooled estimate is represented by the diamond at the bottom of the forest plot, with its width indicating the corresponding 95% confidence interval.

The heterogeneity among the included studies

was very high ($I^2 = 99.2\%$, $p < 0.001$), indicating considerable between-study variability beyond that expected by chance. This substantial heterogeneity may be attributable to differences in study populations, conflict characteristics, countries, PTSD assessment instruments, timing of assessment following trauma exposure, and methodological differences across studies. Consequently, a random-effects model was considered appropriate for estimating the pooled prevalence (Figure 2).

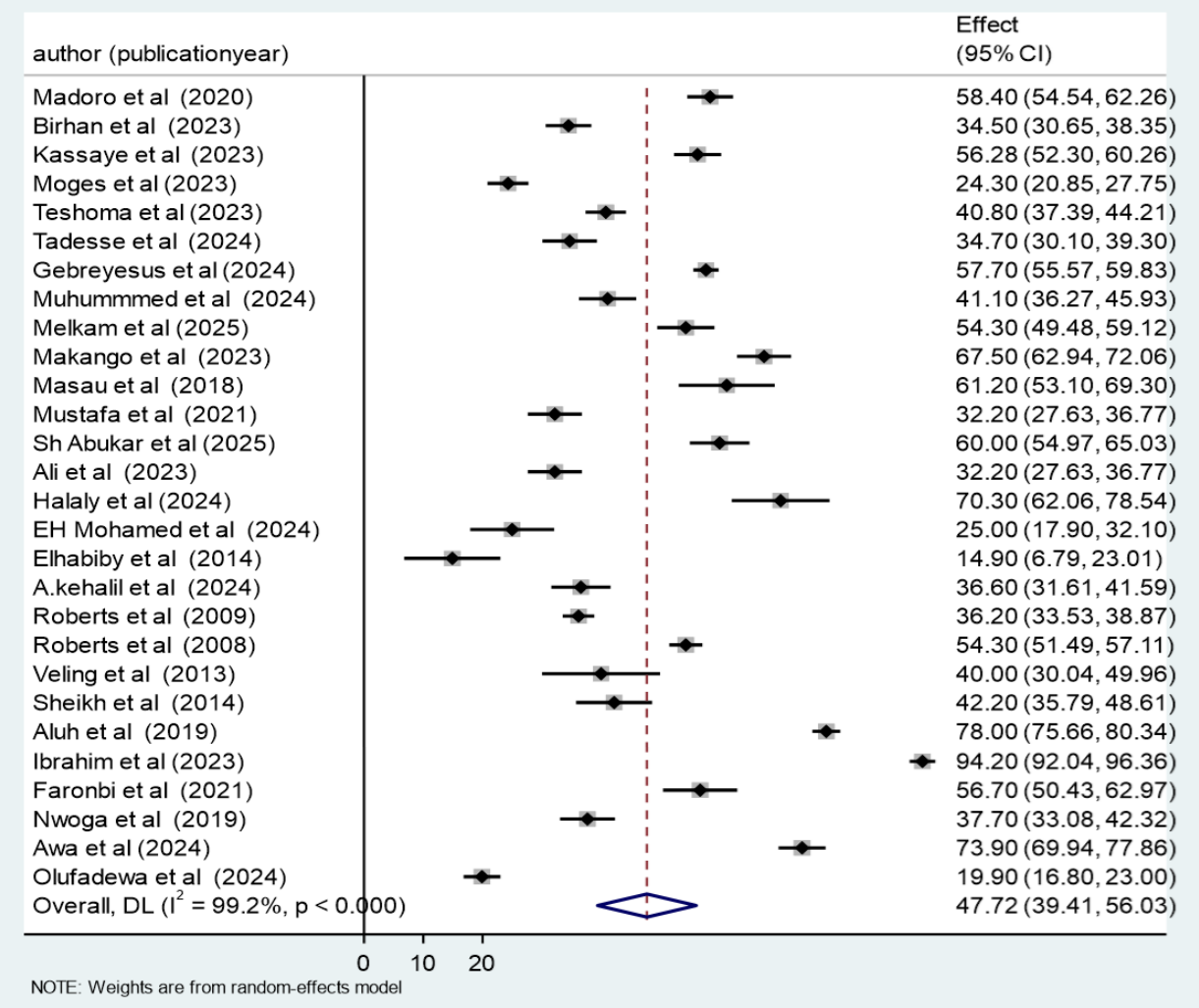


Figure 2 The Forest plot of the pooled prevalence on Gender difference and PTSD among Conflict affected people in sub-Saharan Africa

3.4 Publication bias

Interpretation of the Funnel Plot

Figure 3 presents the funnel plot used to assess potential publication bias among the 28 included studies. The studies are plotted on the x-axis by their prevalence estimates and on the y-axis by their standard errors on. In the absence of publication bias, studies are expected to be distributed symmetrically around the pooled prevalence estimate, with smaller studies (larger standard errors) showing greater dispersion and larger studies (smaller standard errors) clustering near the top of the plot.

Visual inspection of the funnel plot suggests some degree of asymmetry, with studies distributed unevenly around the pooled effect estimate. Several studies with relatively high prevalence estimates appear on the right side of the plot without corresponding studies on the left, while several smaller studies are more widely

scattered outside the pseudo-95% confidence limits. This pattern may indicate the presence of publication bias or small-study effects. However, the observed asymmetry should be interpreted with caution because the meta-analysis demonstrated substantial between-study heterogeneity ($I^2 = 99.2\%$), which can also contribute to funnel plot asymmetry (Figure3).

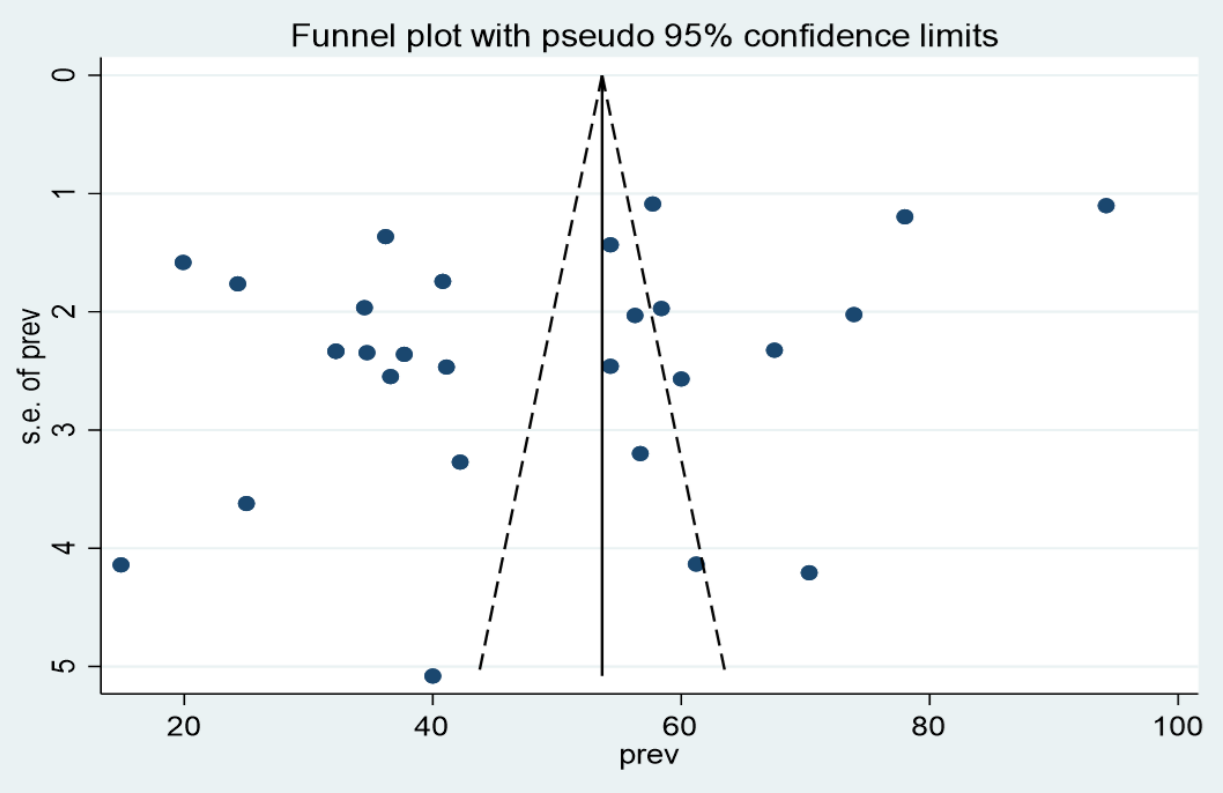


Figure 3 Funnel plot of PTSD among conflict affected people sub-Saharan Africa

To complement the visual assessment, formal statistical tests such as Egger's regression test should be used to determine whether the observed asymmetry is statistically significant. The results of these tests provide more robust evidence regarding the presence or absence of publication bias than visual inspection alone (Table 3).

Table 3 Egger's test of PTSD among conflict affected people in sub–Saharan Africa (Number of studies = 28; Root MSE = 11.55)

Std_Eff	Coefficient	Std. err.	T	P>|t|	[95% conf. interval]
Slope	77.30715	14.05957	5.50	0.000	48.14938 - 106.4649
Bias	-12.84872	7.293126	1.76	0.092	-27.97374 - 2.276297

Test of H_0: no small-study effects; P = 0.09

3.5 Subgroup analysis

Subgroup analysis was conducted based on the study setting of the primary study. The meta-analysis reveals significant variability in effect sizes across countries, with an overall pooled estimate of 47.72 (39.41–55.03) but extremely high heterogeneity ($I^2 = 98.2\%$, $p < 0.000$). Countries like Nigeria and Sudan exhibit extreme variability ($I^2 > 97\%$), likely due to differences in study design, populations, or contextual factors (Figure.4).

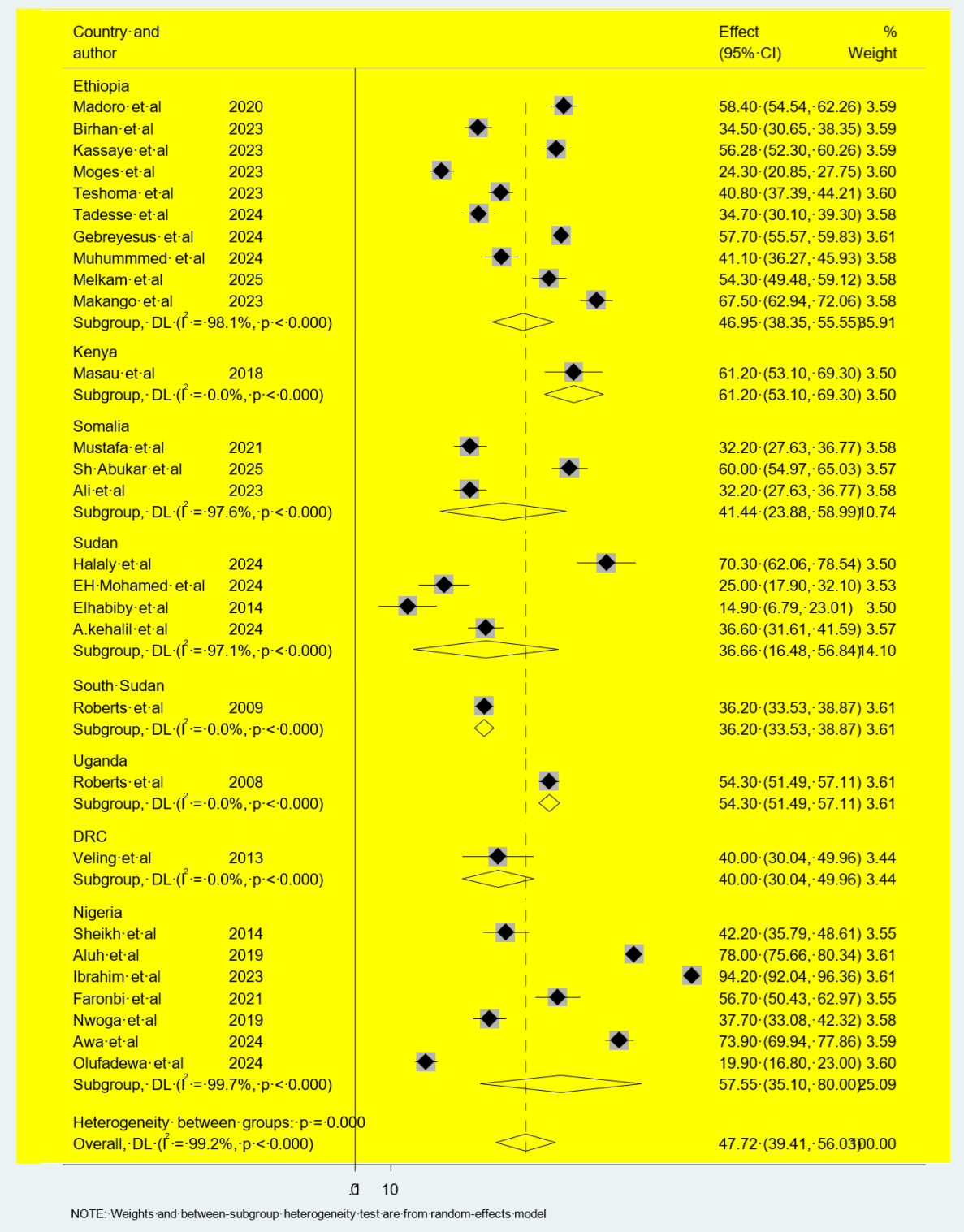


Figure 4 Forest plot on subgroup analysis by study country of the pooled prevalence of PTSD among conflict affected people in sub-Saharan Africa

3.6 Sensitivity analysis

A notable finding of this meta-analysis was the substantial between-study heterogeneity (I^2 = 99.2%, p < 0.001). The observed heterogeneity may be attributed to differences in study populations (e.g., internally displaced persons, refugees, and conflict-affected community members), conflict characteristics and severity, PTSD assessment instruments, timing of outcome assessment following trauma exposure, and methodologi-

cal differences, including sampling techniques and study settings. Given this considerable heterogeneity, a random-effects model was applied to account for both within- and between-study variability and to provide a more conservative pooled estimate. Although subgroup analyses were conducted to explore potential sources of heterogeneity, residual heterogeneity remained, suggesting that multiple contextual and methodological factors contributed to the variation in PTSD prevalence across studies (Table 4).

Table 4 A sensitivity analysis of a meta-analysis and systematic review conducted on gender differences and their association with PTSD among conflict affected people in sub-Saharan Africa

Author (Year)	Estimate 95%CI	Heterogeneity	
		I^2(%)	P- value
Madoro *et al.* (2020)	54.536 — 62.264	98.1	0.00
Birhan *et al.* (2023)	30.650 — 38.350	98.1	0.00
Kassaye *et al.* (2023)	52.300 — 60.260	98.1	0.00
Moges *et al.* (2023)	20.845 — 27.755	98.1	0.00
Teshoma *et al.* (2023)	37.386 — 44.214	98.1	0.00
Tadesse *et al.* (2024)	30.104 — 39.296	98.1	0.00
Gebreyesus *et al.* (2024)	55.569 — 59.831	98.1	0.00
Muhummmed *et al.* (2024)	36.266 — 45.934	98.1	0.00
Melkam *et al.* (2025)	49.478 — 59.122	98.1	0.00
Makango *et al.* (2023)	62.944 — 72.056	98.1	0.00
Masau *et al.* (2018)	53.099 — 69.301	97.4	0.00
Mustafa *et al.* (2021)	27.628 — 36.772	97.8	0.00
Sh Abukar *et al.* (2025)	54.967 — 65.033	97.8	0.00
Ali *et al.* (2023)	27.627 — 36.773	97.8	0.00
Halaly *et al.* (2024)	62.056 — 78.544	97.1	0.00
EH Mohamed *et al.* (2024)	17.903 — 32.097	97.1	0.00
Elhabiby *et al.* (2014)	6.786 — 23.014	97.1	0.00
A.kehalil *et al.* (2024)	31.607 — 41.593	97.1	0.00
Roberts *et al.* (2009)	33.527 — 38.873	97.1	0.00
Roberts *et al.* (2008)	51.492 — 57.108	97.3	0.00
Veling *et al.* (2013)	30.043 — 49.957	97.1	0.00
Sheikh *et al.* (2014)	35.789 — 48.611	99.8	0.00
Aluh *et al.* (2019)	75.656 — 80.344	99.8	0.00
Ibrahim *et al.* (2023)	92.040 — 96.360	99.8	0.00
Faronbi *et al.* (2021)	50.431 — 62.969	99.8	0.00
Nwoga *et al.* (2019)	33.077 — 42.323	99.8	0.00
Awa *et al.* (2024)	69.936 — 77.864	99.8	0.00
Olufadewa *et al.* (2024)	16.800 — 23.000	99.8	0.00

3.7 Female association with PTSD

This meta-analysis presents a pooled odds ratio of 1.81 (1.10–2.99) across eight studies, indicating a statistically significant but highly heterogeneous association ($I^2 = 92.4\%$, $p < 0.000$). Most individual studies report positive associations, with odds ratios ranging from 1.62 to 3.87, except for one outlier (Study 7: 0.31 [0.20–0.48]), which suggests a protective effect (Figure 5).

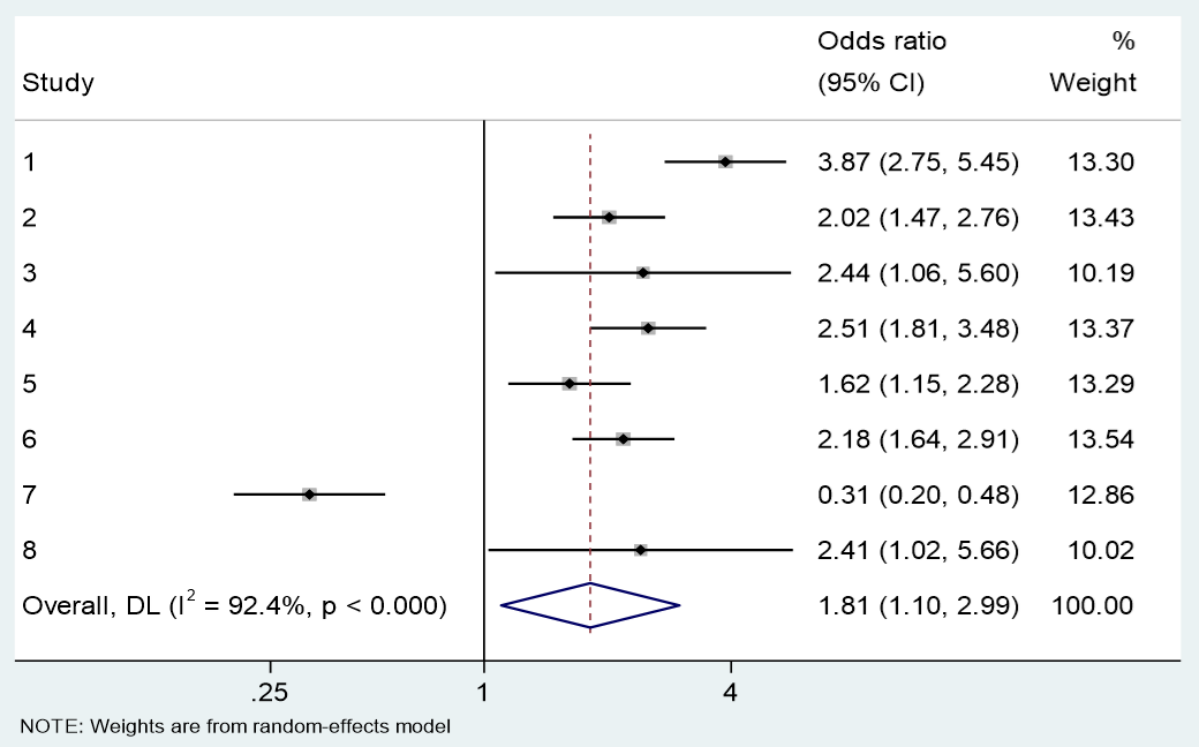


Figure 5 Forest plot on the pooled association of female gender with PTSD among conflict affected people in sub-Saharan Africa

4 Discussions

The association between female gender and PTSD in sub-Saharan African populations affected by conflict was investigated in this systematic review and meta-analysis, with an emphasis on the vulnerabilities and experiences of women following trauma.

These results add to an increasing body of research indicating that gender has a major impact on both the likelihood of developing PTSD and the way PTSD presents. In sub-Saharan Africa, the pooled prevalence of PTSD among individuals exposed to violence was 47.7% (95% CI: 39.41% to 56.03%), with an I^2 of 99.2%, according to the systematic review and meta-analysis.

This finding is consistent with several systematic reviews and meta-analyses conducted in different conflict-affected settings, including estimates of PTSD prevalence in Africa (51%), global conflict-affected populations (41%), and WHO estimates for acute conflict zones (50%). It is also comparable to post-genocide Rwanda (54%), Sri Lanka (56%), and a review focusing on war- and conflict-affected communities (23.5%). Similarly, a review on the burden of PTSD in countries affected by war reported a prevalence of 26.51%.

However, the present estimate is higher than those reported in other studies, including systematic reviews and meta-analyses in conflict settings (32.4%) and a 2020 global meta-analysis estimating 22.6% for sub-Saharan Africa. It is also higher than country-specific estimates, such as pooled PTSD prevalence in Ethiopia (39.28%) and Syria (36%), as well as reports among survivors living in war-affected areas (26%), civilians residing in armed conflict-affected regions (23.70%), and national/regional prevalence in sub-Saharan Africa (22%).

These discrepancies may be explained by differences in study populations, conflict severity, duration of exposure, diagnostic instruments, and cultural variations in symptom expression and help-seeking behaviours. Prolonged and extensive conflicts—often involving mass displacement, sexual violence, and limited access

to psychosocial care—have been common in sub-Saharan Africa and may contribute to elevated PTSD prevalence.

However, this finding was lower than the PTSD prevalence reported in this review, which was consistent with studies conducted in the Kurdistan region of Iraq (60%) [40] and Medellín, Colombia (88%) [41]. One possible explanation is that extreme violence, urban conflict, and prolonged trauma exposure may account for the higher PTSD rates observed in these settings [42]. Therefore, contextual factors such as conflict severity, socio-political environment, and healthcare infrastructure are likely to play a critical role in shaping PTSD prevalence across different settings [43].

The meta-analysis yielded a pooled odds ratio of 1.81 (1.10–2.99) across eight studies, indicating a statistically significant association, although the results were highly heterogeneous ($I^2 = 92.4\%$, $p < 0.000$).

The findings of this study align with previous research showing that women are generally at higher risk of developing PTSD than men, even though men often experience higher overall rates of trauma. This discrepancy is commonly attributed to differences in the types of trauma encountered by each gender. Women are more likely to experience interpersonal violence, including sexual assault and domestic abuse, whereas men are more frequently exposed to combat and physical violence. This pattern is supported by a systematic review and meta-analysis conducted in Africa [44], studies from Ethiopia [36, 45], and a systematic review focusing on natural hazard exposures [46]. Overall, the consistency of these findings highlights the urgent need to address the mental health needs of vulnerable populations, particularly those exposed to trauma in war-affected areas.

According to the meta-analysis, women were more likely than men to experience PTSD. The higher prevalence of PTSD among women may be explained by several factors [21]. PTSD is more common in women than in men, as reported across studies in different countries [47–49]. The determinants of PTSD prevalence can be broadly grouped into biological, psychological, and social domains [50]. Biologically, hormonal differences between females and males—such as the effects of oestrogen—may increase emotional reactivity and facilitate memory consolidation, thereby heightening susceptibility to PTSD [51]. Socially, women are more likely to experience interpersonal trauma, including sexual assault and domestic violence, which are strongly associated with increased PTSD risk compared with other trauma types [21]. In addition, societal gender roles and expectations that emphasize emotional expressiveness and vulnerability in females may further contribute to women's elevated PTSD risk [52].

Psychological factors may also contribute. Females are more likely to use emotion-focused coping strategies, such as rumination and suppression, which may intensify PTSD symptoms [53]. By contrast, males more often use problem-focused coping strategies, which are generally more effective for managing stress [54]. Furthermore, although females often benefit from stronger social networks that provide emotional support and may buffer stress, these networks can also increase exposure to discussions about traumatic events, potentially contributing to higher PTSD risk [55].

Understanding these factors is essential for developing targeted prevention and treatment strategies for PTSD, particularly among female internally displaced persons (IDPs) [56]. This evidence underscores the importance of prioritizing both psychological and general support for females to reduce the impact of PTSD on their daily lives.

Finally, one study included in the meta-analysis reported a protective association between female gender and PTSD (OR = 0.31), which contrasts with the overall pooled estimate showing that women had significantly higher odds of developing PTSD. This outlier may reflect differences in the study population, conflict context, sample characteristics, or methodological factors, including how PTSD was measured, whether confounders were adjusted for, or sampling pro-

cedures. It is also possible that contextual factors—such as differential exposure to traumatic events, cultural influences on symptom reporting, or resilience-related characteristics in the study population—contributed to the inverse association. Despite this outlier, the pooled results consistently indicated that female gender was associated with significantly increased odds of PTSD, suggesting that the overall findings were robust.

5 Conclusion

In conclusion, this review highlights the substantial burden of PTSD among conflict-affected populations in sub-Saharan Africa and shows that women are at significantly greater risk than men. These findings underscore the need for gender-responsive mental health policies, routine PTSD screening, trauma-informed and culturally appropriate interventions, and the integration of mental health services into humanitarian and primary healthcare systems. Strengthening these efforts may improve mental health outcomes and support recovery among conflict-affected populations.

Strength and limitations

The study provides a robust quantitative estimate of PTSD prevalence and its association with female gender by pooling data from 28 studies across sub-Saharan Africa, which is a strength of this study. However, only eight studies explicitly examined female gender as a risk factor, which may limit the generalizability of the association. In addition, the exclusion of non-English and grey literature may influence the pooled estimates. Moreover, due to the limited number of studies and incomplete reporting of key variables, additional analyses could not be conducted reliably.

List of abbreviations

CI	Confidence Interval
CS	Cross-Sectional
NOS	Newcasle-Ottawa Scale
OR	Odds Ratio
PTSD	Post-Traumatic Stress Disorder
SSA	Sub-Saharan Africa

Declarations

Ethics approval and consent to participation

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and received approval from the Institutional Review Board (IRB) of Dilla University College of Health Sciences and Medicine (approval number: DU/225/4/102).

Availability of data and materials

All data generated or analyzed during this study are included in this article. The data sets of the current study are available from Derebe Madoro, email:derebemd@gmail.com; Mobile: +251910895760, Dilla University, Dilla upon reasonable request.

Conflict of interests

The authors declare that they have no competing interests.

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Authors' contributions

DM: Conceptualization, Data curation, Methodology, Software, Writing – original draft, Writing – review & editing. DS: Data curation, Writing – review & editing. AAM: Data curation, Writing – review & editing. BY: Writing – review & editing. SA: Writing - review & editing; AA: Writing – review & editing.

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