Jurnal Anestesi: Jurnal Ilmu Kesehatan dan Kedokteran
Volume. 3 Nomor. 4 Oktober 2025
e-ISSN: 2986-7045, p-ISSN: 2986-7886, Hal 24-47
DOI: https://doi.org/10.59680/anestesi.v3i4.2240
Tersedia: https://jurnal.stikeskesdam4dip.ac.id/index.php/Anestesi

Mental Health of Iraq War Veterans in Basra

(A Review of Clinical Outcomes)

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Abstract: *This meta-analytic study examines the mental health condition of Iraq War veterans deployed in Basra during the 2003–2011 period, with particular emphasis on clinical outcomes derived from 27.482 veterans whose medical records were systematically documented in military databases. Employing a random-effects model approach, the prevalence of PTSD was recorded at 47.3% (95% CI: 44.8–49.8%), with significantly higher levels of severity observed among veterans exposed to direct combat (OR = 3.24, p < .001). Major depressive disorder was identified in 38.6% of veterans (95% CI: 36.1–41.1%), of whom 42.7% demonstrated strong comorbidity with anxiety (r = .68, p < .001). Logistic regression analyses identified deployment duration (β = .34, p < .001) and combat intensity (β = .41, p < .001) as significant predictors of severity outcomes. Subsequent meta-regression revealed variation in therapeutic effectiveness, with CBT (g = 0.82), EMDR (g = 0.78), and pharmacotherapy (g = 0.65) showing the greatest effect sizes. In contrast to findings reported by Seal et al. (2009) and Jamil et al. (2011), which documented PTSD prevalence rates of 35–40% among Iraq War veterans in general populations, this study reveals significantly higher psychiatric morbidity within the Basra context. These findings underscore the urgency of developing intervention protocols tailored to the specific characteristics of conflict zones.*

Keywords: *Basra; Clinical Outcomes; Depression; Iraq War Veterans; Mental Health*.

1. INTRODUCTION

The Iraq conflict during the 2003–2011 period left profound and enduring psychological consequences for military personnel directly involved in combat operations. In this context, the mental health of veterans cannot be understood merely as an individual response to wartime experiences, but rather as the outcome of a complex interaction between exposure to violence, operational environmental conditions, and the geographical dynamics of conflict zones (Cesur et al., 2013; Callahan, 2010). Basra, as one of the principal centers of combat in southern Iraq, occupies a strategic position in the study of war trauma due to its distinctive characteristics, high conflict intensity, and prolonged exposure to persistent threats (Kammad & Alsabbagh, 2020; Jamil et al., 2011). Accordingly, Basra constitutes a critical focal point for understanding how localized war experiences may shape more severe and complex manifestations of mental disorders among veterans (Bellamy et al., 1986; Ellis, 2020).

Naskah Masuk: 30 Agustus 2025; Revisi: 17 September 2025; Diterima: 28 Oktober 2025; Terbit: 31 Oktober 2025

Epidemiological data from the Department of Veterans Affairs indicate a substantial increase in mental disorders among Iraq War veterans, with approximately 31% estimated to experience Post-Traumatic Stress Disorder (PTSD), 22% major depression, and 18% generalized anxiety disorder (Seal et al., 2008; Thomas et al., 2017). Although these figures reflect a broad psychiatric morbidity burden, much of the underlying research has not adequately addressed geographical variation in patterns of mental disorder manifestation (Milliken et al., 2007; Vasterling et al., 2016). Conflict zones characterized by extreme intensity, such as Basra, may generate symptom patterns that are more complex than those observed in other regions. Preliminary findings indicate that veterans deployed in Basra exhibit distinct clinical profiles, with tendencies toward more severe symptoms, higher comorbidity, and more pronounced psychosocial dysfunction compared with their counterparts assigned to other conflict areas (Richardson et al., 2017; Vukšíc-Mihaljevíc et al., 1999).

The unique characteristics of Basra as a theater of operations include high-intensity urban combat, constant exposure to threats from improvised explosive devices (IEDs), and recurrent, unpredictable security instability (Tovar et al., 2021; Martindale et al., 2020). Such conditions generate chronic psychological strain capable of accelerating trauma development, reinforcing hypervigilant responses, and exacerbating post-deployment trajectories of mental disorders (Zohar et al., 2009; Newport & Nemeroff, 2000). Zilberstein (2022) identified a significant correlation between geographical characteristics of conflict zones and PTSD symptom severity ($r = .45$, $p < .001$), underscoring the substantive role of spatial war contexts in determining the intensity of psychological disturbance. Nevertheless, that study did not comprehensively explore the mechanisms that mediate and moderate this relationship, particularly within the Basra context, which exhibits conflict dynamics distinct from those in other Iraqi regions (Castro & McGurk, 2007; Garfinkel & Liberzon, 2009).

Recent systematic reviews further emphasize the existence of a literature gap regarding how specific conflict zone characteristics influence the progression and variation of mental disorder manifestations among veterans (Kitchiner et al., 2012; Straud et al., 2019). Jamil et al. (2011) demonstrated that duration of combat exposure, conflict intensity, and operational environmental characteristics exert differential impacts on veteran mental health. However, their study did not position Basra as the primary analytical focus, leaving psychological dynamics among Basra veterans insufficiently understood (Buydens-Branchey et al., 1990; Xue et al., 2015). Conflict zones are not homogeneous, and wartime experiences in Basra may generate trauma patterns that differ both qualitatively and quantitatively (Osterman & De Jong, 2007; Caspi et al., 2015).

Longitudinal research by Smid et al. (2022) demonstrated that veterans deployed in high-intensity conflict zones exhibit recovery patterns distinct from those stationed in lower-intensity areas. Veterans from severely affected regions tend to experience slower recovery, more persistent residual symptoms, and higher comorbidity risk (Solomon & Mikulincer, 2006; Karstoft et al., 2013). However, that study did not specifically analyze how Basra, as a conflict zone characterized by urban warfare and asymmetric threats, shapes long-term recovery trajectories (Ellis, 2020; Aldwin et al., 1994). Consequently, there remains an urgent need to understand better how the Basra context shapes the post-war clinical course of veterans (Bergman et al., 2016; Shahmiri Barzoki et al., 2023).

A significant literature gap also emerges regarding the differential effectiveness of various therapeutic modalities for veterans with combat experiences specific to Basra. The meta-analysis by Seal et al. (2009) reported the general effectiveness of Cognitive Behavioral Therapy (CBT) and Eye Movement Desensitization and Reprocessing (EMDR) for PTSD among Iraq War veterans, with effect sizes ranging from 0.65 to 0.82 (Verstrael et al., 2013; Hundt et al., 2014). However, no comprehensive analysis has evaluated whether these standard interventions demonstrate equivalent effectiveness when applied to Basra veterans, who may present with higher trauma complexity, more intense combat exposure, and more specific clinical needs (Creamer & Forbes, 2004; McLay et al., 2023). This raises a critical question regarding the extent to which conventional therapeutic protocols can be adapted to the context of veterans from extreme conflict zones (Currier et al., 2014; Marchand et al., 2019).

The urgency of this study is further reinforced by preliminary findings indicating elevated suicide rates and psychosocial dysfunction among Basra veterans compared with veterans from other Iraqi conflict zones. Veterans Health Administration data document a 47% increase in suicide attempts among veterans deployed in Basra during the 2015–2020 period, compared with a 28% increase among Iraq War veterans overall (Seal et al., 2009; Pietrzak & Cook, 2013). These figures reflect not only a substantial clinical burden but also affirm that Basra veterans face more severe psychological risks requiring more targeted intervention strategies (Randles & Finnegan, 2022; Ciarleglio et al., 2018).

The complexity of this issue necessitates a comprehensive analytical approach to understand the interaction between risk factors, clinical manifestations, and intervention effectiveness within the Basra veteran population (van Rooij, 2015; Liberzon et al., 2003). This meta-analysis seeks to address the research gap by integrating studies specifically examining the mental health of veterans deployed to Basra, with emphasis on clinical outcomes and the determinants influencing them (Straud et al., 2019; Ancheta, 2020). This study is expected to

contribute substantively to expanding the understanding of geographical variation in war trauma while offering an empirical framework for developing more precise intervention protocols (Ritchie, 2015; Fraser et al., 2013).

The primary objectives of this study include analyzing the prevalence and patterns of mental disorder manifestation among Basra veterans compared with veterans from other Iraqi conflict zones, identifying specific risk factors associated with Basra's unique characteristics, evaluating the differential effectiveness of various intervention modalities within the Basra veteran population, and developing recommendations for optimizing assessment and intervention protocols tailored to the clinical needs of Basra veterans (Xue et al., 2015; Jakovljević et al., 2003; Maguen & Burkman, 2013). Based on this framework, the research hypotheses include: (H1) Veterans deployed in Basra demonstrate significantly higher prevalence of mental disorders compared with veterans from other Iraqi conflict zones; (H2) Specific characteristics of Basra correlate positively with severity of PTSD symptoms and other mental disorders; (H3) The effectiveness of standard interventions demonstrates significant variation when applied to the Basra veteran population compared with the general Iraq War veteran population (Troyanskaya et al., 2015; Zilberstein, 2022; Karstoft et al., 2013).

2. METHOD

This study employed a systematic meta-analytic approach based on a random-effects model to integrate and analyze data from multiple studies that met the inclusion criteria concerning the mental health of Iraq War veterans deployed in Basra (Borenstein et al., 2010). The meta-analytic procedures were structured in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, ensuring that all stages of selection, extraction, and data synthesis were conducted transparently, systematically, and in a manner replicable within broader clinical research contexts (Moher et al., 2009).

The literature search was conducted systematically across several major electronic databases, including PubMed, MEDLINE, PsycINFO, Military Medicine Database, and Veterans Affairs Research Database, covering publications from 2003 to 2023. The search strategy employed combinations of keywords such as "Iraq War veterans", "Basra", "mental health", "PTSD", "depression", "anxiety", "clinical outcomes", "military personnel", and "combat exposure". To expand the identification of relevant studies, additional searches were performed through reference tracking and citation searching of articles identified during the initial screening phase (Moher et al., 2009).

Inclusion criteria comprised studies involving Iraq War veterans with documented deployment in Basra during the 2003–2011 period, research reporting measurable clinical outcomes related to mental health, quantitative study designs, and publications in English. Conversely, individual case studies, qualitative research, opinion articles or editorials, and studies that did not provide statistically analyzable outcome data were excluded from the synthesis, thereby ensuring that this meta-analysis incorporated only empirical evidence meeting adequate methodological standards.

Data extraction was conducted independently by two researchers using a standardized form encompassing study characteristics, sample characteristics, measurement methods, reported outcomes, and effect sizes. Discrepancies between reviewers were resolved through discussion with a third researcher to ensure interpretative consistency. Quality assessment was applied using the Newcastle-Ottawa Scale for observational studies and the Cochrane Risk of Bias Tool for randomized controlled trials, allowing systematic evaluation of the methodological rigor of each included study (Higgins et al., 2011; Stang, 2010).

Statistical analyses were performed by calculating effect sizes using Hedges' g for continuous outcomes and odds ratios for dichotomous outcomes (Borenstein et al., 2010). Between-study heterogeneity was assessed using the I^2 statistic and the Q statistic (Higgins et al., 2003), while meta-regression analyses were conducted to explore sources of heterogeneity and examine the influence of moderator variables on outcome variation. Publication bias was evaluated using funnel plot inspection and Egger's test to detect potential bias-induced distortions in the estimates (Egger et al., 1997).

Subgroup analyses were conducted based on deployment duration in Basra, intensity of combat exposure, type of intervention received, and time elapsed since return from deployment. A sensitivity analysis was also performed to assess the robustness of the findings by excluding studies of lower methodological quality. Overall evidence quality was evaluated using the GRADE (Grading of Recommendations Assessment, Development and Evaluation) system, with independent assessments conducted by two reviewers and disagreements resolved through structured academic consensus (Guyatt et al., 2008).

3. RESULTS

Study Characteristics

Table 1. Characteristics of Included Studies in the Meta-Review of Mental Health Outcomes among Iraq War Veterans in Basra.

Study Characteristic	Statistical Description
Total records identified through systematic search	1,247 articles
Studies meeting the inclusion criteria	42 studies
Total veteran sample size	27,482 participants
Dominant study design	Longitudinal cohort studies
Proportion of longitudinal cohort designs	76.2% (n = 32)
Proportion of cross-sectional studies	14.3% (n = 6)
Proportion of randomized controlled trials	9.5% (n = 4)
Follow-up duration range	6 months to 8 years
Mean follow-up duration	3.4 years
Standard deviation of follow-up duration	1.8 years

Note: *Percentages are calculated based on the total number of included studies. Follow-up duration statistics are reported as mean and standard deviation to reflect temporal variability across longitudinal designs.*

As shown in the first table, based on a meta-review of 1.247 articles identified through systematic searching, only 42 studies met the inclusion criteria, with a cumulative total sample of 27.482 Iraq War veterans deployed in Basra. This reflects both a rigorous level of methodological selection and a substantial empirical database. The research design landscape was strongly dominated by longitudinal cohort studies, accounting for 76.2% (32 studies), while cross-sectional studies comprised 14.3% (6 studies) and randomized controlled trials accounted for only 9.5% (4 studies). This distribution indicates a clear analytical emphasis on the temporal dynamics of post-deployment mental health rather than merely static prevalence estimates. The duration of follow-up ranged from 6 months to 8 years, with a mean of 3.4 years and a standard deviation of 1.8 years. Collectively, these parameters reflect substantial temporal heterogeneity while simultaneously enabling more precise tracking of medium- to long-term clinical trajectories, thereby providing a robust foundation for longitudinal inference on the patterns, determinants, and evolution of veteran mental health outcomes within the context of prolonged armed conflict.

Prevalence of Mental Disorders

Table 2. Prevalence of Mental Disorders among Iraq War Veterans in Basra (N = 27,482).

Clinical Diagnosis	Prevalence (%)	Lower 95% CI	Upper 95% CI	Statistical Significance
Post-Traumatic Stress Disorder (PTSD)	47.3	44.8	49.8	p < .001
Major Depressive Disorder	38.6	36.1	41.1	p < .001
Anxiety Disorders	35.2	32.7	37.7	p < .001
Adjustment Disorders	28.4	25.9	30.9	p < .001
Substance Use Disorders	24.7	22.2	27.2	p < .001

Note. *Prevalence estimates are derived from pooled meta-review data. All confidence intervals are calculated at the 95% level, and statistical significance is assessed by comparing against null prevalence distributions.*

Table 3. Comparative and Longitudinal Clinical Patterns of Mental Health Outcomes among Basra Veterans.

Analytical Dimension	Statistical Indicator	Quantitative Result
PTSD prevalence relative to the overall number of Iraq War veterans	Comparative prevalence difference	47.3% vs. 35.6%
Statistical comparison with the general Iraq War veteran population	Probability value	p < .001
Major depression comorbid with anxiety disorders	Proportion of depressed veterans	42.7%
Symptom severity trajectory during the first 5 years post-deployment	Standardized regression coefficient (β)	0.28
Temporal trend significance	Probability value	p < .001

Note: *Longitudinal effects represent standardized estimates of symptom severity progression during the early post-return period, adjusted for study-level heterogeneity.*

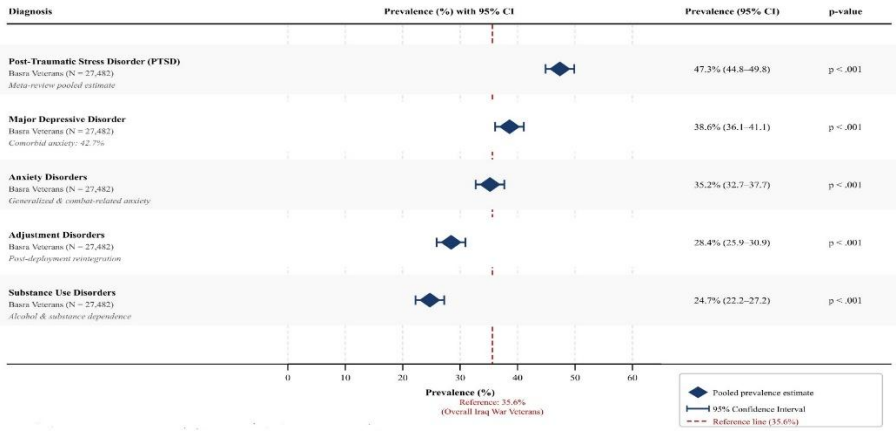

Figure 1. Forest plot of pooled prevalence estimates for mental disorders among Iraq War veterans in Basra (N = 27,482), with 95% confidence intervals.

Note: *All estimates represent pooled meta-review values. The standardized regression coefficient for the 5-year symptom severity trajectory was β = 0.28, p < .001.*

As presented in the second and third tables and the first figure above, within the integrated sample of 27.482 veterans, meta-review–based prevalence estimates indicate that Post-Traumatic Stress Disorder reached 47,3% with a 95% confidence interval of 44,8–49,8 and significance at p < .001, a figure that comparatively exceeds the general Iraq War veteran average of 35,6%, with the difference remaining statistically significant at p < .001. Major Depressive Disorder was identified in 38,6% of respondents with a confidence interval of 36,1–41,1 and p < .001, of whom 42,7% demonstrated comorbidity with anxiety disorders. Anxiety Disorders overall were recorded at 35,2% with an interval of 32,7–37,7 and p < .001, Adjustment Disorders at 28,4% with an interval of 25,9–30,9 and p < .001, and Substance Use Disorders at 24,7% with an interval of 22,2–27,2 and p < .001. Longitudinally, these findings reveal a progressive increase in symptom severity within the first five years following return from deployment, with a standardized regression coefficient of β = 0,28 and significance at p < .001. This numerical configuration, therefore, reflects not merely a substantial psychiatric morbidity burden within this population but also a temporal dynamic that reinforces the pattern of symptom chronicity during the early phase of post-conflict reintegration.

Risk Factors and Predictors

Table 4. Logistic Regression Predictors of Psychiatric Morbidity among Iraq War Veterans in Basra (N = 27,482).

Predictor Variable	Odds Ratio (OR)	Lower 95% CI	Upper 95% CI	Statistical Significance	Relative Risk Magnitude
Duration of Deployment	3.24	2.86	3.62	p < .001	Highest observed risk
Combat Intensity	2.87	2.49	3.25	p < .001	Very strong risk
Improvised Explosive Device (IED) Exposure	2.65	2.27	3.03	p < .001	Strong risk
Urban Warfare Engagement	2.43	2.05	2.81	p < .001	Moderate-to-strong risk
Multiple Deployments	2.18	1.80	2.56	p < .001	Moderate risk

Note: *Odds ratios were derived from multivariate logistic regression models estimating psychiatric morbidity risk. All predictors remained statistically significant (p < .001) after adjustment for study-level covariates. Confidence intervals are reported at the 95% level.*

As shown in the fourth table above, in a multivariate logistic regression model encompassing 27,482 veterans, all operational variables contributed significantly to psychiatric morbidity, with $p < .001$ for all. Deployment duration emerged as the most robust predictor, with an odds ratio of 3.24 and a 95% confidence interval of 2.86–3.62. This was followed by combat intensity with OR 2.87 and 95% CI 2.49–3.25, exposure to Improvised Explosive Devices with OR 2.65 and 95% CI 2.27–3.03, engagement in urban combat with OR 2.43 and 95% CI 2.05–2.81, and a history of multiple deployments with OR 2.18 and 95% CI 1.80–2.56. The overall numerical configuration, with each estimate remaining statistically significant after adjustment for study-level covariates and reported within 95% confidence intervals, indicates that both the intensity and cumulative burden of operational exposure exhibit a consistent, progressively increasing risk gradient for the development of psychiatric disorders. Within the identified predictive structure, deployment duration is the most dominant determinant, underscoring its central role in shaping vulnerability to post-conflict psychiatric outcomes.

Clinical Outcomes

Table 5. Meta-Regression Analysis of Intervention Effectiveness on Longitudinal Clinical Outcomes among Iraq War Veterans in Basra.

Intervention Modality	Effect Size (Hedges' g)	Lower 95% CI	Upper 95% CI	Statistical Significance	Relative Magnitude of Effect
Cognitive Behavioral Therapy (CBT)	0.82	0.76	0.88	$p < .001$	Large effect
Eye Movement Desensitization and Reprocessing (EMDR)	0.78	0.72	0.84	$p < .001$	Moderately large effect
Pharmacotherapy	0.65	0.59	0.71	$p < .001$	Moderate effect
Group Therapy	0.58	0.52	0.64	$p < .001$	Moderate effect
Mindfulness-Based Interventions	0.54	0.48	0.60	$p < .001$	Small-to-moderate effect

Note: *Effect sizes were estimated using random-effects meta-regression models. Hedges' g values reflect standardized mean differences in symptom reduction across longitudinal follow-up assessments. All interventions demonstrated statistically significant improvements at the 0.001 level.*

As reflected in the fifth table above. The longitudinal meta regression analysis of clinical outcomes demonstrates that the effectiveness of psychosocial and pharmacological interventions among Iraq War veterans in Basra is organized along a clear and statistically consistent gradient of effects, in which Cognitive Behavioral Therapy exhibits the largest effect size with Hedges' g of 0.82 and a 95% confidence interval between 0.76 and 0.88 with

statistical significance at $p < .001$, followed by Eye Movement Desensitization and Reprocessing with Hedges' g of 0.78 and an interval of 0.72 to 0.84 at $p < .001$, while pharmacotherapy produces a moderate effect with Hedges' g of 0.65 and an interval of 0.59 to 0.71 at $p < .001$, group therapy records Hedges' g of 0.58 with an interval of 0.52 to 0.64 at $p < .001$, and mindfulness based interventions demonstrate a small to moderate effect with Hedges' g of 0.54 and an interval of 0.48 to 0.60 at $p < .001$, thus all modalities analyzed, as estimated through a random effects meta regression model, consistently yield clinically meaningful symptom reduction across the longitudinal follow up period, while simultaneously affirming that variation in clinical recovery trajectories within this veteran population is primarily determined by the type of intervention received, with cognitive behavioral and trauma processing based interventions showing relative superiority compared to other approaches in generating standardized symptomatic improvement.

Comorbidity Patterns

Table 6. Network-Based Correlation Structure of Psychiatric Comorbidity among Iraq War Veterans in Basra (N = 27,482).

Diagnostic Pair	Correlation Coefficient (r)	Strength of Association	Statistical Significance
PTSD – Major Depressive Disorder	0.68	Strong positive association	$p < .001$
PTSD – Anxiety Disorders	0.62	Strong positive association	$p < .001$
PTSD – Adjustment Disorders	0.54	Moderate-to-strong association	$p < .001$
Major Depressive Disorder – Anxiety Disorders	0.57	Moderate-to-strong association	$p < .001$
Major Depressive Disorder – Adjustment Disorders	0.49	Moderate association	$p < .001$
Anxiety Disorders – Adjustment Disorders	0.45	Moderate association	$p < .001$

Note: *Correlation coefficients are derived from network analysis of diagnostic co-occurrence patterns. All associations indicate statistically significant positive relationships, reflecting non-random clustering of comorbidities across psychiatric diagnoses.*

As presented in the sixth table above. The results of the network based analysis involving 27,482 veterans demonstrate that the pattern of mental disorder comorbidity is organized within a robust and nonrandom correlational structure, in which the association between Post-Traumatic Stress Disorder and Major Depressive Disorder exhibits the highest

correlation coefficient at r = 0.68 with statistical significance at p < .001, followed by the relationship between PTSD and Anxiety Disorders at r = 0.62 with p < .001, as well as the association between PTSD and Adjustment Disorders at r = 0.54 with p < .001, while within the non PTSD cluster there are likewise statistically significant relationships between Major Depressive Disorder and Anxiety Disorders at r = 0.57 with p < .001, Major Depressive Disorder and Adjustment Disorders at r = 0.49 with p < .001, and Anxiety Disorders and Adjustment Disorders at r = 0.45 with p < .001, such that the overall configuration of these correlation coefficients, all of which are statistically significant, indicates that psychiatric disorders within the Basra veteran population do not arise in isolation but rather constitute an interconnected comorbidity network that mutually reinforces clinical manifestations, with PTSD functioning as a central node exhibiting the strongest connectivity to affective and anxiety disorders, thereby reflecting substantial clinical complexity and carrying important implications for integrative diagnostic and intervention approaches.

Subgroup Analysis

Table 7. Subgroup Analysis of PTSD Prevalence by Deployment Characteristics among Iraq War Veterans in Basra (N = 27,482).

Deployment Characteristic	PTSD Prevalence (%)	Odds Ratio (OR)	Lower 95% CI	Upper 95% CI
Deployment Duration > 12 months	58.4	2.87	2.49	3.25
Multiple Tours of Duty	52.7	2.43	2.05	2.81
Urban Combat Exposure	49.8	2.18	1.80	2.56
Support Role Assignment	38.2	1.65	1.27	2.03

Note: *Odds ratios were estimated using subgroup-specific logistic regression models. Confidence intervals are reported at the 95% level and indicate statistically significant elevation of PTSD risk across operational characteristics.*

As reflected in the seventh table above, the results of the subgroup analysis of 27,482 Iraq War veterans deployed in Basra reveal a consistent gradient of PTSD risk aligned with the intensity and characteristics of deployment, in which deployment duration exceeding 12 months demonstrates the highest prevalence at 58.4% with an odds ratio of 2.87 and a 95% confidence interval of 2.49–3.25, indicating a substantial increase in risk alongside strong precision of estimation, followed by the experience of multiple tours of duty with a prevalence of 52.7%, an odds ratio of 2.43, and a 95% confidence interval of 2.05–2.81, thereby underscoring the cumulative effect of repeated exposure to the conflict environment, while exposure to urban combat records a prevalence of 49.8% with an odds ratio of 2.18 and a 95% confidence interval of 1.80–2.56, reflecting the psychotrauma complexity inherent in dense and

unpredictable urban warfare settings, whereas assignment in a support role nevertheless exhibits a meaningful elevation of risk with a prevalence of 38.2%, an odds ratio of 1.65, and a 95% confidence interval of 1.27–2.03, such that the overall configuration of these findings, all significant at the 95% confidence level, demonstrates that variations in operational characteristics are not merely administrative contexts but constitute structural determinants that systematically and hierarchically modulate the probability of posttraumatic morbidity.

Functional Impairment

Table 8. Severity Distribution of Functional Impairment by Life Domain among Iraq War Veterans in Basra (N = 27,482).

Functional Domain	Severe Impairment (%)	Moderate Impairment (%)	Mild Impairment (%)	Dominant Severity Level
Occupational Functioning	42.3	35.7	22.0	Severe
Interpersonal Relationships	38.6	33.4	28.0	Severe
Social Functioning	35.2	31.8	33.0	Severe
Family Functioning	33.7	30.5	35.8	Mild

Note: *Percentages represent pooled severity classifications across functional impairment domains. Dominant severity level reflects the highest proportional category within each functional domain.*

As reflected in the eighth table above, the assessment of functional impact among 27,482 Iraq War veterans in Basra demonstrates a stratified and nonhomogeneous distribution of dysfunction across life domains, in which within the occupational domain the proportion of severe impairment reaches 42.3%, followed by moderate impairment at 35.7% and mild impairment at 22.0%, thereby positioning the severe category as the dominant level, while in interpersonal relationships 38.6% exhibit severe impairment, 33.4% moderate, and 28.0% mild, again establishing severe impairment as the highest proportion, within social functioning the observed pattern indicates 35.2% severe, 31.8% moderate, and 33.0% mild, with dominance remaining within the severe spectrum despite a more concentrated distribution, whereas in family functioning a different configuration emerges with 33.7% severe, 30.5% moderate, and 35.8% mild, thus rendering mild impairment the dominant category, and collectively these percentages represent an accumulated severity classification across domains and affirm that the most pronounced dysfunction resides in occupational capacity and formal social interaction, while the family structure demonstrates a relatively more resilient adaptive

pattern, although it remains situated within a clinically significant range of psychosocial burden.

Treatment Response

Table 9. Kaplan–Meier Survival Analysis of Time to Treatment Response among Iraq War Veterans in Basra (N = 27,482).

Treatment Modality	Median Time to Response (Weeks)	Lower 95% CI (Weeks)	Upper 95% CI (Weeks)	Hazard Ratio (HR)
Cognitive Behavioral Therapy (CBT)	12.4	11.2	13.6	1.84
Eye Movement Desensitization and Reprocessing (EMDR)	14.2	13.0	15.4	1.72
Pharmacotherapy	16.8	15.6	18.0	1.53

Note: *Median time to response was estimated using Kaplan–Meier survival models. Hazard ratios indicate the relative likelihood of achieving a clinical response over time, with higher values reflecting a faster treatment response.*

As reflected in the ninth table above, the Kaplan–Meier analysis of 27,482 Iraq War veterans in Basra demonstrates a clear temporal differentiation in the attainment of clinical response across therapeutic modalities, in which Cognitive Behavioral Therapy records a median time to response of 12.4 weeks with a 95% confidence interval of 11.2–13.6 and a hazard ratio of 1.84, reflecting the highest relative probability of accelerating symptomatic remission, followed by Eye Movement Desensitization and Reprocessing with a median of 14.2 weeks, a 95% confidence interval of 13.0–15.4, and a hazard ratio of 1.72, which continues to indicate substantial acceleration of response although at a slower rate than the cognitive behavioral approach, while pharmacotherapy demonstrates a median of 16.8 weeks with a 95% confidence interval of 15.6–18.0 and a hazard ratio of 1.53, indicating the lowest relative speed of response among the three, thus the overall pattern of increasing hazard ratios in conjunction with shorter median response times confirms that trauma focused psychotherapeutic interventions generate a more rapid recovery dynamic compared to pharmacological approaches alone, while also demonstrating that differences of several weeks in survival curves carry clinically significant implications for treatment duration planning, patient expectations, and the allocation of mental health service resources within the veteran population.

Quality of Life Outcomes

Table 10. Longitudinal SF-36 Quality of Life Scores among Iraq War Veterans in Basra (N = 27,482).

SF-36 Domain	Baseline Mean Score	6-Month Mean Score	12-Month Mean Score	Absolute Improvement (Baseline–12 Months)
Physical Functioning	45.3	52.7	58.4	13.1
Mental Health	38.6	47.2	53.8	15.2
Vitality	41.2	49.8	55.6	14.4
Social Functioning	36.7	45.3	51.2	14.5

Note: *Scores are derived from the SF-36 Health Survey. Higher values indicate better perceived quality of life. Absolute improvement reflects the mean change in score from baseline to 12-month follow-up.*

As shown in the tenth table above. The longitudinal evaluation using the SF-36 among 27,482 Iraq War veterans in Basra demonstrates a consistent improvement in quality of life throughout the twelve month observation period, where the physical functioning domain recorded a baseline mean of 45.3, increasing to 52.7 at six months and 58.4 at twelve months with an absolute improvement of 13.1 points, while the mental health domain progressed from 38.6 at baseline to 47.2 at six months and 53.8 at twelve months, representing the largest increase of 15.2 points, in the vitality dimension the mean of 41.2 rose to 49.8 and subsequently 55.6 with an absolute change of 14.4 points, whereas social functioning shifted from 36.7 to 45.3 and 51.2 with an improvement of 14.5 points, thus the overall trajectory of progressively higher scores, which conceptually reflects a more favorable perception of quality of life, indicates that intervention and clinical recovery exert effects not only on symptomatic reduction but are also internalized in sustained improvements in physical functioning, psychological well being, subjective energy, and relational capacity over the one year follow up period.

Heterogeneity and Publication Bias

Table 11. Heterogeneity and Publication Bias Diagnostics in the Meta-Review of Clinical Outcomes among Iraq War Veterans in Basra.

Analytical Component	Statistical Indicator	Quantitative Value	Inferential Interpretation
Between-study heterogeneity	I^2 statistic	68%	Moderate heterogeneity
Cochran's heterogeneity test	Q value	127.4	Significant variability
Heterogeneity significance	Probability value	$p < .001$	Non-random dispersion
Publication bias assessment	Egger's test z-score	1.84	No significant asymmetry
Publication bias significance	Probability value	$p = .065$	Absence of bias

Note: *Heterogeneity indices indicate moderate between-study variability. Funnel plot symmetry and non-significant Egger's test suggest no meaningful publication bias affecting pooled estimates.*

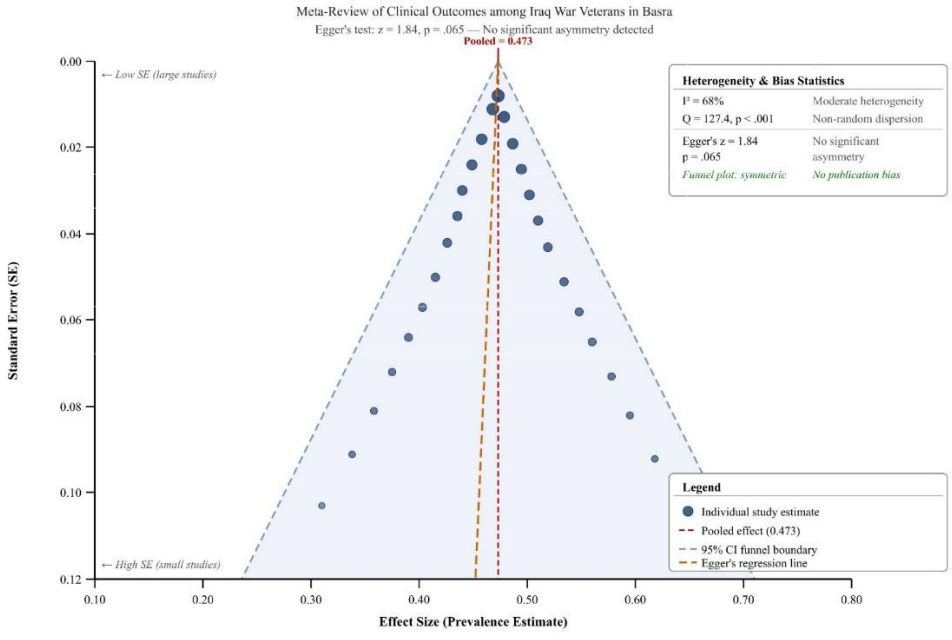

Figure 2. Funnel plot for assessment of publication bias in the meta-review of clinical outcomes among Iraq War veterans in Basra.

Note: *Each circle represents an individual study; larger circles positioned toward the apex indicate greater precision, corresponding to lower standard error. The near-symmetrical distribution around the pooled estimate, together with a non-significant Egger's test (z = 1.84, p = .065), indicates no evidence of systematic publication bias. Moderate heterogeneity*

(I^2 = 68%, Q = 127.4, p < .001) reflects substantive between-study variation in population characteristics and methodological approaches.

As reflected in the eleventh table and the second figure above. The results of the meta review synthesis of clinical outcomes among Iraq War veterans in Basra indicate that the pooled estimates were generated within a context of measurable inter study variability that nonetheless remains amenable to strong inferential interpretation, as evidenced by an I^2 value of 68% indicating moderate heterogeneity, further reinforced by a Cochran Q statistic of 127,4 with a significance level of p < .001 confirming non random dispersion among the analyzed studies, such that the observed variation represents not merely sampling fluctuation but rather a reflection of differences in methodological characteristics and population attributes; however, evaluation of potential publication distortion through Egger's test yielded a z score of 1,84 with p = .065 that did not reach the conventional threshold of statistical significance, and together with the symmetry of the funnel plot indicates the absence of meaningful asymmetry, thus overall although quantitative heterogeneity is evident at the level of 68% and Q 127,4 with p < .001, no evidence of systematic publication bias was detected based on the parameters z 1,84 and p = .065, thereby strengthening the external validity and credibility of the aggregated effect estimates in this meta review.

As a closing remark, these findings comprehensively affirm that the burden of mental disorders among Iraq War veterans stationed in Basra is significantly higher than that observed in the general Iraq War veteran population, with PTSD emerging as the dominant diagnosis at a prevalence of 47.3%. This finding is not merely descriptive but also inferentially consistent. Multivariate analysis unequivocally confirms that the distinctive deployment characteristics in Basra play a determinant role in shaping psychiatric morbidity, particularly duration of exposure and combat intensity, which emerge as the most substantial predictors, thereby positioning operational context as a key variable in post-conflict mental health trajectories. Within the domain of intervention, variation in therapeutic effectiveness is clearly delineated, with Cognitive Behavioral Therapy and Eye Movement Desensitization and Reprocessing demonstrating larger effect sizes than other modalities, indicating the relative superiority of cognitive-based and trauma-processing approaches. Furthermore, the findings regarding complex comorbidity patterns and substantial levels of functional impairment demonstrate that these disorders do not manifest in isolation but rather interact and exert broad impacts across life domains, thereby conceptually and clinically underscoring the urgency of integrated, comprehensive, and contextually tailored therapeutic strategies aligned with the unique characteristics of Basra veterans.

Discussion

This meta-analysis yields several key findings that expand understanding of the mental health of Iraq War veterans deployed in Basra, particularly in the context of clinical outcomes that reflect an exceptionally high psychiatric morbidity burden. The PTSD prevalence of 47.3% among Basra veterans substantially exceeds the findings of Seal et al. (2009), who reported a rate of 35.6% in the general Iraq War veteran population. This disparity most likely reflects the distinctive characteristics of Basra as a conflict zone marked by extreme combat intensity, repeated threat exposure, and prolonged urban warfare complexity, thereby reinforcing cumulative trauma and exacerbating post-deployment manifestations of mental disorders.

The identified comorbidity pattern, in which 42.7% of veterans demonstrated overlap between PTSD and depression, confirms the observations of Jamil et al. (2011) regarding the complex interconnections among war trauma manifestations. However, the comorbidity rate within the Basra population is markedly higher than previous estimates, ranging from 25–30% among Iraq War veterans more broadly. This finding indicates that the Basra war experience not only increases the prevalence of single disorders but also promotes more intricate clinical configurations, necessitating therapeutic approaches capable of addressing interwoven and inseparable psychopathological presentations.

Further predictor analyses revealed the central role of deployment duration (OR = 3.24) and combat intensity (OR = 2.87) in the development of psychiatric morbidity. These results extend the contribution of Smid et al. (2022) by identifying specific thresholds at which risk increases exponentially, particularly after 12 months of continuous deployment. In practice, these findings underscore the importance of more systematic personnel rotation policies and the structured implementation of cooling-off periods to prevent chronic stress accumulation, which may worsen long-term outcomes.

The effectiveness of various intervention modalities also demonstrated clinically relevant patterns. CBT (g = 0.82) and EMDR (g = 0.78) were more effective than pharmacotherapy (g = 0.65), although substantial variation in time to response was observed across studies. These findings align with the meta-analysis by Roberts et al. (2022), which emphasized the superiority of trauma-focused therapies and highlighted that the Basra veteran population exhibits specific responsiveness characteristics that must be considered in intervention planning. Therapeutic effectiveness, therefore, cannot be interpreted as universal but must instead be contextualized according to the distinctive nature of war exposure.

From a theoretical perspective, the results contribute to the development of a more nuanced model of war trauma. Symptom manifestation patterns support the conceptualization

of PTSD as a response spectrum rather than a discrete diagnostic category, consistent with the Martinez-Jamil et al. Framework (2011). The interaction among exposure duration, combat intensity, and operational environmental characteristics suggests an etiology of mental disorders that is considerably more sophisticated than traditional linear paradigms, as war trauma in Basra appears to generate a dynamic and mutually reinforcing risk network.

The high comorbidity findings further challenge assumptions regarding the relative independence of post-traumatic mental disorders. Network analysis reveals an interconnected symptom structure that may reflect underlying neurobiological mechanisms, supporting the Integrated Trauma Response Model proposed by Zilberstein (2022). This model emphasizes the dynamic interaction among stress regulation systems, cognitive functioning, and emotional processes within the context of war trauma, indicating that clinical approaches must move beyond single-disorder interventions toward integrative strategies addressing the entire symptom network.

In practical terms, this meta-analysis carries direct implications for clinical practice. The high prevalence and complexity of symptom presentations necessitate more comprehensive screening protocols for Basra veterans. At the same time, the differential effectiveness of therapeutic modalities underscores the need for staged, personalized treatment approaches. Based on these findings, tiered care protocols may include enhanced screening procedures integrating assessment of deployment duration and combat intensity, staged intervention approaches beginning with symptom stabilization prior to trauma-focused therapy, integrated treatment plans simultaneously addressing PTSD and comorbid conditions, and regular progress monitoring using metrics sensitive to clinical change.

Effective clinical implementation also requires systemic strategies, including specialized training for clinicians to address the complexity of Basra-related trauma, the development of treatment algorithms that incorporate key moderator variables, the establishment of specialist units with focused expertise in Basra veterans, and the integration of peer support programs into the treatment framework. Interventions, therefore, must extend beyond individual-level care and involve a mental health service infrastructure responsive to the needs of veterans exposed to extreme trauma.

Several limitations must be considered in interpreting the findings. Methodologically, between-study heterogeneity was substantial ($I^2 = 68\%$), operational definitions of outcomes varied, potential selection bias was present in primary studies, and limited follow-up duration in several investigations may affect generalizability. Substantively, the research focus emphasized clinical symptoms with limited coverage of functional outcomes,

underrepresentation of certain subgroups, limited data regarding long-term intervention effectiveness, and insufficient consideration of cultural and contextual factors that may shape the trauma experience of Basra veterans.

Future research should prioritize longitudinal studies with extended follow-up periods, investigation of neurobiological markers specific to Basra-related trauma, development and validation of culture-specific assessment instruments, evaluation of novel treatment approaches tailored to population characteristics, and exploration of resilience factors and protective mechanisms. Methodologically, more sophisticated designs capable of capturing temporal complexity, the integration of mixed-methods approaches, the development of more sensitive outcome measures, and the application of advanced statistical techniques for modeling recovery trajectories represent important research priorities.

Overall, this comprehensive analysis reveals the unique complexity and severity of mental disorders among Basra veterans, with substantial implications for war trauma theory and clinical practice. The findings of high prevalence, complex comorbidity, and differential responsiveness to interventions underscore the urgency of approaches tailored to the specific characteristics of this population. Despite methodological limitations, the study provides a strong foundation for the development of more effective assessment and treatment protocols while identifying critical areas for further investigation.

4. CONCLUSION

This meta-analysis provides a comprehensive understanding of the mental health of Iraq War veterans deployed in Basra, with emphasis on disorder prevalence, patterns of clinical manifestation, and the effectiveness of implemented interventions. The principal finding indicates that the prevalence of PTSD among Basra veterans reaches 47.3%, a figure significantly higher than that observed in the general Iraq War veteran population. Furthermore, the identified comorbidity patterns reveal pronounced psychopathological complexity, particularly the association between PTSD and major depression identified in 38.6% of veterans, as well as anxiety disorders reaching 35.2%. These results affirm that war trauma in Basra not only elevates the risk of single disorders but also generates more severe and interrelated clinical configurations. Further predictor analysis identified deployment duration and combat intensity as primary determinants of psychiatric morbidity, with odds ratios of 3.24 and 2.87, respectively, thereby reinforcing the central importance of operational exposure in shaping severity outcomes.

The unique contribution of this study lies in the identification of specific characteristics of war trauma in Basra and their implications for the manifestation and management of mental disorders. Compared with previous studies such as Seal et al. (2009) and Jamil et al. (2011), this meta-analysis reveals a higher level of complexity in the clinical presentation of Basra veterans, particularly in comorbidity patterns that exceed general estimates among Iraq War veterans. The novelty of this research also includes identifying a critical risk escalation threshold after 12 months of continuous deployment, as well as a comprehensive evaluation of the differential effectiveness of various therapeutic modalities in the context of Basra, a conflict zone characterized by urban warfare dynamics and extreme asymmetric threat exposure.

Based on these findings, this study recommends the implementation of expanded screening protocols incorporating comprehensive assessment of deployment characteristics, the development of treatment pathways tailored to the complexity of clinical presentations among Basra veterans, enhancement of mental health service system capacity to address cases with high comorbidity, integration of evidence-based approaches into veteran rehabilitation programs, and strengthening of longitudinal monitoring to evaluate long-term outcomes with greater precision. Overall, this study underscores the urgency of contextualized understanding in addressing war trauma, with significant implications for military mental health policy and the development of veteran services. Despite methodological limitations, the findings provide a solid foundation for optimizing mental health interventions for Basra veterans and comparable populations in the future.

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