Evidence-based treatments for PTSD symptoms resulting from military sexual trauma in women Veterans: A systematic review

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ABSTRACT

Introduction: Military sexual trauma (MST) can encompass sexual assault and harassment and has been shown to be pervasive across militaries, disproportionately affecting women. The most common psychological consequence is post-traumatic stress disorder (PTSD). This study sought to synthesize the treatments that demonstrate effectiveness in treating PTSD symptoms resulting from MST in women Veterans. **Methods:** A systematic review explored research into interventions that included measured outcomes of PTSD symptoms resulting from MST. An electronic search for studies published between 1992 and 2022 was conducted. Effect sizes were calculated for all interventions. **Results:** A total of 998 papers were initially identified, of which 12 met inclusion criteria. Seven interventions were studied, and all reported meaningful impact on PTSD symptoms. Studies with follow-up measurements post-treatment were limited in number (n = 5). Heterogeneity in study design and populations, and definition of MST were observed. Trauma-focused interventions — particularly cognitive processing therapy (CPT) — had the strongest evidence for reducing PTSD symptoms beyond treatment completion. One non-trauma-focused intervention — Trauma Center Trauma-Sensitive Yoga (TCTSY) — similarly demonstrated longitudinal PTSD symptom reductions. Higher dropout rates were reported for trauma-focused therapies compared to non-trauma-focused interventions. **Discussion:** CPT demonstrated the strongest published evidence base, with emerging evidence for TCTSY. Future attempts should be made to facilitate international comparisons, with a need for a consistent operationalization of MST. A focus on the sequalae resulting from MST beyond PTSD may also allow for developing targeted adjuvant interventions that may improve overall treatment response.

Key words: military, military sexual trauma, posttraumatic stress disorder, PTSD, sexual assault, systematic review, Veteran, women

RÉSUMÉ

Introduction : Il est démontré que les traumatismes sexuels dans le cadre du service militaire (TSSM), qui peuvent englober les agressions sexuelles et le harcèlement sexuel, sont omniprésents chez les militaires et touchent un nombre disproportionné de femmes. Le trouble de stress post-traumatique (TSPT) en est la conséquence psychologique la plus fréquente. Cette étude visait à synthétiser les traitements dont l'efficacité était démontrée pour traiter les symptômes de TSPT découlant de TSSM chez les vétéranes. **Méthodologie :** Une analyse systématique a évalué les recherches sur les interventions qui incluaient les résultats mesurés des symptômes de TSPT découlant de TSSM. Une recherche électronique des études publiées entre 1992 et 2022 a été réalisée, et l'ampleur de l'effet a été calculée pour toutes les interventions. **Résultats :** Au total, 998 articles ont été repérés au départ, dont 12 respectaient les critères d'inclusion. Sept interventions ont été étudiées, et toutes rendaient compte de répercussions significatives sur les symptômes de TSPT. Peu d'études comportaient des mesures de suivi après le traitement (n = 5). L'hétérogénéité des méthodologies et des populations à l'étude, de même que de la définition de TSSM, a été constatée. Les interventions axées sur les traumatismes, notamment la thérapie du processus cognitif (TPC), présentaient les données probantes les plus solides pour réduire les symptômes de TSPT après la fin du traitement. De même, une intervention qui n'était pas axée sur les traumatismes — le yoga sensible aux traumatismes du centre des traumatismes (TCTSY) —, a démontré une réduction longitudinale des symptômes de TSPT. Les thérapies axées sur les traumatismes étaient associées à un taux de décrochage plus élevé que les interventions qui n'y étaient pas associées. **Discussion :** La TPC reposait sur les données probantes publiées les plus solides, et des données émergentes favorisaient le TCTSY. De prochaines tentatives devraient être réalisées pour faciliter les comparaisons internationales, car il faut assurer une opérationnalisation uniforme des TSSM. Si on s'intéressait aux séquelles découlant des TSSM au-delà du TSPT, il serait possible d'élaborer des interventions adjuvantes ciblées qui pourraient améliorer la réponse globale au traitement.

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Mots-clés : militaire, traumatisme sexuel lié au service militaire, trouble de stress post-traumatique, TSPT, agression sexuelle, analyse systématique, vétéran(e), femmes

LAY SUMMARY

Military sexual trauma (MST) includes experiences of sexual harassment and assault. It is widespread across militaries and disproportionately affects women. Posttraumatic stress disorder (PTSD) is one of the most frequent outcomes of experiencing MST. However, as Veterans can often respond differently from civilians to psychological treatments, this study aimed to review the literature that exists on treatment for PTSD resulting from MST specifically in women Veterans. Trauma-focused therapies were found to have the best quality evidence base, in particular, cognitive processing therapy (CPT). Emerging evidence was found for Trauma Center Trauma-Sensitive Yoga (TCTSY) to reduce PTSD symptoms. It should be noted trauma-focused therapies had the highest patient dropout rates, and the definition of MST was inconsistent across studies.

INTRODUCTION

Across countries and studies, rates of military sexual trauma (MST) are high. While no global consensus definition of MST exists, the U.S. Department of Veteran Affairs uses the statutory definition of sexual trauma (38 U.S.C. §1720D), which encompasses sexual assault and repeated or threatening sexual harassment that occurs during military service. A meta-analysis of 69 studies showed a mean of 15.7% of serving members and Veterans who reported experiencing MST, with 38.4% of women compared to 3.9% of men disclosing such experiences.[1] Although the majority of MST research is U.S. based, similar prevalence estimates have been found for other countries. Among French service personnel, 36.7% of women and 17.5% of men reported experiencing MST in the previous year, with 12.6% and 3.5%, respectively, reporting sexual assault.[2] Lifetime MST was reported by 44.6% of women and 4.8% of men in a Canadian Armed Forces sample,[3] while a similar proportion of Belgian servicewomen reported physical sexual harassment.[4] In the same Belgian sample, non-physical sexual harassment was reported by 64.4% of servicewomen and 9.0% reported rape over the course of their careers. Such estimates are regarded as conservative because of potentially high rates of non-disclosure.[5] Accordingly, the pervasive nature of MST and its consequences warrants attention as a significant service-related traumatic exposure for military personnel. The greater proportions of men across armed forces may mean absolute numbers of those experiencing MST between genders are equal, with research into Veteran men comparatively lacking.[6] While the impact of MST on servicemen should not be diminished or ignored, women remain disproportionately affected.[1]

Experiencing MST is linked to an array of comorbid physical, functional, and psychological sequalae,[7-10] most notably posttraumatic stress disorder (PTSD).[11,12] While commonalities exist, some evidence suggests gender differences extend beyond prevalence and are also evident in psychological outcomes, with potential resulting implications for treatment. For example, the association between MST and PTSD was shown to be almost three times stronger among women than men.[11] Furthermore, women Veterans with PTSD and a history of MST were more likely to present with comorbid depression, anxiety, and eating disorders compared to men Veterans with similar past experiences.[13]

MST type may also impact the profile of resultant psychological difficulties. In a cohort of UK women Veterans, those who experienced military sexual harassment were more than two times as likely to develop PTSD as women who had not experienced military sexual harassment, with odds increasing further for those who experienced military sexual assault.[14] U.S. women Veterans were demonstrated to be nine times more likely to report symptoms of PTSD if they had a history of military sexual assault.[12] Here too, gender differences were observed. Compared to men who experienced sexual assault during military service, women Veterans reported more severe depressive and less aggression-linked symptoms at baseline.[15] Sexual assault during service was also linked to a higher risk of certain PTSD symptoms in women Veterans, including intrusions, avoidance, negative affect, and anhedonia.[16] Therefore, a gender-specific focus is merited.

Several psychotherapeutic interventions have been used to treat PTSD resulting from sexual trauma in civilian populations. Prolonged exposure (PE), eye movement desensitization and reprocessing (EMDR), and cognitive processing therapy (CPT) all demonstrated effectiveness,[17] with improvement in symptoms after both PE and CPT sustained for up to six years post-treatment in civilian samples.[18] However, the impact of

post-trauma psychotherapeutic interventions in civilian populations is not always replicated in Veteran cohorts[19] for whom dropout rates can also be higher.[20] Importantly, civilians and military Veterans diverge in both the context of the trauma and the context in which help and support may be sought.

Sexual assault in a military context can lead to higher levels of PTSD symptoms in women Veterans compared to symptom levels related to assaults occurring in adulthood, before or after military service.[21] Veterans who experienced sexual assault across the lifespan reported poorer psychosocial outcomes compared to non-Veterans with similar experiences.[22] The military environment has several unique features: the influence of rank is pervasive, reporting structures are often connected to the chain of command, service members live and work in proximity, and basic needs such as food and housing depend on continued service. In this context, MST is both a personal and institutional betrayal.[23] Women Veterans who experienced MST reported concerns about confidentiality or recriminations should they speak up.[24] Disclosure of MST while serving brought not only a fear of whether they would be believed and their careers negatively impacted but also concern that doing so could invalidate struggles for equity and acceptance as a gender minority in a hyper-masculine environment.[25] Crucially, these concerns can persist and impact disclosure and help seeking after military service.[25]

While interventions targeting PTSD in general are commonplace in Veteran mental health services globally, the nature and context of MST, the resultant PTSD profiles, and the gender-based idiosyncrasies of both prevalence and outcomes necessitate treatments for PTSD specifically resulting from MST in women Veterans. Therefore, the aim of this review was to identify and synthesize the effectiveness of treatment approaches specifically for PTSD symptoms resulting from MST in women Veterans.

METHODS

Search strategy

The review was informed by both Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[26] and Cochrane[27] and was pre-registered (PROSPERO; CRD42022328711). Searches were conducted in August 2022 of the Cochrane Library, Embase (via Ovid), ScienceDirect, PubMed, Epistemonikos, and Web of Science Core Collection. Topic-specific collections on PsycINFO (via Ovid), PTSDpubs, and PubPsych were also used. Combination searches used a Population, Exposure, Intervention/Comparison, and Outcome (PEI/CO) formulation. Anxiety and depression were included alongside PTSD as search terms because of clinical co-occurrence and to ensure as comprehensive an initial search as possible before manual sift (see Appendix 1). Ethical approval was not required as this study exclusively used previously published material.

Eligibility criteria

To be considered for inclusion, peer-reviewed studies were required to report treatment outcomes for PTSD symptoms resulting from MST in a cohort (or subcohort) of women Veterans. Accordingly, studies had to

- state the primary therapeutic intervention used;
- include a validated measure of PTSD symptoms (see the section "Measurement of PTSD symptoms");
- identify MST as the primary or index trauma from which PTSD resulted and for which treatment was sought;
- be published in English between 1992 and 2022, a 30-year period deemed to be appropriate in that it encompassed the 4th and 5th editions of the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV* and *DSM-5*) and associated symptom measurement tools.

Measurement of PTSD symptoms

The use of at least one of two measurement tools for PTSD symptoms deemed a study eligible for inclusion. The Clinician Administered PTSD Scale for *DSM-5* (CAPS-5)[28] is a 30-item, structured interview conducted by trained clinicians or researchers. Responses are scored, with a final summed score providing information on the presence and severity of symptoms. Frequency of symptoms are also recorded, and clinician judgement is used in interpretation. It is considered the gold standard in making a clinical PTSD diagnosis. The previous version (CAPS) reflected the *DSM-IV* nosology.

The PTSD Checklist for *DSM-5* (PCL-5)[29] is a 20-item self-report questionnaire that records the subjective distress of the individual — namely, how much they were bothered by each PTSD symptom. A prior iteration of the checklist (PCL) corresponds to the *DSM-IV* definition of PTSD and features 17 items. Scores are summed, with those exceeding a threshold (typically 44-50 for PCL and 31-33 for PCL-5) indicative of probable PTSD. In addition, the earlier PCL has three alternative versions including the military-specific

PCL-M, which refers to stressful military experiences, and the PCL-S that focuses on a specific index event. Scores are not interchangeable between the clinician and self-report measures, nor between different iterations of the same tool.

Data extraction, synthesis, and analysis

Study characteristics and intervention data from each relevant article were extracted and recorded. This included sample demographics and any stratification by gender and/or index trauma as appropriate, participant inclusion/exclusion criteria and the definition of MST used, therapeutic intervention(s) used and any control/comparison group(s) including intervention modality, outcome measures of PTSD used to measure symptom change, measurement timepoints, and dropout rate. Data extraction was completed collaboratively by two authors (GMC and NB), with any discrepancies checked and resolved.

Interventions were categorized as trauma-focused or non-trauma-focused. Trauma-focused interventions typically attend directly to memories of index traumatic events or thoughts and feeling related to those events. They may involve in vivo or imaginal exposure and/or the repeated recounting of trauma narratives as part of the therapeutic program. Non-trauma-focused therapies, by contrast, do not directly target the thoughts, memories, and feelings related to the traumatic events, but instead may bolster wider or related coping mechanisms and skills such as via mindfulness and meditation.

Means and SD of scores on PTSD symptom measures at the given timepoints (e.g., baseline, post-treatment, and any subsequent follow-up points) were recorded. The magnitude of change in PTSD symptoms from baseline to post-treatment and any follow-up points was calculated using Cohen's *d* statistic.[30] Cohen's *d* was selected as it is widely used and understood and provides an effect size for each intervention between baseline and subsequent follow-up points. This allowed for the inclusion of uncontrolled trials. To mitigate against inconsistency of statistical approaches, published *d* values (if provided) were not used and were instead calculated by the authors using the published PTSD measurement means and SD as previously described (see Appendix 1). In articles in which the study population of women Veterans with an index trauma of MST was further subdivided, means and SD on PTSD symptom measures at the given timepoints were calculated for the whole study population of women Veterans with MST experiences. Positive effect sizes represent an improvement of symptoms from baseline (small ≥ 0.20, medium ≥ 0.50, large ≥ 0.80). In addition, clinically meaningful changes in PTSD severity for participants were reported where provided, typically described as a 10-point reduction in self-reported[29] or clinician-assessed[31] symptoms. All other data were synthesized narratively.

Risk of bias assessment

The QualSyst risk of bias assessment framework was used.[32] QualSyst was deemed appropriate for assessing and comparing a range of study designs, without pejoratively benchmarking all studies against the gold-standard randomized controlled trial (RCT) design. Quantitative studies were scored on 14 questions for which possible responses were yes, partial, no, and not applicable. Yes responses were scored as a 2, partial responses were scored as a 1, and they were summed to produce a total sum score, with a maximum possible total sum score of 28. However, QualSyst recognizes not all questions are applicable to all study designs. For example, naturalistic intervention evaluations may not be able to ensure blinding of researchers and/or participants in the manner of an RCT. Not applicable answers were scored a -2 and subtracted from the maximum possible total sum score of 28. This yielded a total possible sum score for each individual study. The final summary score of between 0 and 1 was calculated by dividing the total sum score by the total possible sum score. A higher score is considered an indication of higher quality. No prior quality cut-off for inclusion was set, although 0.55 and above is indicated in the literature as a potential lowest benchmark.[32] Assessment was carried out independently by two authors (GMC and NB) who collaboratively resolved any disagreements via consensus discussions.

Use of language

There is an observed lack of consistency and consensus on the use of sex- and gender-specific terms across the published literature. While some publications use the sex-based term females to describe and define the population of focus, others prefer the gender-based term women. It is noted the terms also appear to be used interchangeably in some publications. As this study is adopting a gender-based perspective on MST, the authors used the gender-based term women throughout.

RESULTS

Search results are presented in Figure 1. After removing duplicates, 998 records were screened based on title and abstract. Full texts for 180 records were then retrieved

and reviewed for eligibility. Secondary analyses or combination analyses were excluded, as they did not present novel intervention impact findings. In total, 12 studies were included in the final analysis.

Study characteristics and PTSD measures

Table 1 presents an overview of key characteristics of the 12 included articles.[33-44] All studies were of U.S.-based Veteran populations. Across all studies, the mean age ranged from 41.3 to 51.3 years, and 753 women reporting MST were included (52.3% of the total combined sample). The three studies that used mixed gender samples[34,39,41] all provided treatment outcome results for women Veterans with MST histories. Four studies did not require participants to have a diagnosis of PTSD.[36,37,40,43] All studies used variations of the self-report PCL/PCL-5 to measure PTSD symptomology. The military-specific PCL-M was used in two studies.[35,39] In addition, half of the included studies also used the gold-standard CAPS[35,41,42,44] or CAPS-5[34,45] clinician assessment.

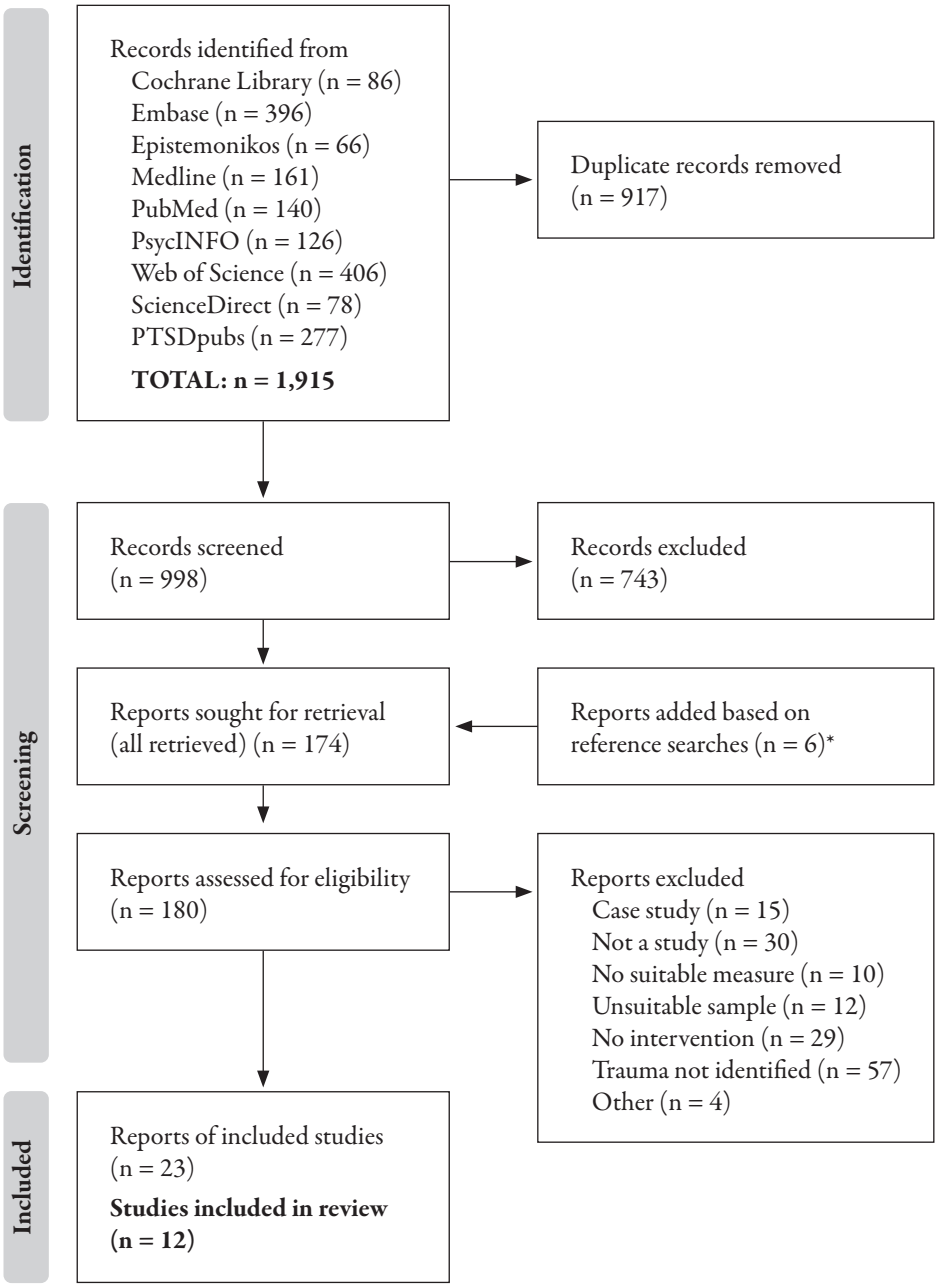

Figure 1. PRISMA chart of search results and screening

* None included in final selection.

† Index trauma either not identified as MST or not stratified according to inclusion criteria.

Table 1. Summary and characteristics of included studies

Study	Study design	N*	MST-positive women Veterans (%)	Mean age, years (SD)	Population	MST definition	MST criterion for participation	PTSD diagnosis?
Acierno et al. (2021)[33]	RCT	136	100	43.40 (11.51)	Women Veterans	Harassment and assault	MST-related index event	Yes
Christ et al. (2021)[34]	Retrospective outcome evaluation	333	31.2	47.62 (10.88)	Men/women Veterans	Assault	MST as index trauma (MST-IT)	Yes
Holder et al. (2017)[35]	RCT retrospective analysis (sub-sample)	27	100	41.45 (11.23)	Women Veterans	Assault	index trauma of MST	Yes
Katz (2016)[36]	Naturalistic outcome evaluation	43	100	49.47 (10.24)	Women Veterans	Harassment and assault	A history of MST	No
Katz & Sawyer (2020)[37]	Naturalistic outcome evaluation	38	100	47.63 (12.95)	Women Veterans	Harassment and assault	Self-identification as a survivor of MST	No
Kelly et al. (2021)[38]	RCT	104	100	48.38 (11.1)	Women Veterans	Harassment and assault	PTSD related to MST	Yes
Kip et al. (2015)[39] ¶	Retrospective outcome evaluation	113	5.3	41.3 (13.5)‡	Men/women civilians, serving & Veterans	None given	MST as primary trauma	Yes
Story & Beck (2017)[40]	Open trial, feasibility pilot	5	100	49.4 (13.98)	Women Veterans	Harassment and assault	Veterans who had experienced MST	No
Voelkel et al. (2015)[41] †	Retrospective outcome evaluation	481	26.8	44.89 (9.36)§	Men/women Veterans	Assault (experiencing or witnessing)	MST index trauma	Includes subthreshold PTSD
Walter et al. (2014)[42] †	Retrospective outcome evaluation	110	100	46.7 (7.74)	Women Veterans	Assault (experiencing or witnessing)	Index trauma of MST	Yes
Weiss et al. (2018)[43]	Open trial, feasibility pilot	10	100	51.30 (14.74)	Women Veterans	Harassment and assault	Positive MST screen	No
Zaccari et al. (2022)[44]	Feasibility pilot RCT	41	100	45.0 (9.9)	Women Veterans	Harassment and assault	MST as index trauma	Yes

MST = military sexual trauma; PTSD = posttraumatic stress disorder; RCT = randomized controlled trial.
*Total number of participants in study, regardless of gender, MST or treatment completion status. Mean age is for women Veterans with MST histories unless otherwise stated.
†Studies had 67 subjects in common, amounting to 60.9% (Walter et al.)[42] and 51.9% (Voelkel et al.)[41] of MST-positive women. Christ et al.[34] was from the same geographic area, and may also contain overlapping subjects but this was not clearly stated in the published work.
‡All women servicemembers and Veterans.
§All women regardless of MST status.
¶Kip et al.[39] drew their military cohort for analysis from a previous study with a population comprising 31% active duty or reservist personnel. It could not be determined and was not stated whether the Kip et al.[39] cohort — and specifically the women who had experienced MST — included any active duty or reservist personnel.

Definitions of military sexual trauma

Definitions of MST varied across studies. In four studies[34,35,41,42] MST was defined solely as sexual assault using threat or force during military service, of which two[41,42] also included witnessing sexual assault in line with diagnostic Criterion A for PTSD more generally.[46] A further seven studies[33,36-38,40,43,44] either explicitly used or alluded to a definition that included sexual harassment, in line with the official U.S. statutory definition (38 U.S.C. §1720D). There was no stated clear definition of MST in Kip et al.[39]

Study design and risk of bias

QualSyst risk of bias analysis is presented in Figures 2 and 3. Summary scores ranged from 0.61 to 0.95, demonstrating average to high quality. Questions concerning randomization of subjects and blinding of both participants and investigators were most frequently found to

Figure 2. Risk of bias assessment: summary matrix

be not applicable, with no study reporting full blinding of subjects or investigators. Only 2 of the 10 applicable studies were deemed to have completely controlled for confounding variables. Three studies used an RCT design, in which two used a treatment control condition[38,44] and one compared two delivery modalities of the same intervention.[33] Holder et al.[35] was a secondary analysis of a larger RCT[47] (see the Discussion section). However, this secondary analysis did not include a control treatment. Two studies were considered open trial, feasibility pilots and had population sizes of 10 or fewer.[40,43] The remainder were outcome evaluations, with a mixture of retrospective analysis of existing data and pooled or naturalistic evaluations.

Interventions

Across the articles, seven primary interventions were examined (Table 2). Three interventions could be characterised as trauma-focused (CPT[34,35,38,41,42,44], PE[33], Accelerated Resolution Therapy[39]), and four categorized as non-trauma-focused, including complementary or alternative therapies (TCTSY[38,44], Warrior Renew[36,37], Guided Imagery and Music[40], Skills Training in Affective and Interpersonal Regulation[43]). All studies reported a reduction in population mean scores on measures of PTSD symptoms after treatment.

CPT

Six articles studied CPT as a treatment,[34,35,38,41,42,44] making it the most widely studied intervention. Four of these studies used CPT as the sole treatment condition,[34,35,41,42] and two used CPT as a comparison intervention.[38,44] The large sample sizes in three studies[34,41,42] of more than 100 Veterans was a strength.

Effect sizes for score changes from baseline to post-treatment on self-report PCL/PCL-5 measures of PTSD symptoms ranged from medium to large. Two papers reported medium effects (d = 0.58,[44] 0.66[38]) and four reported large effect sizes (d = 1.17,[42] 1.35,[41] 1.50[34,35]). On the CAPS/CAPS-5, the effect sizes from baseline to post-treatment ranged from d = 0.79[38] to 2.00.[41]

Three of the studies reported PTSD symptom reduction from baseline at 2 to 3 months post-treatment.[35,38,44] Effect sizes were large for all three studies for clinician-assessed symptoms (d = 1.03,[44] 1.37,[35] 1.53[38]), and large in two of the three studies for self-assessed symptoms (d = 1.07,[38] 1.29[35]). The effect size on self-assessed PTSD symptoms in the remaining study was small (d = 0.23).[44]

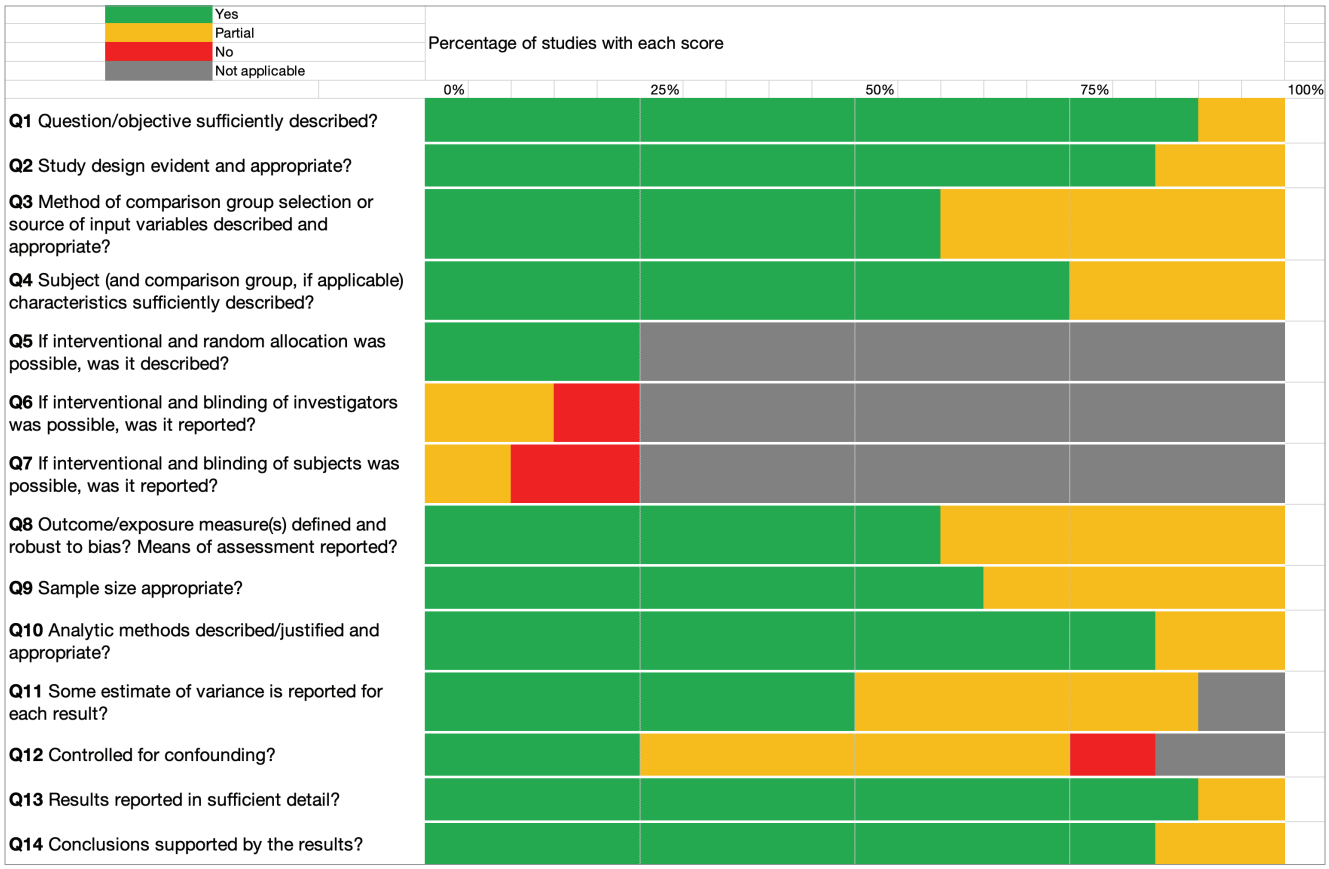

Figure 3. Risk of bias assessment: percentage for each rating across all studies

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Table 2. Included studies of effectiveness of treatment of PTSD symptoms

Treatment	Study	Treatment modality	Dropout (%)	PTSD measure	Treatment effect size (*d*) from baseline to		
					post-treatment	3 months post	6 months post
CPT	Christ et al.[34]	7-week residential; 12+ sessions; group, individual; & adjuvant group interventions	—	CAPS-5	1.77	—	—
				PCL-5	1.50	—	—
	Holder et al.[35]	Outpatient; 12 sessions weekly or twice-weekly; individual	37.0	CAPS	1.23	1.37‡	1.46
				PCL-M	1.50	1.29‡	1.53
	Voelkel et al.[41]	7-week residential; 12+ sessions; group, individual; & adjuvant group interventions	8.7	CAPS	2.00	—	—
				PCL-S	1.35	—	—
	Walter et al.[42]	7-week residential; 12+ sessions; group, individual; & adjuvant group interventions	—	CAPS	1.95	—	—
				PCL-S	1.17	—	—
	Kelly et al.[38*]	Outpatient; 12 weekly sessions; group	65.2	CAPS-5	0.79‡	1.53	—
				PCL-5	0.66‡	1.07	—
	Zaccari et al.[44*]	Outpatient; 12 weekly sessions; group	58.3	CAPS	1.20‡	1.03	—
					0.58‡	0.23	—
PE	Acierno et al.[33]	Outpatient; 10-12 sessions; individual	50.7	PCL-5	1.32	1.28	1.17
		Home-based telemedicine; as above	50.7		1.04	0.91	1.22
ART	Kip et al.[39]	Outpatient; 2-5 sessions; individual	—	PCL-M	1.64	1.96	—
TCTSY	Kelly et al.[38*]	Outpatient; 10 weekly sessions; group	39.7	CAPS-5	1.70‡	1.50	—
				PCL-5	0.77‡	0.81	—
	Zaccari et al.[44*]	Outpatient; 10 weekly sessions; group	41.2	CAPS	1.34‡	0.90	—
				PCL	0.79‡	0.55	—
WR	Katz[36]	Outpatient; 24 twice-weekly sessions; group	20.9	PCL	1.25	—	—
				PCL-5	1.49	—	—
	Katz & Sawyer[37]	Outpatient; 8 weekly sessions; group	21.0	PCL-5	1.14	—	—
GIM	Story & Beck[40]	Outpatient; 10 weekly sessions; individual	—	PCL-5	1.21	—	—
STAIR	Weiss et al.[43]	Health centre-based telemedicine; 10 weekly sessions; individual	—	PCL-5	1.21	—	—

PTSD = posttraumatic stress disorder; CAPS-5 = Clinician Administered PTSD Scale for *DSM-5*; PCL-5 = PTSD Checklist for *DSM-5*; CPT = cognitive processing therapy; CAPS = Clinician Administered PTSD Scale; PCL-M = PTSD Checklist-Military; PCL-S = PTSD Checklist-Specific; PCL = PTSD Checklist; PE = prolonged exposure; ART = accelerated resolution therapy; TCTSY = Trauma Center Trauma-Sensitive Yoga; WR = Warrior Renew; GIM = Guided Imagery and Music; STAIR = Skills Training in Affective and Interpersonal Regulation.

*Study compared CPT with TCTSY.

†2 weeks post-treatment.

‡2 months post-treatment.

A reduction in both self- and clinician-assessed PTSD symptoms was recorded at 6 months post-treatment in one study, and the effect sizes continued to be considered large (d = 1.46 and 1.53, respectively).[35]

Clinically meaningful reductions in symptom scores of 10 points or greater were reported at 3 months post-treatment for 57.1%[44] to 73.7%[38] of the study samples on CAPS/CAPS-5 and 25.0%[44] to 47.4%[38] of the study samples on PCL/PCL-5.[44] Walter et al.[42] reported 64.5% of the population no longer met diagnostic criteria for PTSD at treatment end.

However, treatment dropout rates for weekly outpatient-delivered CPT were high, ranging from 37.0%[35] to 65.2%.[38] One study examining a 7-week residential program of CPT reported a lower patient dropout of 8.7%.[41] All residential CPT treatment programs also included adjuvant interventions such as art therapy, psychoeducation, anger management skills, elements of dialectical behavioural therapy, and wellness groups on nutrition and yoga, which the authors state are delivered through the prism of the primary therapy.[34,41,42]

PE

Only one included study examined PE and compared the impact of delivering the treatment in person versus online telemedicine.[33] The large sample size and RCT design can be considered particular strengths of the study. Large effect sizes on reducing self-reported PTSD symptoms were reported when delivered both through conventional weekly in-person sessions (d = 1.32) and via home-based telemedicine (d = 1.04). The effect sizes remained large for the reduction in symptoms at both 3 and 6 months post-treatment, and there were no discernible differences in outcomes between the two delivery modalities. Dropout rates in both conditions (defined as completing fewer than 8 sessions) were 50.7%. Logistical problems and excessive distress caused by the treatment were the two most frequently cited reasons given for dropout.

Accelerated Resolution Therapy (ART)

One study examined the effectiveness of ART.[39] Although the sub-sample of women Veterans with MST as their primary trauma was small (n = 6), a large effect size on reduction in self-reported PTSD symptoms at post-treatment (d = 1.64) and 3-month follow-up (d = 1.96) was reported.[39] Four of the six women Veterans demonstrated clinically meaningful reduction (10 points or greater) in self-reported PTSD symptoms, although the mean score post-treatment and at 3-month follow-up remained near caseness thresholds.

TCTSY

TCTSY was examined in two studies[38,44] and was delivered as a weekly outpatient intervention directly compared with CPT as a control. The use of a RCT design in both comparing TCTSY with CPT and the larger sample size in Kelly et al.[38] are strengths. As a result, TCTSY is the most robustly examined non-trauma-focused intervention. Dropout rates were lower (39.7%[38] and 41.3%[44]) than CPT (65.2%[38] and 58.3%[44]), with the difference in one study approaching significance.[38] Effect sizes for change from baseline to 2 weeks post-treatment in self-reported PTSD symptoms were medium (d = 0.77[38] and 0.79[44]). Effect sizes for clinician-assessed PTSD symptoms for the same period were large (d = 1.70[38] and 1.34[44]). For both methods of symptom assessment, the effect sizes were medium to large at 3 months post-treatment (range: d = 0.55[44] to 1.03[38]). Both studies reported TCTSY participants demonstrated a greater reduction in PTSD symptoms by midpoint of the treatment compared to the CPT group, implying a more immediate impact of treatment on symptoms.[38,44] In the larger of the two study populations, the mean change from baseline was larger for the CPT cohort.[38] Mean reductions were also considered clinically meaningful at 3 months post-treatment for 64.3%[38] and 60.0%[44] of the studied populations on clinician-assessed symptoms, and 50.0%[38,44] on self-assessed symptoms, with both studies finding TCTSY compared favourably with CPT in terms of outcomes.[38,44]

Warrior Renew (WR)

WR — an experiential-focused psychotherapy — was studied in two trials.[36,37] Both studies used self-selective treatment populations (N = 38[37] and 43[36]) without comparison conditions but varied in the number and frequency of sessions. WR demonstrated a large effect size (range: d = 1.14[37] to 1.49[36]) at post-treatment compared to baseline on self-reported PTSD symptoms. Both the longer[36] and truncated[37] versions of the WR intervention found similar dropout rates of 20.9% and 21.0%, respectively.

Guided Imagery and Music (GIM)

One study examined GIM.[40] The small-scale feasibility pilot reported the effect size for PTSD symptom change from baseline to end-of-treatment as large (d = 1.21).[40] Three of the four participants recorded clinically meaningful reductions in self-reported symptom scores. However, the small sample size is of note. Furthermore, three of four participants for whom PCL-5 data were

presented had baseline scores below PTSD caseness threshold (range: 14-29), indicating caution is merited in interpreting the results. The one Veteran who exceeded the caseness threshold remained so at post-treatment, despite a clinically meaningful reduction in PCL-5 score of 11 points.

Skills Training in Affective and Interpersonal Regulation (STAIR)

STAIR was examined in one study.[43] The sample size was small (N = 10) and participants were already receiving unspecified health care interventions at the time of recruitment. A large baseline to post-treatment effect size on PCL scores was demonstrated for STAIR delivered via health centre-based telemedicine (d = 1.21).[43] Statistically significant decreases in symptom change over time were also reported, with 7 of 8 participants no longer meeting PTSD caseness at post-treatment.

DISCUSSION

Main findings

This review aimed to examine and evaluate the effectiveness of treatments for PTSD symptoms resulting from MST for military Veteran women. All seven interventions reduced symptoms at treatment completion. However, longitudinal impact on PTSD beyond treatment completion was only reported for the three trauma-focused (CPT, PE, ART) and one non-trauma-focused (TCTSY) approaches. While this review presents tentative evidence of the effectiveness of the other included therapies, it cannot be stated whether their effects endure for a significant period past treatment completion. Furthermore, the variations in study design and participant inclusion criteria make drawing firm conclusions about relative intervention impact across the studies problematic.

However, given the generally greater sample size and study quality, these findings suggest trauma-focused therapies, in particular CPT, currently have the strongest evidence base for reducing PTSD symptoms resulting from MST.[34,35,38,41,42,44] Additionally, TCTSY demonstrates growing evidence for enduring reductions in PTSD symptoms, comparable to CPT.[38,44]

Clinical implications

That half of included studies included CPT is unsurprising; along with PE and EMDR, it is one of the officially recommended gold-standard therapies for treating PTSD in U.S. Veterans.[48] Furthermore, CPT was specifically designed for treating PTSD symptoms resulting from rape in civilian samples.[49] Generally, CPT and PE are frequently examined in RCTs of first-line interventions for PTSD in Veterans.[50] Given the prevalence of MST experiences and, in particular, among women Veterans, results of these more general studies of treatments for PTSD in Veterans potentially include those with PTSD resulting from MST as an index trauma.

While excluded from this review in favour of a smaller sub-analysis[35] because of a mixed-gender sample, Surís and colleagues[51] demonstrated the effectiveness of CPT in comparison to a control in the largest randomized trial to date evaluating CPT for PTSD resulting from MST (N = 86; CPT n = 52), in which 85% of the study population were MST-positive women Veterans. When compared with a non-trauma-focused control (present-centred therapy, PCT), CPT resulted in a significantly greater reduction in self-reported symptoms with comparable effect sizes to the sub-analysis reported here. PE was also shown to be effective by Schnurr et al.,[52] with greater likelihood of losing PTSD diagnosis in comparison to PCT in a population sample featuring 68.3% MST-positive women Veterans. Of note, in a comparison of PE and CPT for PTSD in Veterans in general, while PE was statistically more effective in reducing clinician-rated PTSD symptoms, the difference was not regarded as clinically significant and the two treatments were viewed as comparable.[53]

The effectiveness of trauma-focused interventions in reducing PTSD symptoms, or resulting in a loss of diagnosis among those with MST experiences, is commensurate with the wider evidence base and official recommendations for treatment of PTSD in Veterans in general.[48] However, there is mixed evidence as to whether treatment outcomes are inferior for PTSD resulting from MST as compared to PTSD resulting from other index events such as combat trauma.[15,19,41,54] Nonetheless, studies included in this review show not all women Veterans with MST histories demonstrate clinically significant reductions in symptoms, nor do all lose their PTSD diagnosis.

A review of interventions for Veterans with PTSD in general found 13% to 39% of those treated with CPT or PE dropped out of treatment.[50] The present review reported dropout rates in excess of this, with a range of 8.7% to 65.2%. Other studies reported that higher dropout rates for those with PTSD resulting from MST appear unrelated to baseline symptom severity[51] and that elevated dropout from trauma-focused treatment

for PTSD overall was significantly predicted by being female or reporting MST as an index trauma.[55] The reasons behind this are likely varied. First, competing practical demands for women Veterans, such as balancing child care and treatment, may exacerbate the likelihood of withdrawal.[56] Second, while the country-specific structural elements of care provision and context for women Veterans is outside the scope of this review, they, too, may play an important role. Tsai et al.[57] reported 7.8% of women Veterans experienced homelessness within one year of referral to specialist U.S. Veteran mental health care, which may impact engagement with, and effectiveness of, treatment.

More widely, a study of UK women Veterans with lived experience of mental health difficulties, 73.7% of whom experienced MST, reported Veteran services tended to be dominated by Veteran men.[25] The study also found such environments could remind women Veterans of both the context and the perpetrators of MST, hindering engagement and retention. Veterans, in general, reported the stigma of mental ill health and accessing services, and a perceived paucity of professional expertise equipped to deal with Veteran needs, all act as barriers to engagement.[58] The UK study highlighted these concerns were additionally heightened for women Veterans, for whom Veteran services were seen as tailored to the needs and experiences of Veteran men.[25]

Elevated dropout rates may also result from the nature of the treatment used. Trauma-focused therapies may involve repeated recounting of trauma narratives. Such trauma work creates potential stress points at which distress can increase and treatment dropout potentially becomes more likely.[33,59] In comparison, the lower dropout rates for non-trauma-focused therapies reported in the present study[36-38,44] add further credence to this point. Nonetheless, the lower dropout rate demonstrated by the delivery of CPT in a residential, rather than outpatient, setting[41] may indicate the benefit of alternative delivery modalities for recommended trauma-focused interventions for women Veterans with MST histories.

One possibility may be that residential treatments can facilitate more time, and access to support, to explore traumas additional to Veterans' index or most salient experiences.[60] This may be especially beneficial for women Veterans who survived MST and typically report multiple and elevated instances of lifetime traumas, including childhood, repeated military and adult sexual abuse, and intimate partner violence.[53,61,62] Similarly, a supportive environment that may feature other women Veterans with MST experiences may reduce the shame associated with sexual trauma.

Additionally, residential programs typically feature adjuvant interventions alongside the main intervention, which may temper distress caused during core treatment. In this review, those studies in which CPT was delivered in this manner[34,41,42] all demonstrated slightly larger effect sizes than those that did not feature adjuvant treatments.[35,38,44] While overinterpretation should be avoided, it is possible that adjuvant psychoeducation, mindfulness, wellness groups, and elements of dialectical behavioural therapy may target wider aspects of the sequalae of MST.

Nonetheless, multidimensional therapeutic interventions delivered in a residential setting are not immune to the challenges that necessitate participants taking time away from usual routines and roles — challenges that may be particularly salient for women Veterans.[63,64] Consideration may also be needed of the potential requirement for ongoing support to prevent symptomatic recurrence once wraparound residential treatment is completed.[65]

Relative to other index traumas and commensurate with other experiences of sexual trauma and interpersonal violence, MST can result in heightened negative posttraumatic cognitions and feelings of self-blame.[66] Successfully altering negative posttraumatic cognitions and self-blame were shown as central to the potential mechanism of change in CPT in military Veterans with PTSD resulting from MST.[67,68] Similarly, the saliency of emotional regulation difficulties in MST cohorts[69] may indicate another potential target for adjuvant treatments that may improve both specific functioning domains and overall PTSD symptom changes.[62]

Findings of this review show treatments found to be most effective for Veterans with PTSD in general are also suitable for women Veterans with PTSD resulting from MST. However, more work is needed to explore what modifications or novel approaches to intervention — including questions of access, applicability and delivery modality, and adjuvant treatments — may improve effectiveness and reduce dropout for women Veterans with PTSD resulting from MST.

Research implications

Across eligible studies, there was a paucity of study designs using treatment comparisons, and no studies measured treatment impact past 6 months post-treatment. Future studies would benefit from not only ensuring longer-term follow-up periods but also explor-

ing the qualitative treatment experiences of women Veterans to identify and improve delivery modalities and content of interventions that are specifically relevant to women Veterans with PTSD resulting from MST.

Despite the evidence for its use in treating the consequences of sexual trauma in civilians,[18] notably, no EMDR studies were found for this review. ART was included[39] and shares some similarities with EMDR. Both interventions require a participant to experience bilateral stimulation — traditionally, side-to-side eye movements — while engaging in trauma-focused imaginal exposure. Although developed from EMDR, ART is delivered in fewer sessions, with a strictly limited number of eye movements, and attends to trauma-related physiological sensations and altering trauma-related mental images, rather than desensitizing the participant to their impact.[70]

A number of studies of other interventions in Veteran samples that included reports of MST, such as acceptance and commitment therapy,[71] and reconsolidation of traumatic memories,[72] were also excluded, as specific results for women Veterans with PTSD resulting from MST were not reported. As previously mentioned, PCT — a non-trauma-focused, manualized therapy for PTSD — was used as a comparison in two excluded studies of PE[52] and CPT,[51] suggesting PCT may be a viable, non-trauma-focused alternative intervention. However, these studies were not able to stratify results by both gender and trauma type.

The exclusions are indicative of a recurring feature in existing intervention studies that feature Veteran samples of mixed-gender and/or mixed-index traumas — namely, the small percentage of women Veterans included means there is a chronic risk of any attempted statistical analysis of sub-cohorts being underpowered.[53,54] Considering the varied evidence for both different psychopathologies and treatment responses resulting from MST compared to other traumas[47,54,55] and in women compared to men,[13,15,41] it may be prudent to focus on studying treatment effectiveness specifically in focused populations, rather than attempting to disaggregate treatment responses statistically.

All included studies in this review were of U.S. populations and, by extension, the U.S. Veteran health care system. The pervasive demonstration of MST across different countries' militaries indicates there is a requirement to investigate the effectiveness of treatments across differing national populations, cultural contexts, and health care systems. However, for adequate international comparisons to be made, specificity and consensus is required in the operationalization of MST. In the included studies, MST was variously defined as experiencing military sexual assault, experiencing or witnessing military sexual assault, or experiencing military sexual assault or military sexual harassment. Although sexual harassment itself exists on a continuum of increasingly inappropriate and psychologically damaging behaviour that should be neither dismissed nor diminished, sexual assault, by comparison, has been positively and significantly associated with more severe sequalae, including suicidal ideation[73] and heightened PTSD symptoms.[74] Accordingly, a lack of consensus definition potentially impairs both a clear understanding of the prevalence of such traumas[1] and how to best treat the resultant varying impact.

Strengths and limitations

Care was taken to ensure an appropriate and thorough search strategy, following established methodologies and guidelines. However, it is possible some studies were excluded because of restrictions such as the publication window and only including English-language works. In addition, search strategies across different publication databases are not always directly analogous.[75] The authors attended to the hierarchies of database-specific search terms to ensure as much cross-database consistency as possible. To improve completeness, broad search terms were used across a cross-section of major databases and specialist repositories so the final examined corpus is reflective of the available field.

The authors further acknowledge criteria that required studies to report outcomes for PTSD resulting from MST in women may have excluded some studies that only reported findings in a mixed-gender or mixed-trauma fashion. When appropriate, the authors acknowledged these cases in the discussion section. Furthermore, this review concentrated only on published literature and did not account for publication bias. It was beyond the scope of this study to include grey literature.

The authors have taken care to include interpretable effect sizes and reports of clinical change; however, they acknowledge alternative and more nuanced effect measurements can be employed.[76]

Finally, while this review focused on PTSD symptoms as the most frequent outcome of MST, the range of potential sequalae is much broader and no single intervention can be of universal effectiveness.[77] Accordingly, future research into the range of outcomes resulting from MST and the associated appropriate interventions would be beneficial.

Conclusion

This review identified seven interventions, broadly dichotomised into either trauma-focused or non-trauma-focused therapies. On the balance of evidence, trauma-focused therapies (in particular, CPT) presented the strongest evidence for treating PTSD symptoms resulting from MST in women Veterans. The reduction in symptoms in these interventions was demonstrated to persist at 6 months post-treatment. In addition, there is emerging evidence for the effectiveness of non-trauma-focused TCTSY. However, variation persists in the definition of MST. Consistent operationalization of MST will allow for not only better estimates of prevalence but also comparative research into Veteran populations outside the United States, which is currently absent. Additionally, while all interventions included some degree of symptom improvement, the lack of robust and consistent follow-up measures means comparative effectiveness conclusions are limited. Finally, a fuller understanding needs to be gathered of the factors contributing to, and potential mitigation of, the comparatively high dropout rates and proportion of Veterans not demonstrating clinically meaningful reduction in symptoms or dropping below PTSD caseness thresholds after engaging in gold-standard trauma-focused therapies, with specific reference to the unique needs and experiences of women Veterans. Allied to this is the need to further investigate the role of adjuvant treatments to target specific symptoms and functioning domains idiosyncratic to those with MST histories, which may improve PTSD symptoms and overall treatment response.

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COMPETING INTERESTS

The authors have nothing to disclose.

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APPENDIX

SEARCH STRATEGY AND TERMS

Search terms across databases are not always directly analogous. Please see Gusenbauer and Haddaway[1] for a discussion of this point. Search terms used represent the highest level of term in the appropriate taxonomy on examination. For example, the term MILITARY MEDICINE in the PubMed taxonomy was omitted as it was defined as "the practice of medicine as applied to special circumstances associated with military operations." Instead, the term MILITARY HEALTH was preferred as it pertains to "the physical and mental conditions of MILITARY PERSONNEL and the MILITARY FAMILY."

Source: PubMed

Population

#1: "Military Health"[Mesh] OR "Military Personnel"[Mesh] OR "Veterans"[Mesh] OR "Military Health"[Mesh]
= 61,908 results

Exposure

#2: "Intimate Partner Violence"[Mesh] OR "Rape"[Mesh] OR "Sex Offenses"[Majr] OR "Sexual Trauma"[Mesh]
= 33,528 results

Combined

#3: #1 AND #2
= 640 results

Intervention/ Comparison

#4: "Psychotherapy"[Mesh] OR "Counseling"[Mesh] OR "Complementary Therapies"[Mesh] OR "Physical Therapy Modalities"[Mesh] OR "treat*"[tw]
= 7,167,826 results

Combined

#5: #3 AND #4
= 215 results

Outcome

#6: "Stress Disorders, Post-Traumatic"[Mesh] OR "Stress Disorders, Traumatic, Acute"[Mesh] OR "anxiet*"[tw] OR "depress*"[tw] OR "PTSD"[tw]
= 797,892 result

Full Combined

#7: #5 AND #6
= 142 results

Limit Date range: 1992-2022

= 140 results

Source: Embase (via Ovid)

Population

#1: ("veteran" or "military").mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]
= 108,270 results

Exposure

#2: (Rape or Domestic Violence or Intimate Partner Violence or Sexual Assault or sexual trauma).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]
= 43,444 results

Combined

#3: #1 AND #2
= 1,246 results

Intervention

#4: (Psychotherap* or Alternative Therap* or "Complementary Therap*" or Physical therap* or treat*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]
= 9,594,960 results

Combined

#5: #3 AND #4
= 472 results

Outcomes/ Comparison

#6: (Psychological Trauma or Sexual Trauma or Stress Disorder or PTSD or Depress* or anxiet* or postrauma*).mp. [mp=title, abstract, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword heading word, floating subheading word, candidate term word]
= 1,151,514 results

Combined

#7: #5 AND #6
= 402 results

Limit Date range: 1992-2022 and English language only
= 396 results

Source: Medline (via Ovid)

Population

#1: exp Military Personnel/ or exp Veterans/ or exp Military Health/ or exp Military Medicine/
= 83,233 results

Exposure

#2: exp Rape/ or exp Intimate Partner Violence/ or exp Sexual assault/ or exp sexual trauma/ or exp sexual violence/
= 37,738 results

Combined

#3: 1+2
= 736 results

Intervention/ Comparison

#4: exp Psychotherapy/ or exp Counseling/ or exp Complementary Therapies/ or exp Physical Therapy Modalities/ or "treat*".tw. or "therap*".tw.
= 8,135,452 results

Combined

#5: 3+4
= 250 results

Outcome

#6: exp Stress Disorders, Post-Traumatic/ or exp Stress Disorders, Traumatic, Acute/ or (exp Anger/ or exp Anxiety/ or exp Depression/ or exp Emotional Regulation/ or exp Psychological Distress/) or exp Anxiety Disorders/
= 766,512 results

Combined

#7: #5 AND #6
= 163 results

Limit to English, 1992-2022
= 161 results

Source: ScienceDirect

Limitations: 1992-2022, English only

Title/Author/Keyword search

(Military OR Veteran) AND (rape OR (sexual AND (violence OR assault OR trauma)) AND (treat OR therapy)
=78 results

Note: ScienceDirect did not accept wildcard characters and Boolean terms were limited to eight in total. If search was used in full text, returns were too numerous to be meaningful.

Source: Web of Science

Population

#1: ALL=("Military Health" OR "Military Personnel" OR "Veteran" OR "Military")
= 216,370 results

Exposure

#2: ALL=("Intimate Partner Violence" OR "rape" OR "sexual violence" OR "sexual trauma" OR "sexual assault")
= 61,203 results

Combination
#3: #1 AND #2
= 1,569 resultsa
Intervention
#4: ALL=("Psychotherap*" OR "Counsel*" OR "Complementary Therap*" OR "Physical Therap*" OR "treat*")
=4,493,140 results
Combination
#5: #3 AND #4
= 510 results
Outcomes/ Comparison
#6: ALL=("PTSD" OR "Stress Disorder" OR "anxiet*" OR "depress*" OR "postrauma*")
= 959,633 results
Full Combined search
#7: #5 AND #6
Full syntax: (((ALL=("Military Health"OR "Military Personnel" OR "Veteran" OR "Military")) AND ALL=("Intimate Partner Violence" OR "rape" OR "sexual violence" OR "sexual trauma" OR "sexual assault")) AND ALL=("Psychotherapy" OR "Counselling" OR "Complementary Therapies" OR "Complementary therapy" OR "Physical Therapy" OR "Physical Therapies" OR "treatment" OR "treatments")) AND ALL=("PTSD" OR "Stress Disorder" OR "anxiet*" OR "depress*")
= 408 results
Limit date range: 1992-latest
= 406 results

Source: PsycINFO (via Ovid)

Limitations: English Language only
Population
#1: exp Volunteer Military Personnel/ or exp Military Personnel/ or exp Military Medical Personnel/ or exp Military Veterans/
= 33,528 results
Exposure
#2: exp Rape/ or exp Domestic Violence/ or exp Intimate Partner Violence/ or exp Rape/ OR exp Sexual Assault/
= 61,194 results
Combined
#3: #1 AND #2
= 892 results
Intervention
#4: exp Psychotherapy/ or (Alternative Therapies or "Complementary and Alternative Therapies" or Alternative Therapies PsycINFO Subcluster Term).mp. or Physical therapy.mp. or treat*.tw.
= 938,474 results
Combined
#5: #3 AND #4
= 322 results
Outcomes/ Comparison
#6: exp Psychological Trauma/ or exp Sexual Trauma/ or exp Stress Disorders, Post-Traumatic/ or exp Stress Disorders, Traumatic, Acute/ or anxiet*.tw. or Depress*.tw
= 312,685 result
Full combined search
#7: #5 AND #6
= 128 results
Limit date range: 1992-latest
= 126 results

Source: Cochrane Library

Date: 17 August 2022
All text search
'Military' AND 'trauma' AND 'sexual'
= 19 reviews
= 2 protocols
= 64 trials
= 1 clinical answer
= 86 results

Note: a loose search strategy was employed to ensure that any reviews covering prevalence rates were captured to ensure screening of sources.

Source: Epistemonikos

Title/ Abstract search
'Military' AND 'trauma' AND 'sexual'
= 66 results

Note: a loose search strategy was employed to ensure that any reviews covering prevalence rates were captured to ensure screening of sources.

Source: PTSDpubs

Limitations: Dates: 1992-2022, language: English, all publication types, search: anywhere
Population
#1: MAINSUBJECT.EXACT.EXPLODE("Military Personnel") OR MAINSUBJECT.EXACT.EXPLODE("Veterans") OR MAINSUBJECT.EXACT.EXPLODE("Military Psychiatry")
= 10,847 results
Exposure
#2: MAINSUBJECT.EXACT.EXPLODE("Rape") OR MAINSUBJECT.EXACT.EXPLODE("Military Sexual Trauma") OR MAINSUBJECT.EXACT.EXPLODE("Partner Abuse")
= 8,121 results

#3: #1 AND #2
= 758 results (670 journals, 35 books, 34 Diss/ Theses, 2 reports)

Intervention

#4: MAINSUBJECT.EXACT.EXPLODE("Psychotherapy") OR MAINSUBJECT.EXACT.EXPLODE("Treatment") OR MAINSUBJECT.EXACT.EXPLODE("Physical Treatment Methods") OR MAINSUBJECT.EXACT.EXPLODE("Alternative Medicine")
= 26,229 results

#5: #3 AND #4
= 341 results (253 peer reviewed)

Outcomes/ Comparison

#6: MAINSUBJECT.EXACT.EXPLODE("PTSD") OR MAINSUBJECT.EXACT.EXPLODE("Anxiety Disorders") OR MAINSUBJECT.EXACT.EXPLODE("Mood Disorders") OR MAINSUBJECT.EXACT.EXPLODE("Acute Stress Disorder")
= 44,644 results

Full combined search

#7: #5 AND #6
= 277 results

Source: PubPsych

Limitations: dates 1992-2022

Text search

Military AND sexual AND treat*

= 179 results

Note: a wide search syntax was used as PubPsych is a limited database but was included as a backstop check on other results.

A NOTE ON COHEN'S *d*

Cohen's *d* was calculated using the "classic" approach using the formula: $d = \frac{M_2 - M_1}{SD_{pooled}}$

Where: $SD_{pooled} = \sqrt{\left(\frac{SD_1^2 + SD_2^2}{2}\right)}$

Please see Westfall's excellent discussion of the differences between classical Cohen's *d*, d_a, and d_z for more: https://jakewestfall.org/blog/index.php/2016/03/25/five-different-cohens-d-statistics-for-within-subject-designs/.

ENDNOTE

1. Gusenbauer M, Haddaway NR. Which academic search systems are suitable for systematic reviews or meta-analyses? Evaluating retrieval qualities of Google Scholar, PubMed, and 26 other resources. Res Synth Methods. 2020;11:181-217. https://doi.org/10.1002/jrsm.1378