Moral Injury and Mental Health Among US Military Service Members and Veterans

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AUTHORS

Author roles, affiliations, and contributions (using the CRediT taxonomy) are listed below.

Author	Role and Affiliation	Report Contribution
Erin H. Beech, MA	Senior Research Associate, Evidence Synthesis Program (ESP) Coordinating Center, Portland VA Health Care System Portland, OR	Conceptualization, Methodology, Investigation, Data curation, Visualization, Formal analysis, Writing – original draft, Writing – review & editing, Project administration
Katherine M. Mackey, MD, MPP	Director & Clinician Investigator, ESP Coordinating Center, Portland VA Health Care System Portland, OR	Conceptualization, Methodology, Investigation, Formal analysis, Funding acquisition, Writing – original draft, Writing – review & editing, Supervision
Nicholas J. Parr, PhD, MPH	Associate Director & Research Scientist, ESP Coordinating Center, Portland VA Health Care System Portland, OR	Methodology, Investigation, Data curation, Formal analysis, Visualization, Writing – original draft, Writing – review & editing
Becky Baltich Nelson, MLS, MS	Research Librarian, ESP Coordinating Center, Portland VA Health Care System Portland, OR	Investigation
Sarah Young, MPH	Research Associate, ESP Coordinating Center, Portland VA Health Care System Portland, OR	Investigation
Bradley E. Belsher, PhD	Psychology Program Manager, Phoenix VA Health Care System Phoenix, AZ	Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Writing – review & editing

PREFACE

The VA Evidence Synthesis Program (ESP) was established in 2007 to conduct timely, rigorous, and independent systematic reviews to support VA clinicians, program leadership, and policymakers improve the health of Veterans. ESP reviews have been used to develop evidence-informed clinical policies, practice guidelines, and performance measures; to guide implementation of programs and services that improve Veterans' health and wellbeing; and to set the direction of research to close important evidence gaps. Four ESP Centers are located across the US. Centers are led by recognized experts in evidence synthesis, often with roles as practicing VA clinicians. The Coordinating Center, located in Portland, Oregon, manages program operations, ensures methodological consistency and quality of products, engages with stakeholders, and addresses urgent evidence synthesis needs.

Nominations of review topics are solicited several times each year and submitted via the ESP website. Topics are selected based on the availability of relevant evidence and the likelihood that a review on the topic would be feasible and have broad utility across the VA system. If selected, topics are refined with input from Operational Partners (below), ESP staff, and additional subject matter experts. Draft ESP reviews undergo external peer review to ensure they are methodologically sound, unbiased, and include all important evidence on the topic. Peer reviewers must disclose any relevant financial or non-financial conflicts of interest. In seeking broad expertise and perspectives during review development, conflicting viewpoints are common and often result in productive scientific discourse that improves the relevance and rigor of the review. The ESP works to balance divergent views and to manage or mitigate potential conflicts of interest.

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Operational Partners

Operational partners are system-level stakeholders who help ensure relevance of the review topic to the VA, contribute to the development of and approve final project scope and timeframe for completion, provide feedback on the draft report, and provide consultation on strategies for dissemination of the report to the field and relevant groups.

Jason Nieuwsma, PhD
Associate Director, VA Integrative Mental Health
VA Mid-Atlantic MIRECC

Keith Meador, MD, ThM, MPH
Director, VA Integrative Mental Health
VA Mid-Atlantic MIRECC

Melissa Smigelsky, PhD
Psychologist, VA Integrative Mental Health
VA Mid-Atlantic MIRECC

Disclosures

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The findings and conclusions in this document are those of the author(s) who are responsible for its contents and do not necessarily represent the views of the Department of Veterans Affairs or the United States government. Therefore, no statement in this article should be construed as an official position of the Department of Veterans Affairs. The final research questions, methodology, and/or conclusions may not necessarily represent the views of contributing operational and content experts. No investigators have affiliations or financial involvement (*eg*, employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties) that conflict with material presented in the report.

Main Report

Evidence Synthesis Program

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ABBREVIATIONS TABLE

Abbreviation	Definition
3MDR	Multi-Modal Motion-Assisted Memory Desensitization and Reconsolidation
ACT-MI	Acceptable and Commitment Therapy for Moral Injury
AD	Adaptive Disclosure
AMPS-HCP	Accepting Moral Pain and Suffering for Healthcare Providers
BEP-MT	Brief Eclectic Psychotherapy for Moral Trauma
BMIS	Brief Moral Injury Screen
CBT	Cognitive behavioral therapy
CHAI	Comparative Health Assessment Interview
CPT	Cognitive processing therapy
HCW	Health care worker
EMIS	Expressions of Moral Injury Scale
IOK	Impact of Killing
KQ	Key question
MC4	Mental Health Clinician Community Chaplain Collaboration
MI	Moral injury
MIDS	Moral Injury and Distress Scale
MIE	Morally injurious experience
MIES	Moral Injury Events Scale
MIG	Moral Injury Group
MIOS	Moral Injury Outcome Scale
MIS	Moral Injury Scale
MIQ	Moral Injury Questionnaire
MISS	Moral Injury Symptom Scale
MOVED	Moral Elevation Online Intervention for Veterans Experiencing Distress Related to PTSD and Moral Injury
NHRVS	National Health and Resilience in Veterans Study
PMIE	Potentially morally injurious event
PSP	Public safety personnel
QUIPS	Quality in Prognosis Studies tool
R&R	Restore and Rebuild
RCT	Randomized clinical trial
REAL	Reclaiming Experiences and Loss
SICPT	Spiritually Integrated Cognitive Processing Therapy
SR	Systematic review
STBs	Suicidal thoughts and behaviors
SUD	Substance use disorder
TrIGR	Trauma-Informed Guilt Reduction Therapy

BACKGROUND

Military service members may be exposed to unanticipated, ambiguous, and stressful situations in which their own actions or the actions of others conflict with deeply held values. Moral injury (MI) describes a uniquely intense and distressing response to such exposures, which are referred to as potentially morally injurious events (PMIEs). MI is characterized by feelings of guilt and shame, loss of trust, and loss of meaning or purpose. Over the past 2 decades, increased clinical and research interest has focused on the impacts of PMIEs, and whether exposure to such events ultimately produces a cluster of psychological, emotional, behavioral, spiritual, and social symptoms distinct from other recognized psychiatric conditions.[1] While initially described for military service members who experienced war, the concept of MI has increasingly been applied to other populations encountering morally ambiguous situations. For example, the concept of MI has been evoked for health care workers attempting to deliver care under resource-constrained conditions and while facing personal health risks during the peak of the COVID-19 pandemic.[2]

PMIEs have been conceptualized as fitting into several broad categories: moral transgressions related to self-directed actions (commissions) or inactions (omissions) and other-directed actions including witnessing or being a victim of others' transgressions and leadership betrayal.[1,3] Commonly cited examples of PMIEs in a wartime setting include witnessing or perpetrating atrocities, killing in combat, feeling betrayed by military leadership, or witnessing human suffering.[1] Studies have documented that between 24%[4] to 40%[5] of deployed service members report exposure to at least 1 of these events. PMIEs and MI share a similar relationship to that of trauma and PTSD, with a PMIE being a necessary but not sufficient requirement for the development of MI. However, unlike the traumatic exposure requirement for PTSD (*exposure to death, threatened death, actual or threatened serious injury, or actual or threatened sexual violence*), there is a lack of agreement on the specific PMIE criteria and whether there is an exposure threshold to qualify for an MI syndrome.

Interest in MI has arisen, in part, from the observation that established PTSD criteria may not adequately characterize a unique set of symptoms seemingly related to morally injurious stressors. Accordingly, it has been speculated that combat-related PTSD may be more treatment refractory (compared with PTSD due to non-combat traumas) because conventional PTSD treatments inadequately address MI-specific responses like guilt and shame.[6] Shay[7] first introduced the concept of MI in his 1994 book, drawing metaphoric parallels between the internal struggles of Vietnam Veterans and the experiences described in Homer's *Iliad*, particularly those involving leadership betrayal. In 2009, Litz et al[1] proposed the first conceptual model and definition of MI, aiming to promote more empirical research on MI that could inform treatment. Research on MI has proliferated since these initial publications, but despite this growth, consensus has not been reached on definitions of PMIEs and MI, nor on the most accurate and useful measures of MI-related constructs.[8–10]

Numerous definitions of MI have been proposed,[11,12] with a recent systematic review identifying 12 different published definitions of MI, only 2 of which were based on empirical evidence.[12] At the present time, there is no gold standard measure of MI or agreed upon clinical definition for confirming the presence of MI. A number of measures have been developed that assess PMIE exposures, MI outcomes, or both. Several measures include an assessment of PMIE exposures with corollary items to assess MI, and as a result, studies have differed in whether they employ the measures as predictors of outcomes or as outcomes themselves.[8,9,13] Importantly, when PMIE exposure and MI outcomes are measured separately, the constructs are often highly (though not perfectly) correlated.[14,15] This

suggests a relationship between the experience of PMIEs and the development of guilt, shame, and other responses characteristic of MI.

Until recently, measures of PMIE exposure and MI outcomes were developed mostly by psychologists who generated items based on their clinical experience or compiled items from existing scales, raising concerns about the validity of these measures.[16] A systematic review of measures of MI and moral distress[10] that assessed 7 domains of reliability and validity found that convergent and divergent validity were not examined for most measures, and most assessed PMIE exposures and outcomes together. The Moral Injury Events Scale (MIES) is the oldest and most often used measure to assesses military-related PMIE exposures, although it has also been used to measure MI given the inclusion of 3 items assessing unspecified distress. Older measures assessing MI outcomes, such as the Moral Injury Symptom Scale (MISS) and Expressions of Moral Injury Scale (EMIS), do not index MI outcomes to PMIE exposures. Newer measures, such as the Moral Injury Outcomes Scale (MIOS), have been developed in recent years to overcome issues with validity and conceptual clarity present with earlier measures.

MI-related constructs have been linked to adverse psychosocial outcomes among Veterans and military service members.[17,18] For example, Wisco et al[5] found that exposure to PMIEs was associated with mental health disorders and suicidal ideation and attempts among a large national sample of US Veterans of the Iraq and Afghanistan wars. Transgressions by self were associated with suicidal ideation, while betrayal was associated with post-deployment suicide attempts. Bryan et al[19] found that transgressions by self and transgressions by others were more predictive of a lifetime history of a suicide attempt relative to betrayal in a sample of active duty service members. Other studies have demonstrated that Veterans suffering from both MI symptoms and PTSD may experience higher rates of suicide attempts relative to either condition alone.[20]

The VA Integrative Mental Health (IMH) initiative, supported by the VHA Office of Mental Health and Suicide Prevention (OMHSP), requested the present review, which aimed to characterize published literature on moral injury broadly across populations and to synthesize available evidence on the relationship between PMIE and MI and mental health outcomes among a more narrowly defined subset of US Veterans and military service members. IMH's Understanding Moral Injury project is working to address Section 506a of the STRONG Veterans Act (H.R. 6411), which directs VA to conduct research on how MI relates to the mental health needs of Veterans who served in the Armed Forces after September 11, 2001, and to identify best practices for mental health treatment among these Veterans. Findings from this review will inform these efforts and help guide VA research on PMIE and MI.

METHODS

REGISTRATION AND REVIEW

A protocol for this review was preregistered on OSF. A draft version of this report was reviewed by external peer reviewers; their comments and author responses are located in the Appendix.

KEY QUESTIONS AND ELIGIBILITY CRITERIA

The following key questions were the focus of this review:

Key Question 1	What are the characteristics of evidence on MI with regards to: • The distribution of studies over time across populations • Measures used to assess MI • Characteristics of interventions to address MI
Key Question 2	What is the association between PMIE and MI and suicidal thoughts and behaviors (STBs) and other mental health outcomes among Veterans and US military service members?

Study eligibility criteria are shown in the table below. Key Question (KQ) 1 corresponds to the descriptive portion of the review, and KQ2 corresponds to the systematic review (SR). For KQ1, all published research studies with a focus on individuals with exposure to PMIE or MI were included. We did not use an explicit definition of PMIEs or MI during screening. We included studies if the main topic of the research was MI or PMIE exposure, as defined by the authors, to address the first aim of describing the current state of the literature. We did not include studies on moral distress only, or studies where MI was included only as a secondary outcome (for example, qualitative studies of work experiences in HCWs where MI was one of several themes that emerged from interviews). For KQ2, studies with quantitative measurement of the association between PMIEs or MI and specified mental health outcomes in US Veterans or military service members were included.

	Eligibility Criteria
Population	KQ1: Adults with MI or who have experienced potentially morally injurious events (PMIEs); KQ2: US military service members and Veterans with MI or who have experienced PMIEs. We will include Veterans from any service era but will prioritize studies conducted among post-9/11 Veterans.
Intervention	KQ1: Exposure to moral injury or PMIEs, interventions to prevent or treat MI, use of assessment tools to identify MI; KQ2: Exposure to moral injury or PMIEs.
Comparator	Any (*eg*, adults without MI/PMIEs) or none.
Outcomes	KQ1: Any; KQ2: Association between MI or PMIEs and STBs and other mental health outcomes (*ie*, symptoms or diagnoses of PTSD, depression, anxiety, and substance use; functioning). Studies must include a quantitative measure of the association.
Study Design	KQ1: Published research studies; KQ2: Published quantitative studies with sample size ≥ 10.

SEARCHING AND SCREENING

To identify articles relevant to the key questions, a research librarian searched MEDLINE and PsycINFO through February 2024 using terms for *moral injury* (see Appendix for complete search strategies). For KQ2, additional citations were identified from hand-searching reference lists of relevant systematic reviews. Screening was conducted in 2 stages. First, a single investigator screened English-language titles, abstracts, and full-text articles for studies addressing KQ1. Second, titles,

abstracts, and full-text articles of studies included from the initial screening step were independently reviewed by 2 investigators for inclusion for KQ2, and disagreements were resolved by consensus.

DATA ABSTRACTION AND RISK OF BIAS ASSESSMENT

For the descriptive part of the review (KQ1), study design, study type, and population and exposure characteristics were abstracted from all included studies. For the SR (KQ2), estimates of associations between PMIE exposures and/or MI symptoms and outcomes were also abstracted. For KQ2, we examined the data source for each publication and linked publications with overlapping samples. For KQ1, we linked publications from the same study during abstraction of study characteristics but did not systematically examine the data source for each publication. The internal validity (risk of bias) of each study included in the SR was rated using the Quality in Prognosis Studies (QUIPS) tool[21]; internal validity was not assessed for the remaining studies that were included only in the descriptive portion of the review. All data abstraction and internal validity ratings were first completed by 1 investigator and then checked by another; disagreements were resolved by consensus or discussion with a third investigator (see Appendix for risk of bias ratings).

SYNTHESIS

Characteristics of available research on moral injury (KQ1) were described narratively and summarized using visualizations. When 3 or more sufficiently comparable studies reported associations between PMIE exposures or MI symptoms and an eligible mental health outcome in US Veterans or military service members (KQ2), study results were synthesized with meta-analysis.

Associations between PMIE exposures and/or MI symptoms and outcomes were typically reported as correlation coefficients. When only unstandardized regression coefficients were reported, coefficients and their standard errors were used to calculate *t*-values, which were further transformed to (partial) correlation coefficients. A small number of studies applied thresholds to a continuous PMIE exposure scale to create exposed and unexposed groups, then reported mean values of outcome measures in each group. In these cases, group means and standard deviations were used to calculate biserial correlation coefficients.[22] All correlation coefficients were transformed with Fisher's *r*-to-*z* transformation for analyses, then back-transformed to correlations for interpretation and reporting.

For all outcomes except for functioning (for which sufficient data were not available), the relationship between PMIE exposure and outcomes, and between MI symptoms and outcomes, was examined separately (see Table 1 for detail on how we determined which associations to include for PMIE exposure versus MI symptoms). Although the MIES includes 3 items assessing unspecified distress stemming from specific PMIE exposures, we considered it to primarily be a measure assessing military-related PMIE exposures. One study[2,23] reported total scores for the Brief Moral Injury Screen (BMIS), which assesses both PMIE exposures and MI symptoms. These data were included for both analyses.

Table 1. Categorization of Assessment of PMIE Exposure or MI Symptoms for Synthesis

PMIE Exposure	MI Symptoms
BMIS – Total score	BMIS – Total score
MIES – Total score or subscales	EMIS-M – Total score or subscales
MIQ-M	MIS
Studies reporting frequency of PMIE exposures without a measure	MISS-M or MISS-M-SF
	Modified MIQ-M[a]
Studies categorizing traumatic events as PMIE exposures without a measure	Use of items from non-MI scales to assess symptoms of MI[b]

Notes. [a]Includes 5 items assessing MI symptoms for each exposure item; [b]One study used items from the DES-IV and DRRI-2 to assess the MI symptoms of sorrow, regret, shame, and alienation.

Abbreviations. BMIS=Brief Moral Injury Screen; EMIS-M=Expressions of Moral Injury Scale – Military Version; MI=moral injury; MIES=Moral Injury Events Scale; MIQ-M=Moral Injury Questionnaire – Military Version; MIS=Moral Injury Scale; MISS-M=Moral Injury Symptom Scale – Military Version; MISS-M-SF= Moral Injury Symptom Scale – Military Version – short form.

Correlations for each mental health outcome were pooled using multilevel random-effects meta-analyses, given that studies frequently reported multiple correlations for the same outcome type (*ie*, dependent estimates). Common examples of dependency included reporting of both patient and clinician assessments of the same outcome or multiple subscales of a PMIE exposure or MI symptom measure. A correlation of 0.9 was assumed among dependent estimates. One exception to this approach was when studies reported estimates from multiple comparable measures of a similarly defined outcome in identical samples (*eg*, past-month PTSD symptom severity assessed with 2 self-report measures). In these cases, we included data from only 1 measure in meta-analyses (typically the most commonly used measure across studies). Another exception was when studies assessed PMIE exposure or MI symptoms using multiple versions of the same measure (*eg*, a full version and a developmental short-form version). In this scenario, we included data from only the full or better-established measure.

Variation in correlations across studies (heterogeneity) was estimated using restricted maximum-likelihood estimation and is presented as 95% prediction intervals (PIs). Prediction intervals describe the likeliest range of true associations (*eg*, true correlations between MI symptoms and outcomes) across studies and provide an estimate of the magnitude and direction of associations that would be found in future studies similar to those included in a synthesis.[24] A prediction interval encompassing values similar to the overall estimate suggests limited heterogeneity, whereas an interval that includes estimates in the same direction as the overall estimate but that vary widely in magnitude (*eg*, small to large positive correlations) suggests moderate heterogeneity. If a prediction interval encompasses estimates that range widely in both magnitude and direction, then substantial heterogeneity is likely present. Prediction intervals were evaluated alongside forest plots (provided in the Appendix) to reach conclusions about whether correlations included in a given analysis were consistent, moderately inconsistent, or highly inconsistent.

All meta-analyses were conducted using the *metafor*[25] package for R (R Foundation for Statistical Computing, Vienna, Austria). For meta-analyses involving fewer than 20 correlations, a more conservative *t*-distribution was used for 95% confidence intervals and significant tests. When fewer

than 3 comparable studies were available for a given outcome—or studies were judged to be too disparate in methodological or participant characteristics—we described evidence narratively.

Strength of Evidence

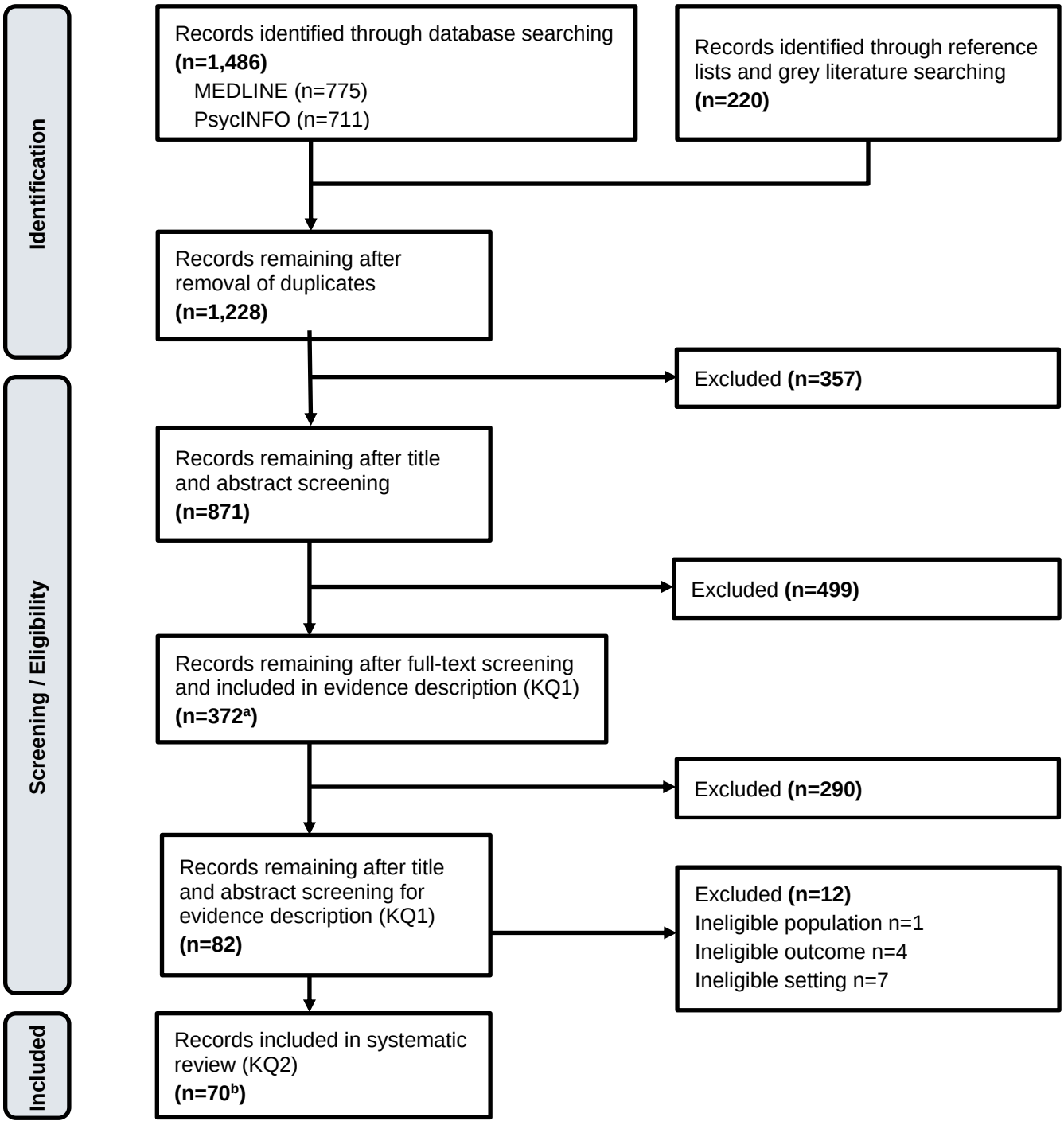
After synthesizing available evidence, we rated the strength of evidence (SOE) for each outcome based on the methodology and risk of bias of available studies, the consistency and certainty of findings, and the directness of outcomes (whether reported outcomes are relevant to patients and providers).[26] We used the following general algorithm: *high strength* evidence consisted of multiple studies with consistent and precise findings at low risk of bias, and clinically relevant outcomes; *moderate strength* evidence consisted of multiple studies with consistent and precise findings at low to moderate risk of bias, and clinically relevant outcomes; *low strength* evidence consisted of a single study, or multiple studies, with moderate to high risk of bias, inconsistent or imprecise findings, and/or outcomes with limited clinical relevance; and *insufficient* evidence consisted of a single study with moderate or high risk of bias, or no available studies.

Before assigning final SOE ratings, we considered the relative contribution of individual studies. For example, if a study was at high risk of bias but made up a relatively small proportion of available evidence for an outcome and/or reported results that were generally consistent with more rigorous studies of the same outcome, we did not downgrade the SOE rating simply because of the presence of that high risk of bias study. Conclusions using *likely* (*eg*, “Greater MI symptoms are likely associated with increases in PTSD symptoms”) are based on moderate strength evidence, while those using *may* are based on low strength evidence. Because of the correlational nature of most available evidence, we did not attempt to draw conclusions about the causal direction of relationships between PMIE/MI and outcomes (*eg*, “Greater MI symptoms likely increase PTSD symptoms").

RESULTS

LITERATURE FLOW DIAGRAM

The literature flow diagram summarizes the results of the study selection process. A full list of excluded studies is provided in the Appendix.



Notes. [a]282 primary studies in 343 publications and 29 reviews; [b]50 primary studies in 70 publications.

CHARACTERISTICS OF PUBLISHED MORAL INJURY LITERATURE

Overview of Included Studies

Our search identified 871 potentially relevant articles after deduplication and title and abstract screening. Of these, 282 primary studies (in 343 publications) and 29 reviews met eligibility criteria (see Appendix for a list of identified review articles). Characteristics of included primary studies are shown in Table 2. About 50 percent of studies (*k* = 135) were conducted among Veterans or military service members. The remaining studies were conducted among health care workers (HCWs; *k* = 75), police or public safety personnel (*k* = 10), or other populations (*k* = 63) such as social workers, journalists, and refugees. Of the studies conducted among Veterans or military service members, many (*k* = 57, 42%) did not report the service era of the participants. Of those that did, 45 (58%) were conducted exclusively among recent era (*ie*, post-9/11, or Operation Iraqi Freedom/Operation Enduring Freedom/Operation New Dawn [OIF/OEF/OND]) Veterans/military service members, 32 (41%) were conducted among Veterans/military service members from multiple war eras, and a single study was conducted among Vietnam Veterans only. The median sample size of included studies was 175 (range: 1–52,692).

About 80% of studies were cross-sectional. Other study types included cohort or pre-post studies (*k* = 34), clinical trials (*k* = 7), laboratory studies (*k* = 10), and case reports or case series (*k* = 7). Most studies (*k* = 192) were quantitative, but a substantial number were qualitative (*k* = 51) or had a combination of quantitative and qualitative data (*k* = 38). Most studies (59%, *k* = 167) examined associations between MI or PMIEs and other variables, such as demographic factors, mental health, combat exposure, quality of life, social support, adverse childhood experiences, and physiological variables, among others. Fifty-eight studies reported on prevalence; however, most of these studies reported the prevalence of PMIE exposure types among the study sample and did not estimate prevalence of PMIE exposure or MI amongst a population. Thirty studies described the development or validation of a PMIE/MI measure and 29 evaluated the efficacy of an intervention.

Most studies (*k* = 104) utilized the MIES, the first published MI measure, to assess PMIE exposure/distress stemming from PMIE exposure (Figure 2). Versions of the EMIS and Moral Injury Questionnaire (MIQ) measures were used to assess MI symptoms and PMIE exposure, respectively, primarily in Veteran/military service member samples. Studies conducted among HCWs primarily utilized the MIES or MISS. The MIOS, published in 2022, was utilized in 14 studies, only 3 of which were conducted among Veterans/military service members. We identified a single study validating the Moral Injury and Distress Scale (MIDS). Other measures were utilized primarily by studies conducted among participants in the "Other" category. A substantial number of studies (*k* = 80) did not use a measure to assess MI/PMIEs.

Just over half (54%, *k* = 151) of studies were conducted in the US. Of the remaining studies, 19% were conducted in the UK or Europe (*k* = 54), 9% in Canada (*k* = 25), 5% in Australia (*k* = 13), and 4% in Israel (*k* = 10). The remaining 10% of studies were conducted in China (*k* = 5), Iran (*k* = 3), India (*k* = 2), Pakistan (*k* = 2), South Korea (*k* = 2), Honduras (*k* = 1), Japan (*k* = 1), Kenya (*k* = 1), Liberia (*k* = 1), Mexico (*k* = 1), Philippines (*k* = 1), South Africa (*k* = 1), Turkey (*k* = 1), and Vietnam (*k* = 1), or in multiple countries (*k* = 6). Most studies conducted in the US and Israel were of Veteran/military service member participants (Figure 2). Most studies conducted in countries in the "Other" category were of HCWs.

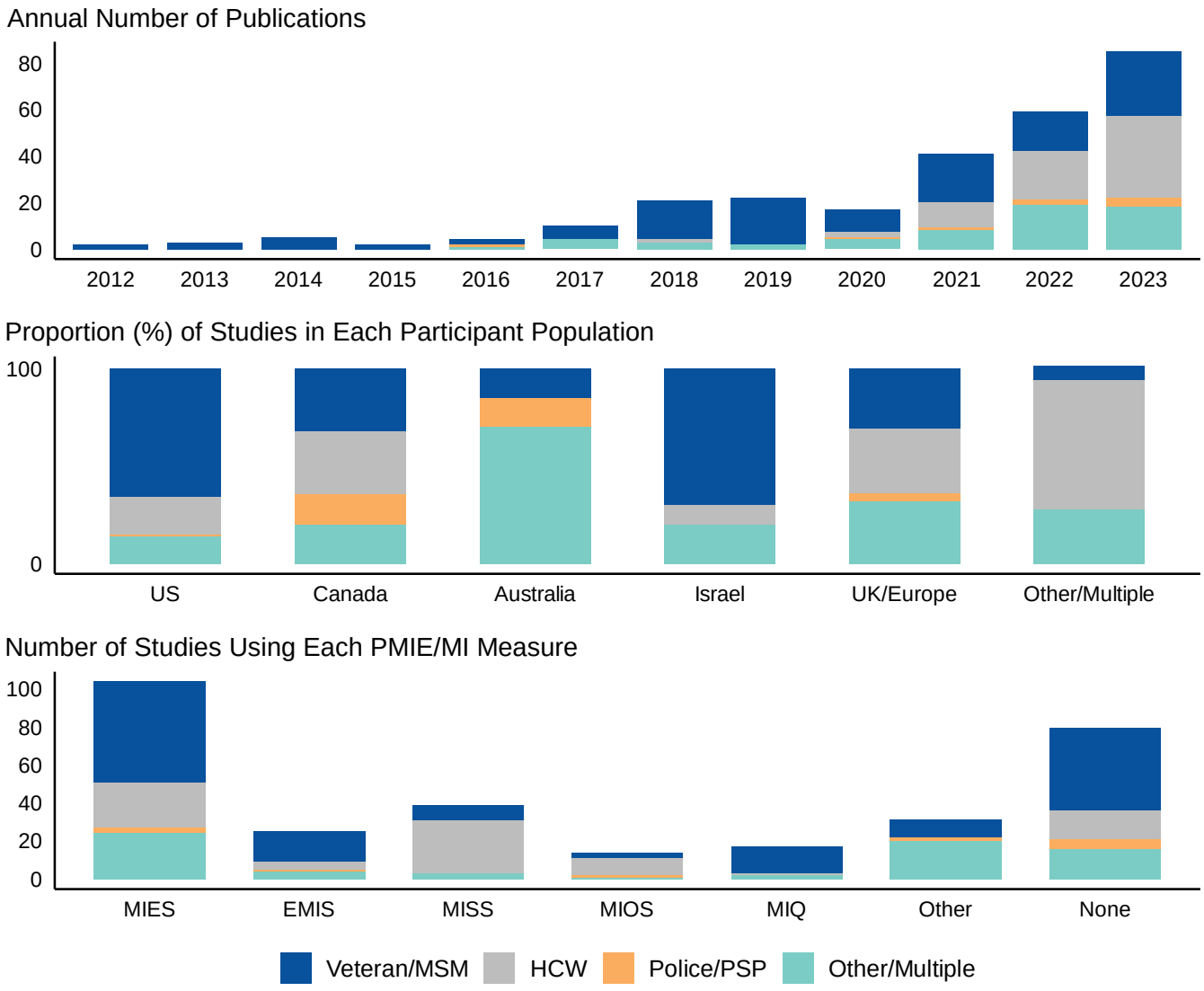
Table 2. Characteristics of Published Moral Injury Literature

	Military/Veteran (k=135)	Health Care Workers (k=75)	Police/PSP (k=10)	Other/Multiple (k=62)
Country				
US	99	29	2	21
Australia	2	—	2	9
Canada	8	8	4	5
Israel	7	1	—	2
UK/Europe	17	18	2	17
Other	2	19	—	8
Sample size				
< 10	8	2	2	3
10-99	47	18	4	22
100-200	24	12	—	12
201-500	25	22	4	8
501-1,000	15	8	—	9
>1,000	15	13	—	7
Study Design				
Cross-sectional	104	61	10	49
Cohort/pre-post	18	12	—	4
RCT/NRCT	6	1	—	—
Case report/series	6	—	—	1
Laboratory	1	1	—	8
MI/PMIE measure				
MIES	53	24	3	24
EMIS	16	4	1	4
MISS	8	28	—	3
MIOS	3	9	1	1
MIQ	14	1	—	2
Other	9	—	2	20
None	44	15	5	16
Outcomes				
Prevalence	18	26	2	12
Associations	79	51	4	34
Measure development	10	7	2	11
Intervention efficacy	24	2	—	3

Abbreviations. EMIS=Expressions of Moral Injury Scale; MI=moral injury; MIES=Moral Injury Events Scale; MIOS=Moral Injury Outcomes Scale; MIQ=Moral Injury Questionnaire; MISS=Moral Injury Symptoms Scale; NRCT=non-randomized controlled trial; PMIE=potentially morally injurious experience; PSP=public safety personnel.

The evidence base on MI has increased substantially since the 2009 publication of the article[1] on MI in war Veterans by Litz et al. Our search identified 2 original research studies published in 2012, and the number of studies published per year has increased steadily since then, with 85 studies published in 2023 (a 4,000% increase). Until 2016, all identified studies were conducted among Veterans or military service members (Figure 1). From 2016 to 2020, small numbers of studies were conducted among other populations, including teachers, police, social workers, parents and professionals involved in Child Protective Services, animal shelter employees, journalists, refugees and asylum seekers, HCWs, and students. Beginning in 2021, coinciding with the COVID-19 pandemic, an increasing number of studies have been conducted among HCWs. In 2021, 11 studies were published of HCWs, and this number increased to 21 in 2022 and 35 in 2023. The number of studies published of other types of non-military populations has also been increasing.

Figure 1. Moral Injury Publication Trends by Participant Population



Abbreviations. EMIS=Expressions of Moral Injury Scale; HCW=health care worker; MI=moral injury; MIES=Moral Injury Events Scale; MIOS=Moral Injury Outcomes Scale; MIQ=Moral Injury Questionnaire; MISS=Moral Injury Symptom Scale; MSM=military service members; PMIE=potentially morally injurious event; PSP=public safety personnel.

Intervention Characteristics

Twenty-five studies, 21 of which were conducted among Veterans/military service members (8 with exclusively recent era Veterans/military service members), reported on interventions for MI. Additionally, 2 pre-post studies[27,28] and 2 case reports[29,30] evaluated PMIE exposure and outcomes from PTSD treatments. Of the MI intervention studies conducted among Veterans/military service members, 2 were RCTs,[31,32] 2 were pilot RCTs,[33,34] 1 was a non-randomized trial,[35] and the remainder were pre-post single arm studies or case studies. Of the studies conducted among HCWs, 1 was an RCT[36] and 1 was a pre-post single arm study.[37] Three studies (2 pre-post studies and 1 case report) reported on interventions in other populations. Most studies were published in 2021 or later (k = 23), and most were conducted in the US (k = 22).

Studies reported on 16 different interventions for Veterans/military service members. Some interventions were intended for individuals with PTSD or combat stress injuries experiencing distress associated with PMIEs that may not be adequately addressed with established evidence-based psychotherapy for PTSD. These interventions include Adaptive Disclosure (AD),[31,38] Impact of Killing (IOK),[33] and Trauma-Informed Guilt Reduction Therapy (TrIGR).[32,39] Building Spiritual Strength, an intervention for spiritual distress in individuals with PTSD, does not explicitly mention moral injury and did not meet criteria for inclusion in this review, but warrants mention as an intervention addressing a similar construct that has been evaluated in an RCT[40] and a pilot RCT.[41]

Other interventions for MI adapted existing treatment paradigms, such as Acceptance and Commitment Therapy for Moral Injury (ACT-MI)[42] and Multi-Modal Motion-Assisted Memory Desensitization and Reconsolidation (3MDR) for MI.[43] One pilot RCT[34] evaluated a novel web-based intervention for MI, Moral Elevation Online Intervention for Veterans Experiencing Distress Related to PTSD and Moral Injury (MOVED). Four were group interventions, either facilitated by a mental health professional (value-based cognitive-behavioral group therapy)[35] or co-facilitated by chaplains and mental health professionals (Moral Injury Group,[44,45] Acceptance and Forgiveness Therapy,[46] and Reclaiming Experiences And Loss[47]). One intervention was a residential arts-based intervention co-facilitated by a psychologist and combat Veteran.[48] Two interventions, a community-based support program (Vets and Friends),[49] and a group journey to Israel (Heroes to Heroes)[50] were led by peers.

Table 3 includes descriptions of interventions for Veterans/military service members evaluated in comparative or pre-post studies. As of our search date, only 2 interventions were evaluated in RCTs sufficiently powered to examine treatment efficacy: AD and TrIGR. Impact of Killing and MOVED were evaluated in pilot RCTs and value-based cognitive-behavioral therapy was evaluated in a non-randomized trial. Eight studies used single-arm pre-post studies and 5 of these included 20 or fewer participants. Three interventions were reported only in case studies or focus groups. These include a case report of a military service member receiving ACT-MI,[42] a study reporting on focus groups of participants of Vets and Friends, a community-based support program,[49] and a case report of 2 combat Veterans participating in an ongoing trial of a spiritually integrated structured MI intervention delivered by chaplains.[51]

Table 3. Moral Injury Interventions for Veterans and Military Service Members Evaluated in Comparative and Pre-Post Studies

Intervention	Duration *Delivery*	Studies
Interventions Evaluated in RCTs		
Adaptive Disclosure (AD) Manualized psychotherapy that was developed to treat military-related PTSD, with a focus on military culture. The treatment directly addresses moral injury (MI) using imaginary narrative to help patients uncover and articulate previously unacknowledged aspects of their trauma. The treatment incorporates CBT-related interventions along with Gestalt techniques.	6 90-minute weekly sessions *Therapist-delivered* *Individual* *Face-to-face*	1 RCT conducted among service members with PTSD (N=122; comparator CPT-C);[31] 1 pre-post study[38] conducted among service members deployed to Iraq or Afghanistan (N=44).
Trauma-Informed Guilt Reduction Therapy (TrIGR) Brief manualized intervention designed to reduce trauma-related guilt and distress in combat Veterans. Aims to help Veterans accurately appraise their combat trauma-related guilt and reidentify and reengage in their values to aid in their recovery from posttraumatic distress.	6 90-minute weekly sessions *Therapist-delivered* *Individual* *Face-to-face*	1 RCT[32] conducted among post-9/11 combat Veterans with guilt related to a combat-related trauma (N=145; comparator Supportive Care Therapy); 1 pre-post study[39] conducted among post-9/11 combat Veterans with guilt and distress related to a combat-related trauma (N=10).
Interventions Evaluated in Pilot RCTs		
Impact of Killing Individual CBT adjunctive treatment module that focuses on the key themes of physiology of killing responses, moral injury, self-forgiveness, spirituality, making amends, and improved functioning.	6-8 weekly 60–90-minute sessions *Therapist-delivered* *Individual* *Face-to-face*	1 pilot RCT[33] conducted among combat Veterans with PTSD who completed a trauma-focused psychotherapy and reported distress regarding killing or feeling responsible for the deaths of others in war (N=33; comparator Waitlist).
Moral Elevation Online Intervention for Veterans Experiencing Distress Related to PTSD and Moral Injury (MOVED) Web-based moral elevation intervention for Veterans with PTSD symptoms and moral injury distress.	8 online sessions over 1 month *Self-guided* *Individual* *Web-based*	1 pilot RCT[34] conducted among US Veterans with PTSD symptoms (N=48; comparator assessments only); 1 case series[52] of post-9/11 Veterans (N=2).

Intervention	Duration *Delivery*	Studies
Interventions Evaluated in Non-Randomized Trials		
Value-based CBT Value-based semi-standardized group therapy combining elements of CBT, ACT, spiritual care, and AD.	20 90-minute sessions over 3 weeks *Supervised by a psychiatrist and psychotherapist Group* *Face-to-face*	1 NRT[35] conducted among German Soldiers with PTSD (N=85; comparator Waitlist).
Interventions Evaluated in Single Arm Pre-Post Studies		
Acceptance and Forgiveness Therapy Psychospiritual group intervention that guides Veterans with MI experientially from a trauma-focused to restorative view of self.	10 weekly sessions *Co-facilitated by a chaplain and mental health provider* *Group* *Face-to-face*	1 pre-post study[46] conducted among US Veterans (N=35).
Heroes to Heroes Journey to Israel in which the group is guided through an established itinerary of sacred places, activities, and rituals aimed at restoring a sense of transcendence and belonging that may equip and empower them to "come home" upon returning to the US.	10 days *Led by Veteran peers Group* *Face-to-face*	1 pre-post study[50] conducted among US Veterans with a combat deployment (N=101).
Moral Injury Group Provides educational information about MI and explores related topics. Leaders invite Veterans to share experiences from their service and guide Veterans toward integrating these concepts into their own self-understanding and narrative. Concludes with a ceremony where participants share testimonies of their MI with the public.	12 90-minute weekly sessions *Co-facilitated by psychologist and chaplain* *Group* *Face-to-face*	1 pre-post study[45] conducted among US Veterans (N=40); 1 case report[44] of a US Veteran (N=1).
Mental Health Clinician Community Chaplain Collaboration (MC4) Builds on community clergy's existing skills in spiritual counseling to address MI symptoms through facilitation of forgiveness and community reintegration.	Weekly or biweekly sessions over 3 months *Delivered by community clergy Individual* *Face-to-face*	1 pre-post study[53] conducted among US Veterans in treatment for PTSD (N=13).
Multi-Modal Motion-Assisted Memory Desensitization and Reconsolidation (3MDR) Virtual-reality exposure-based trauma therapy. Participants walk on a treadmill while a clinician guides them through selection of symbolic representations and music and then viewing of images. Participants describe each image and associated PMIEs, then read numbers displayed on a virtual ball between images.	6 weekly sessions *Clinician-guided Individual* *Face-to-face*	1 pre-post study[43] conducted among Canadian Veterans and ADSMs with treatment-resistant PTSD who experienced trauma in a military combat setting (N=11).
Reclaiming Experiences and Loss (REAL) Interdisciplinary group therapy that emphasizes self-examination of one's inner world and the MIE through the lens of loss. The 3 phases of the group focus on: inventorying losses, telling stories, and reclaiming lives.	12 90-minute weekly sessions *Co-facilitated by a chaplain and mental health professional* *Group*	1 pre-post study[47] conducted among US Veterans (N=15).

Intervention	Duration *Delivery*	Studies
	Face-to-face	
Restore and Rebuild (R&R) Psychotherapy with key themes of processing the event, self-compassion, connecting with others and core values. Includes review of life experiences, psychoeducation, and emotional regulation.	20 weekly sessions *Therapist-delivered* *Individual* *Online*	1 pre-post study[54] conducted among UK Veterans receiving psychological treatment (N=20).
The Warrior's Journey Residential arts-based intervention. Engages participants in art-based reviews of their experiences with distress and renewal. On the final day, participants present a story of their current understanding of past, present, and future to an audience.	5 days *Co-facilitated by a psychotherapist combat Veteran* *Group* *Face-to-face*	1 pre-post study[48] conducted among US male combat Veterans with PTSD (N=8).

Abbreviations. ACT=Acceptance and Commitment Therapy; AD=Adaptive Disclosure; ADSM=active-duty service member; CBT=cognitive behavioral therapy; CPT=cognitive processing therapy; CPT-C=cognitive processing therapy – cognitive only version; MI=moral injury; MOVED= Moral Elevation Online Intervention for Veterans Experiencing Distress Related to PTSD and Moral Injury; NRT=non-randomized trial; PMIEs=potentially morally injurious experiences; TrIGR=Trauma-Informed Guilt Reduction Therapy.

Interventions evaluated among HCWs included virtual group EMDR[36] and an online group therapy including ACT and MI psychoeducation and experientials (Accepting Moral Pain and Suffering for Healthcare Providers [AMPS-HCP]).[37] Interventions evaluated in other populations included Brief Eclectic Psychotherapy for Moral Trauma (BEP-MT), presented in a case report of a refugee,[55] Spiritually Integrated Cognitive Processing Therapy (SICPT), evaluated in a pre-post study conducted with religious patients with MI and PTSD symptoms,[56] and an intervention that utilized "deepfake" technology for perpetrator confrontation, evaluated in a pre-post study conducted with women with PTSD and MI who had experienced sexual violence.[57]

MORAL INJURY AND MENTAL HEALTH AND FUNCTIONING OUTCOMES AMONG US VETERANS AND MILITARY SERVICE MEMBERS

Overview of Included Studies

Of the studies included for Key Question 1, 50 studies (in 70 publications) reported quantitative results on the association between PMIE exposure and/or MI symptoms and mental health and/or functioning outcomes in US Veterans or military service members. These studies examined the association between PMIE exposure/MI symptoms and PTSD (*k* = 41), depression (*k* = 29), STBs (*k* = 23), substance use (*k* =17), anxiety (*k* = 13), and functioning (*k* = 3) including social activity, community engagement, relationship functioning, and physical functioning. Detailed study characteristics and risk of bias assessments are provided in the Appendix.

All studies were observational, and most were cross-sectional. Eleven studies were longitudinal, but in most cases association data in these studies were cross-sectional. The cross-sectional nature of most data is important to highlight, as these data do not provide insight into whether PMIE exposure or MI symptoms preceded, co-occurred with, or followed mental health symptoms or diagnosis. Participants were recruited from outpatient mental health settings in 15 studies and inpatient mental health treatment in 1 study.[58] The remaining studies recruited participants from a variety of community sources (*ie*, not treatment settings) or multiple settings.

Study median sample size was 263 (range: 40–14,057). Thirty-two studies enrolled Veterans only, 10 studies were conducted among military service members only (active-duty service members and/or National Guard and Reserve members), and 8 studies included both populations. Two studies[59,60] examined US Air Force intelligence, surveillance, and reconnaissance (ISR) personnel. One study[61] included justice-involved Veterans participating in Veterans Treatment Court. In most studies that reported participants' service era (28 of 31 studies, 90%), recent-era Veterans/military service members made up at least 75% of the sample. In studies that reported deployment history, most studies (27 of 35 studies, 77%) consisted entirely of Veterans/military service members with at least 1 prior deployment. Fourteen studies had specific inclusion criteria beyond Veteran/military service member status: combat wounded,[62] PTSD diagnosis or symptoms,[27,63–66] hazardous alcohol use or substance use,[58,67] suicidal ideation,[58] mild traumatic brain injury (mTBI),[68] psychogenic non-epileptic seizures,[69] PMIE exposure,[59] MI symptoms,[70] religious/spiritual struggles,[71] and experience of a Criterion A trauma event.[72]

All but 3 studies[73–76] included primarily male participants, and 3 studies did not report on gender. Eight studies[14,64,66,71,74,77–79] comprised primarily Black participants, and 1 study[80] included mainly participants of Hispanic ethnicity. The remaining studies included primarily White non-Hispanic participants, and 8 studies did not report on race or ethnicity. Of the studies that reported mean age of the study sample (*k* = 39), mean age was between 23 and 28 years in 5 studies, between 31 and 39 years in 18 studies, between 40 and 47 years in 7 studies, between 50 and 59 years in 7 studies, and 62 years in 2 studies.

About half of studies used the MIES (*k* = 28). Other measures used to assess PMIE exposure or MI symptoms included the EMIS-M (*k* = 7) or EMIS-M-SF (*k* = 1), the MIQ-M (*k* = 7), the MISS-M (*k* = 3) or MISS-M-SF (*k* = 2), the BMIS (*k* = 1), and the MIS (*k* = 1). No studies were identified that used the recently published MIDS or MIOS measures that met screening eligibility criteria for KQ2. Studies reported associations for total score only (*k* = 17), subscale(s) only (*k* = 13), or both (*k* = 13). In 9 studies, only part of the measure was used, or changes were made to the measure. Two studies[15,81–83]

used a modified version of the MIQ-M that included follow-up items for each exposure item that assessed MI symptoms associated with the exposure. One study[20] used items from the Deployment Risk and Resilience Inventory (DRRI) and Differential Emotions Scale (DES) to assess MI symptoms of sorrow, regret, shame, and alienation. Six studies did not use a measure to assess PMIE exposure or MI symptoms. These studies looked at self-reported PMIEs, often coding traumatic events associated with PTSD symptoms as PMIEs.

Three population-based survey studies (reported in 8 publications[76,84–90]) with analyses that controlled for important potential confounders and appropriately handled missing data were rated low risk of bias. However, most studies had moderate risk of bias due to concerns related to sampling methods, inadequate controlling for potential confounders, and lack of detail on the degree and handling of missing data, including whether data were missing for PMIE or MI measures. As stated above, some studies did not use validated measures for PMIEs/MI, instead coding trauma types as PMIEs.

Pooled correlations of PMIE exposures and MI symptoms with mental health and functioning outcomes are presented in Table 4. Associations using the MIES, MIQ-M, or reporting frequency of PMIE exposures without a measure were included in the pooled analysis of PMIE exposures. Associations using the EMIS-M, MIS, MISS-M, modified MIQ-M, or items from non-MI scales that were used to assess symptoms of MI were included in the pooled analysis of MI symptoms. Associations using the BMIS were included for both analyses (see Table 1 in Methods). All pooled correlations are statistically significant (*ie*, $p < .05$) with the exception of PMIE exposures and MI symptoms with relationship functioning and social engagement. Correlations were generally larger and more consistent between MI symptoms and STBs, PTSD, depression, and anxiety compared to correlations between PMIE exposures and these outcomes.

Table 4. Pooled Correlations of PMIE Exposures and MI Symptoms with Mental Health and Functioning Outcomes

	Total N	Samples	Estimates	Pooled Correlation
Suicidal Thoughts and Behaviors				
PMIE Exposures	1933	10	16	0.19, 95% CI [0.05, 0.31], 95% PI [-0.23, 0.54]
MI Symptoms	4161	9	12	0.27, 95% CI [0.10, 0.43], 95% PI [-0.29, 0.69]
PTSD				
PMIE Exposures	14462	26	60	0.36, 95% CI [0.28, 0.44], 95% PI [-0.11, 0.70]
MI Symptoms	4210	13	15	0.57, 95% CI [0.46, 0.66], 95% PI [0.12, 0.83]
Depression				
PMIE Exposures	12937	20	36	0.29, 95% CI [0.19, 0.38], 95% PI [-0.14, 0.63]
MI Symptoms	2319	8	9	0.45, 95% CI [0.23, 0.63], 95% PI [-0.25, 0.84]
Anxiety				
PMIE Exposures	4018	8	13	0.25, 95% CI [0.08, 0.41], 95% PI [-0.26, 0.66]
MI Symptoms	1347	5	6	0.48, 95% CI [0.27, 0.65], 95% PI [-0.07, 0.81]
Substance Use				
PMIE Exposures	2281	7	15	0.29, 95% CI [0.08, 0.47], 95% PI [-0.31, 0.72]
MI Symptoms	3558	7	9	0.18, 95% CI [0.08, 0.29], 95% PI [-0.13, 0.46]

	Total N	Samples	Estimates	Pooled Correlation
Relationship Functioning/Social Engagement				
PMIE Exposures/ MI Symptoms	7679	3	7	-0.31, 95% CI [-0.70, 0.22], 95% PI [-0.89, 0.64]

Note. All pooled correlations are statistically significant (*ie*, $p < .05$) with the exception of Relationship Functioning/Social Engagement.

Abbreviations. PI=95% prediction interval.

SUICIDAL THOUGHTS AND BEHAVIORS

Both PMIE exposures and MI symptoms may be positively correlated with suicidal thoughts and behaviors (STBs) based on 15 studies and 9 studies, respectively. Our confidence in these findings is low due to study methodological limitations, some inconsistency across studies, and imprecision.

Overview of Included Studies

	PMIE and STBs	MI and STBs
Number of relevant studies *Number of participants (range)*	Evaluated in 15 studies Ns = 40–14,057	Evaluated in 9 studies Ns = 62–1,487
Sample sources	7 clinical samples 5 community samples 3 population-based samples	8 community samples 1 combined clinical and community sample
Number of studies limited to post-9/11 service era Veterans or military service members	4 studies	1 study
Number of studies finding a positive correlation	14 studies	8 studies
Number of studies finding a negative correlation or non-significant association	1 study	1 study
Number of studies included in meta-analysis	10 studies	9 studies

We identified 15 studies examining associations between PMIE exposures and STBs, 10 of which (total $N = 1,933$) could be included in meta-analyses. PMIE exposures were significantly positively correlated with STBs, but the magnitude of this association was small on average ($r_{pooled} = 0.19$).

Findings from 2 large population-based studies,[88,90] which were not included in meta-analyses, also generally found positive correlations between PMIE exposures and STBs. However, associations varied according to PMIE exposure type and other factors such as gender, active military status, and the specific suicidal thoughts and behaviors being assessed. The largest study,[88] which included 14,057 post-9/11 Veterans participating in the Comparative Health Assessment Interview (CHAI) study, examined the relationships between specific categories of PMIE (acts of perpetration, witnessing, and betrayal), suicide attempts, and gender. This study found that men who reported exposure to perpetration were 50% more likely to attempt suicide during their military service (adjusted risk ratio [ARR] = 1.52, 95% CI [1.05, 2.18]) and twice as likely to attempt suicide after separation (ARR = 2.01, 95% CI [1.43, 2.80]) relative to those who denied perpetration. However, perpetration was not a significant predictor of suicide attempts during or after military service among women. Men who endorsed betrayal were nearly twice as likely to attempt suicide during service relative to those who reported no betrayal (ARR = 1.90, 95% CI [1.25, 2.87]) but this association was attenuated after separation from service (ARR = 1.29, 95% CI [0.89, 1.86]). Women who endorsed betrayal appeared to have a higher likelihood of attempting suicide during service relative to those who denied betrayal

(ARR = 1.56, 95% CI [1.00, 2.41]), though this result was non-significant (the association was similar but significant after separation from service: ARR = 1.62, 95% CI [1.06, 2.44]). Exposure to witnessing was not a significant predictor of suicide attempts for men or women during or after military service.

A second large cross-sectional study[90] conducted among a sample of combat Veterans (N = 1,321) participating in the 2019–2020 National Health and Resilience in Veterans Study (NHRVS) found that MIES total scores were weakly associated with lifetime suicide plans (odds ratio [OR] = 1.03, $p < .01$) but not current suicidal ideation or lifetime suicide attempts. When assessed by MIES subscales, perceived transgressions by self or others and betrayal were associated with current suicidal ideation, lifetime suicide plans, and lifetime suicide attempts (ORs = 1.21–1.27, p's < .05).

Results from 2 additional studies not included in the meta-analyses are also consistent with the overall finding of a positive correlation between PMIE exposure and STBs. A study of 1,545 Veterans who completed a routine PTSD intake assessment at a walk-in clinic at the Salt Lake City VA Medical Center[91] found that a 1-unit increase in MIES score was weakly associated with an increased risk of suicidality as represented by ICD-19 diagnosis codes for suicidal ideation, attempt, or self-inflicted injury (OR = 1.02, 95% CI [1.0, 1.04]). A smaller study of 564 combat Veterans participating in the 2013 NHRVS[5] found that MIES total score predicted significantly higher odds of current suicidal ideation (OR = 1.23, 95% CI [1.05, 1.45]), but not post-deployment suicide attempts (OR = 1.07, 95% CI [0.82, 1.40]).

Nine studies of *MI symptoms* (total N = 4,161) reported on STBs and could be included in meta-analyses. MI symptoms were significantly positively correlated with STBs, but just as with PMIE exposure, the magnitude of this association was small on average (r_{pooled} = 0.27). Findings across studies were mostly consistent in reporting small to moderate positive correlations.

Mediators of the association between PMIE/MI and STBs included PTSD symptoms,[15] guilt,[92] meaning made of a salient stressor,[80] thwarted belongingness,[74] perceived burdensomeness,[74] and altered worldviews.[93] One study reported that the interaction of MI and PTSD was a significant predictor of suicidal ideation and suicide attempts.[20]

PTSD

PMIE exposures may be correlated with higher PTSD symptom severity based on 29 studies, and MI symptoms are likely correlated with greater PTSD symptom severity based on 13 studies. Our confidence in findings for PMIE exposure is low due to study methodological limitations, some inconsistency across studies in the direction of effect, and imprecision, while our confidence in findings for MI symptoms is moderate due to greater consistency and precision.

Overview of Included Studies

	PMIE and PTSD	MI and PTSD
Number of relevant studies *Number of participants (range)*	Evaluated in 29 studies Ns = 50-7,200	Evaluated in 13 studies Ns = 62-930
Sample sources	17 community samples 9 clinical samples 2 population-based samples	10 community samples 1 clinical sample 1 combined clinical and community sample

	PMIE and PTSD	MI and PTSD
Number of studies limited to post-9/11 service era Veterans or military service members	10 studies	1 study
Number of studies finding a positive correlation	25 studies	13 studies
Number of studies finding a negative correlation or non-significant association	4 studies	None
Number of studies included in meta-analysis	26 studies	13 studies

Overall, among a total of 42 studies, all but 4 found that PMIE exposure or MI symptoms were positively correlated with PTSD symptom severity (measured most frequency using the PTSD Checklist [PCL]). Twenty-six studies of PMIE exposures (total N = 14,462) and 13 studies of MI symptoms (total N = 4,210) could be included in meta-analyses. PMIE exposures and MI symptoms were significantly positively correlated with PTSD outcomes, with pooled correlations ranging from small to moderate in magnitude (r_{pooled} = 0.36–0.57). Several studies reported notably large positive correlations, particularly for the association between MI symptoms and PTSD outcomes.

Similar to findings for STBs, associations between PMIE exposure or MI symptoms and PTSD may vary according to particular PMIE types or other factors. In a study conducted among combat Veterans (N = 1,321) participating in the 2019–2020 NHRVS,[84] PMIE exposure by perpetration and betrayal were significantly associated with current probable PTSD (OR = 2.14, 95% CI [1.26, 3.65] and OR = 3.08, 95% CI [1.86, 5.12], respectively). PMIE exposure by witnessing may have also been associated with current probable PTSD, but the result was non-significant (OR = 1.61, 95% [0.97, 2.67]). In exploring the temporal relationship between MI and PTSD at 2 time points, Currier[94] found that self-directed MI predicted greater PTSD severity at 6 months. Conversely, PTSD Cluster D symptoms (changes in cognition and mood) predicted self-directed MI at 6 months, suggesting a complex and potentially bidirectional relationship between the 2 conditions. No temporal relationship between other-directed MI and PTSD were evident when controlling for other factors.

Mediators of the association between PMIEs and PTSD symptom severity included MI,[15] guilt,[4,92] shame,[4] anger,[4] meaning made of a salient stressor,[80] religious/spiritual struggles,[71] negative post-trauma cognitions,[63] and altered worldviews.[93] The only potential mediator of the association between MI and PTSD symptom severity was problem-focused thoughts.[62] One study[66] examined religious involvement as a moderator of the effect of MI on PTSD symptom severity, finding that religious involvement attenuated the effect of MI on PTSD, but only for Veterans who served in non-Middle Eastern theaters.

DEPRESSION

PMIE exposures may be correlated with greater depression symptom severity based on 22 studies; MI symptoms are likely correlated with greater depression symptom severity based on 8 studies. Our confidence in findings for PMIE exposure is low due to study methodological limitations, some inconsistency across studies in the direction of effect, and imprecision. Our confidence in findings for MI symptoms and depression is moderate due to consistency and precision of findings.

Overview of Included Studies

	PMIE and Depression	MI and Depression
Number of relevant studies *Number of participants (range)*	Evaluated in 22 studies Ns = 40-7,200	Evaluated in 8 studies Ns = 62-624
Sample sources	12 community samples 8 clinical samples 2 population-based samples	7 community samples 1 combined clinical and community sample
Number of studies limited to post-9/11 service era Veterans or military service members	10 studies	1 study
Number of studies finding a positive correlation	17 studies	8 studies
Number of studies finding a negative correlation or non-significant association	5 studies	1 study
Number of studies included in meta-analysis	20 studies	8 studies

Overall, among a total of 30 studies, all but 6 found that PMIE exposure or MI symptoms were correlated with greater depression symptom severity (measured most frequently with the PHQ tool). Twenty studies of PMIE exposures (total N = 12,937) and 8 studies of MI symptoms (total N = 2,319) reported depression outcomes and could be included in meta-analyses. PMIE exposures and MI symptoms were significantly positively correlated with depression outcomes, with pooled correlations ranging from small to moderate in magnitude (r_{pooled} = 0.29–0.45). Nearly all studies reported positive correlations, and these were generally larger for the association between MI symptoms and depression outcomes compared with PMIE exposure.

Mediators of the association between PMIEs and depression symptom severity included PTSD symptoms,[15] religious/spiritual struggles,[71] meaning made of a salient stressor,[80] negative post-trauma cognitions,[63] and altered worldviews.[93] The only potential mediator of the association between MI and depression symptom severity was problem-focused thoughts.[62]

ANXIETY

PMIE exposures may be correlated with more severe anxiety symptoms based on 8 studies and MI symptoms are likely correlated with greater anxiety symptom severity based on 5 studies. Our confidence in findings for PMIE exposure is low due to study methodological limitations, some inconsistency across studies in the direction of effect, and imprecision, while our confidence in findings for MI symptoms is moderate due to greater consistency and precision.

Overview of Included Studies

	PMIE and Anxiety	MI and Anxiety
Number of relevant studies *Number of participants (range)*	Evaluated in 8 studies Ns = 72-1,086	Evaluated in 5 studies Ns = 154-420
Sample sources	6 community samples 1 clinical sample 1 population-based sample	4 community samples 1 combined clinical and community sample

	PMIE and Anxiety	MI and Anxiety
Number of studies limited to post-9/11 service era Veterans or military service members	2 studies	None
Number of studies finding a positive correlation	6 studies	5 studies
Number of studies finding a negative correlation or non-significant association	2 studies	None
Number of studies included in meta-analysis	8 studies	5 studies

Eight studies of PMIE exposures (total N = 4,018) and 5 studies of MI symptoms (total N = 1,347) reported anxiety outcomes and could be included in meta-analyses. PMIE exposures and MI symptoms were significantly positively correlated with anxiety outcomes, with pooled correlations ranging from small to moderate in magnitude (r_{pooled} = 0.25–0.48). Correlations from studies of PMIE exposures were inconsistent in both magnitude and direction, while all studies of MI symptoms reported positive correlations.

Results from 2 of the largest studies[85,95] suggest that the nature of the relationship between PMIE exposure and anxiety symptoms may vary by PMIE type and gender. In a population-based survey[85] of 7,200 US service members who participated in the Veterans Metrics Initiative, both men and women who reported exposure to witnessing or betrayal had higher odds of screening positive for anxiety (witnessing: women OR = 2.33, 95% CI [1,72, 3.15] and men OR = 2.45, 95% CI [2.09, 2.88] and betrayal: women OR = 2.13, 95% CI [1.57, 2.90] and men OR = 1.68, 95% CI [1.41, 2.00]). For perpetration, only men had higher odds of screening for anxiety (OR = 1.77, 95% CI [1.47, 2.14]). Similarly, in a study of active duty military service members recruited to participating in a STRONG STAR epidemiological study[95] that classified PTSD Criterion A events as MI involving self or others, PMIE exposure involving self was significantly associated with anxiety symptom severity but PMIE exposure involving others was not.

Mediators of the association between PMIEs and anxiety symptom severity included PTSD symptoms[15,96] and religious/spiritual struggles.[71] The only potential mediator of the association between MI and anxiety symptom severity was problem-focused thoughts.[62]

SUBSTANCE USE

PMIE exposures and MI symptoms may be positively correlated with hazardous alcohol use and overall substance use based on findings from 11 and 7 studies, respectively. Our confidence in these findings is low due to study methodological limitations, inconsistency, and imprecision.

Overview of Included Studies

	PMIE and Substance Use	MI and Substance Use
Number of relevant studies *Number of participants (range)*	Evaluated in 11 studies Ns = 50-7,200	Evaluated in 7 studies Ns = 154-1,487
Sample sources	6 community samples 3 clinical sample 2 population-based sample	6 community samples 1 combined clinical and community sample
Number of studies limited to post-9/11 service era Veterans or military service members	5 studies	None

	PMIE and Substance Use	MI and Substance Use
Number of studies finding a positive correlation	8 studies of alcohol use 4 studies of substance use	4 studies of alcohol use 2 studies of substance use
Number of studies finding a negative correlation or non-significant association	2 studies of alcohol use 1 study of substance use	1 study of alcohol use 2 studies of substance use
Number of studies included in meta-analysis	8 studies	7 studies

Note. Some studies evaluated alcohol use and substance use separately and had divergent findings.

Eight studies of PMIE exposures (total N = 2,281) and 7 studies of MI symptoms (total N = 3,558) reported on alcohol and/or substance use and could be included in meta-analyses. PMIE exposures and MI symptoms were significantly positively correlated with substance use, but the magnitude of this association was small on average (r_{pooled} = 0.18–0.29).

Among 10 studies[23,85,89,93,95,97–101] examining associations between PMIE exposure and alcohol use (most frequently assessed using the AUDIT tool), 8[23,85,89,97–101] found that PMIE exposure was positively correlated with hazardous alcohol use, although this finding was only observed for men in 2 studies.[85,97] Among 5 studies[70,81,83,102] of MI symptoms and alcohol use, 4[70,81,83] found that MI symptoms were positively correlated with hazardous alcohol use or misuse.

Among 5 studies[23,69,89,98,100] of PMIE exposure and substance use (not specific to alcohol use), 4[23,89,98,100] identified a positive correlation between PMIE exposure and substance use including a large study[100] of 1,032 participants recruited from an outpatient clinic in Pennsylvania which found that PMIE exposure was associated with a greater odds of past year opioid dependence (OR = 2.30, p = .008) and lifetime marijuana use (OR = 2.06, p = .002). Among 4 studies[75,81,83,103] of MI symptoms and substance use (not specific to alcohol use), 2[83,103] found that MI symptoms were positively correlated with drug use or general substance use.

A single study examined mediators of the associations between PMIE exposure/MI symptoms and substance use outcomes, reported in 2 different publications.[15,97] Among a community sample of 380 recent-era combat Veterans,[97] researchers examined associations between combat exposure and alcohol use and the mediating effects of PMIE exposure and spiritual injury (such as alienation from and/or anger towards respective higher power). PMIE exposure and spiritual injury sequentially mediated the association between combat and alcohol such that more exposure to PMIEs and a higher level of spiritual injury were related to more alcohol use, R^2 = .17. In multiple-group models, this mediation effect was only significant among men. A second analysis[15] conducted among a subsample of 244 Veterans, active duty military service members, and reservists/National Guard members who deployed at least once for Operation Iraqi Freedom or Operation Enduring Freedom found that MI was positively correlated with hazardous alcohol use (r = 0.46) but this association was no longer significant after controlling for the effects of PMIE types (*ie*, atrocities of war, psychological consequences of war, and leadership failure/betrayal) and PTSD symptoms.

FUNCTIONING

PMIE exposures and MI symptoms may be negatively correlated with relationship functioning and social engagement based on 3 studies, but our confidence in this finding is low due to the small number of studies overall, study methodological limitations, and imprecision. In meta-analysis of these 3 studies (total N = 7,679), PMIE exposure and MI symptoms appeared to be negatively correlated with relationship functioning or social engagement outcomes, but this association was non-significant

and fairly small on average (r_{pooled} = -0.31). Whether PMIE exposure or MI symptoms are associated with other functioning domains (*eg*, work functioning, parenting) is unclear, as these associations have only been evaluated in a single study.

Overview of Included Studies

	PMIE/MI and Functioning
Number of relevant studies *Number of participants (range)*	Evaluated in 3 studies Ns = 65-7,200
Sample sources	1 community sample 1 combined clinical and community sample 1 population-based sample
Number of studies limited to post-9/11 service era Veterans or military service members	1 study
Number of studies included in meta-analysis	3 studies

A multi-site, cross-sectional study[77,102] of Veterans (*N* = 414–425) found that MI symptoms (as measured by MISS-M and MISS-M-SF) were associated with lower measures of relationship quality, community involvement, and physical functioning. In a cross-sectional study[104] of combat Veterans participating in a peer-led intervention that promotes spiritual healing and social connection, MI symptoms were negatively correlated with intimate relationship functioning (*r* = -0.49) among participants who were married or in domestic partnerships (*N* = 65).

Based on cross-sectional data from participants (*N* = 7,200) in the Veterans Metrics Initiative, a longitudinal study[85] examining transitions to civilian life among post-9/11 Veterans, different types of PMIEs (as measured by MIES subscales) were variably associated with different functional impairments, which further varied by gender. A subsequent analysis[87] incorporating a larger sample (*N* = 9,566) from the Veterans Metrics Initiative found that higher scores on MI reactions (measured by MIES) were associated with lower levels of baseline social functioning and that measures of social well-being changed differently over time depending on whether MI reactions were self- or other-focused.

DISCUSSION

This report was requested by the VA Integrative Mental Health (IMH) initiative, supported by the VHA Office of Mental Health and Suicide Prevention (OMHSP), to characterize published literature on moral injury broadly across populations and to synthesize available evidence on the relationship between PMIEs and MI and mental health outcomes among US Veterans and military service members. IMH's Understanding Moral Injury project is working to address Section 506a of the STRONG Veterans Act (H.R. 6411), which directs VA to conduct research on how moral injury relates to the mental health needs of post-9/11 Veterans to inform treatment best practices.

We found that about half of studies on PMIEs or MI published to date have been conducted in the US and about half of all studies have been conducted among Veterans or military service members. Nearly 60% of US studies that reported participants' service era were conducted exclusively among recent era (*ie*, post-9/11 or OIF/OEF/OND) Veterans or military service members. The pace of new research on MI among military service members has been accelerating in recent years, and the concept of MI is also expanding to non-military research. In particular, the number of studies focused on MI among health care workers has increased every year since the onset of the COVID-19 pandemic.

Characteristics of the current literature reflect that MI is still an evolving construct. Most studies to date have examined associations between PMIEs or MI and other variables, such as mental health symptoms, or described the development or validation of a PMIE/MI measure. Fewer studies have reported on development or evaluation of MI-specific interventions, and few studies have evaluated the efficacy of MI-specific interventions in RCTs.

Studies reporting associations between mental health symptoms and PMIEs or MI in US Veterans or military service members have most often examined PTSD, followed by depression, suicidal thoughts and behaviors, substance use, anxiety, and psychosocial functioning. We found low-strength evidence that PMIE exposures and MI symptoms may be correlated with increases in STBs, with the magnitude of this association being small on average. Studies with suicide-related outcomes had methodological limitations, some inconsistency across results, and imprecision in the range of effects. The relationship between MI and STBs may vary based on exposure type and other factors (*eg*, gender, active military status, and the specific outcome being assessed). For example, in 1 study,[88] men who reported perpetration were 50% more likely to attempt suicide during their military service and twice as likely to attempt suicide after separation compared to those who denied perpetration, whereas women who endorsed betrayal appeared to have a higher likelihood of attempting suicide during service relative to those who denied betrayal. Another study[90] found a weak association between MI and STBs, but reported that perceived transgressions by self or others and betrayal were more strongly associated with STBs. Based on the scope of this review and the available literature, we were unable to examine these various relationships. Future research may be indicated to explore how MI subtypes may interact with other factors to increase suicide risk.

For PTSD, depression, and anxiety, we found moderate-strength evidence that MI symptoms are correlated with greater symptom severity, and low-strength evidence of this correlation for PMIE exposures. We found low-strength evidence of positive correlations between MI symptoms and PMIE exposures for substance use outcomes, for which the evidence base is smaller, less consistent, and less precise. We also found low-strength evidence of a negative correlation between PMIE exposures or MI symptoms and relationship functioning and social engagement.

Pooled correlations were generally larger and more consistent between MI symptoms and mental health outcomes compared to correlations between PMIE exposures and these outcomes. This trend suggests a closer relationship between MI outcomes and mental health symptoms compared to PMIE exposure and mental health symptoms. Importantly, these findings do not provide insight into the causal nature of the relationship between MI and mental health symptoms. Whether MI symptoms precede, follow, or co-occur with mental health symptoms remains unclear.

Our finding of a larger positive correlation between MI symptoms and PTSD symptoms relative to other mental health outcomes, such as depression and anxiety, is consistent with prior work describing MI and PTSD as highly related yet distinct constructs. Despite similar etiologies and overlapping symptoms, a core feature of MI is its postulated distinction from PTSD.[1,105,106] Several theoretical studies have sought to better understand the relationship between MI-related constructs and PTSD. One suggested distinction between MI and PTSD is the trauma requirement for PTSD which may not encompass the full range of morally injurious stressors that could engender MI symptoms.[21,23] For example, perpetrating acts that are contradictory to moral codes and experiencing leadership betrayal may not always meet the trauma requirement for PTSD.[4,84] Litz et al[72] coded and evaluated different trauma types among service members seeking PTSD treatment. Based on their coding schema, Veterans endorsing PMIE-related traumas demonstrated differential associations with outcomes relative to those who endorsed traditional fear-based traumas. In another study,[20] Bryan et al concluded that MI and PTSD may represent distinct constructs based on the results of an exploratory structural equation model. MI was characterized more strongly by guilt, shame, anhedonia, anger, and social alienation, whereas PTSD was characterized by increased re-experiencing (flashbacks, nightmares), hyperarousal, memory loss, and sleep difficulties.

The present review is unique in its focus on US Veterans and military service members, but our overall findings are consistent with prior systematic reviews of the associations between PMIEs/MI and mental health outcomes not limited to the US or military populations. A 2021 systematic review and meta-analysis by McEwen et al[18] that included 59 studies conducted in military and non-military populations (police officers, teachers, journalists, refugees and asylum seekers) in the US and elsewhere also found significant associations between MI and PTSD, depression, anxiety, substance use, and suicidality outcomes. This review also found larger associations in studies of MI severity compared with studies that used combined measures of MI/PMIE exposure, which is consistent with our finding of larger positive correlations for MI symptoms and mental health outcomes compared with PMIEs. In addition, a 2023 systematic review by Jamieson et al[107] found that exposure to morally injurious events is associated with suicide risk among military personnel and Veterans from the US and other countries and regions with similar military operational frameworks.

Limitations

The current PMIE/MI literature base has several important limitations. First, nearly all identified studies provide cross-sectional data, which can characterize associations between PMIEs/MI and other variables but cannot be used to determine the causal nature of these relationships. Further, PMIE and MI measures utilized by the included studies have faced criticism for inadequate examination of validity and for failing to index MI outcomes to PMIE exposures. Newer measures have been developed in recent years to overcome these measurement issues but have not been utilized by published studies meeting criteria for KQ2 as of the search date for this review. Examining the validity of the included measures was beyond the scope of this review. Other important limitations worth

noting are risks of bias across studies arising from sampling methods, inadequate adjustment for potential confounders, and the extent and handling of missing data.

Limitations of our review methods include use of sequential rather than dual independent review for some steps including data abstraction and quality assessment. In addition, it is possible that some studies we included have overlapping samples, given that much of the research regarding PMIE/MI among US military service members and Veterans has been conducted by the same groups of core researchers or derived from shared sources of data. Wherever overlap was identified, we accounted for non-independence of observations statistically or by using data from only 1 sample (usually the largest), but due to unclear study reporting, there may be some overlap remaining among certain participant samples.

FUTURE RESEARCH

Future research should be aimed at addressing gaps in the current evidence. As noted by several existing reviews, there is a lack of consensus on the conceptual definition of MI, and subsequently, how these constructs can be measured. Efforts to develop a shared definition of these constructs is essential to help advance this body of research. Developing and employing tools with adequate reliability and validity that can differentiate between PMIE exposures and MI symptoms is needed. The MIOS has been proposed as a tool that can potentially index PMIE exposures and assess MI symptoms. As the majority of the research is cross-sectional, future research should aim to capture longitudinal data to advance the conceptual model of MI and how exposure to PMIE causally relates to the development of MI and mental health symptoms. Relatedly, future research should also aim to identify factors that mediate and moderate the relationships between PMIE, MI, and other mental health outcomes, and to further evaluate the differential effects of PMIE and MI subtypes. Although there was only a small correlation between MI and STBs, some existing studies suggest that specific subtypes of PMIE/MI may have more profound influence on these risk factors. Building upon this research, future studies can then investigate interventions to address the psychological sequalae of MI using MI-specific measures as primary outcomes. Clearer reporting on the origins of study data and on missing data (especially missingness on PMIE or MI measures), as well as use of modern methods to impute missing data and account for plausible confounders, would reduce risk of bias concerns and help to facilitate future syntheses of MI evidence. In addition to further work on these foundational issues, future research could also improve understanding of PMIE/MI prevalence and sequelae among unique Veteran populations (based on service era, for example) and non-Veteran populations including health care workers.

CONCLUSIONS

The pace of research on MI among Veterans and military service members has been accelerating since a definition and conceptual model for MI was proposed in 2009. About half of all published literature on PMIEs or MI has been conducted in the US and about half of all studies have been conducted among Veterans or military service members. The concept of MI is also increasingly being applied to non-military populations including health care workers. Characteristics of the current literature reflect that MI is still an evolving construct. Most studies to date have examined associations between PMIEs or MI and other variables, such as mental health symptoms, or described the development or validation of a PMIE/MI measure. Fewer studies have reported on development or evaluation of MI-specific interventions. Studies reporting associations between mental health symptoms and PMIEs or MI

among US Veterans or military service members have most often examined PTSD, followed by depression, STBs, substance use, anxiety, and functioning.

For PTSD, depression, and anxiety, we found moderate-strength evidence that MI symptoms are correlated with greater symptom severity, and low-strength evidence of this correlation for PMIEs. We found low-strength evidence of positive correlations between MI symptoms and PMIE exposures for STBs and substance use outcomes, for which the evidence base is smaller, less consistent, and less precise. We also found low-strength evidence of a correlation between PMIE exposures and MI symptoms and poorer relationship functioning and social engagement.

Future research on the associations between PMIE exposures, MI, and adverse mental health outcomes using recently developed, improved measures to assess PMIE exposure and MI symptoms will further clarify these associations. Importantly, these findings do not provide insight into the causal nature of the relationship between MI and mental health symptoms. Future longitudinal research is needed to clarify the causal pathway between PMIE exposures, the development of MI, and adverse mental health outcomes. As PMIE and MI constructs are better understood in relation to established diagnoses such as PTSD, a focus of future research should also be developing and evaluating treatment interventions.

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