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The prevalence of nonsuicidal self-injury in military personnel: A systematic review and meta-analysis

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Abstract

Military service members and veterans (SMVs) are at risk for self-directed violence, including nonsuicidal self-injury (NSSI). While NSSI is an important construct worthy of independent study, it is understudied among SMVs and, when included in research, typically examined in the context of suicide risk. Consequently, lifetime prevalence rate estimates of NSSI among SMVs vary. This PRISMA systematic review and meta-analysis estimated the average lifetime NSSI prevalence among SMVs and explored demographic and methodological factors that may account for observed variability. Based on a search of Ovid MEDLINE, Embase, PsycINFO and Web of Science, 47 samples from 42 articles across five countries met inclusion criteria. Results revealed an average NSSI lifetime prevalence rate of 15.76% among SMVs. Significantly higher prevalence rates were observed among clinical (28.14%) versus community (11.28%) samples and studies using interviews to assess NSSI (23.56%) versus self-report (13.44%) or chart review

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(7.84%). Lifetime prevalence increased as publication year increased and decreased as sample size increased. In contrast to prior literature, prevalence rates were comparable between active-duty service members and veterans, and studies collecting data anonymously versus those that did not. Lifetime prevalence was not moderated by age, gender, race, country, primary research focus, quality of NSSI operationalization, or whether NSSI methods were assessed. Findings suggest NSSI is a pervasive problem among military personnel, particularly within clinical settings, highlighting the need for systematic assessment of this important but understudied clinical phenomenon among SMVs. Further research is necessary to elucidate additional risk factors for NSSI among SMVs, including trauma exposure.

Keywords

NSSI; self-injury; military; veteran; meta-analysis; review

Nonsuicidal self-injury (NSSI), the deliberate destruction of one's own body tissue without intent to die (American Psychiatric Association, 2013; Klonsky, 2007), constitutes one of the most robust predictors of suicidal thoughts and behavior among military service members and veterans (Baer et al., 2018; Kimbrel et al., 2016; Villatte et al., 2015). By definition, NSSI is distinct from suicidal behavior based on the intended outcome of self-directed violence. While individual NSSI behaviors tend to be less lethal in nature, they are comparatively engaged in with greater frequency, motivated by a variety of underlying functions (e.g., emotion regulation, self-punishment, expressing distress), and predicted by different risk factors (K. R. Fox et al., 2015; Hamza et al., 2012; Taylor et al., 2018). Furthermore, NSSI alone is a valuable treatment target as it is associated with significant distress, impairment, and potential for serious physical injury (Doshi et al., 2005; Selby et al., 2012).

Extant literature has substantially increased our knowledge and understanding of NSSI among civilians in the last twenty years, especially in adolescents and young adults (K. R. Fox et al., 2015; Swannell et al., 2014). However, published prevalence rates vary considerably both across and within subgroups suggesting phenomenological differences among certain population subsets and methodological factors may influence the reliability of estimates (Daukantaitė et al., 2020; Swannell et al., 2014). While SMV suicide prevention is a top research and clinical priority (Department of Veterans Affairs, 2019), there appears to be a relative paucity of data exploring the prevalence of NSSI in this subgroup. Systematic examination of NSSI prevalence among SMVs would support advocacy efforts for the implementation of routine screening that is conducted for other high prevalence mental health targets in these individuals (e.g., PTSD, depression, alcohol use). Moreover, with research consistently demonstrating elevated risk of psychiatric disorders and suicide among SMVs (Department of Veterans Affairs, 2020), it is critical to examine NSSI prevalence and understand factors that may contribute to elevated rates.

Meta-analytic findings report the pooled prevalence of NSSI among the adult general population to be 5.5%, with demonstrably higher rates among young adults (13.4%; Swannell et al., 2014). Evidence also suggests that, among all emotional disorders, NSSI

is most strongly associated with posttraumatic stress disorder (PTSD; Bentley et al., 2015). Thus, it is crucial to elucidate factors contributing to NSSI among populations at greater risk of exposure to potentially traumatic events, including military personnel.

While findings from individual studies suggest rates of NSSI among SMVs appear at least comparable to and generally higher than their civilian counterparts (Bandel & Anestis, 2020; Bryan & Bryan, 2014; Kimbrel et al., 2015; Lear et al., 2021; May et al., 2018; Pinder et al., 2012; Turner et al., 2019), no study to date has comprehensively evaluated these estimates and their contributing factors. For example, rates appear to vary considerably based on several demographic characteristics. Specifically, greater endorsement of NSSI has been observed among SMV women compared to men (Baer et al., 2018; Bryan & Bryan, 2014; Turner et al., 2019). However, NSSI rates in male SMVs may be underestimated due to engagement in different forms of NSSI not typically assessed or recognized as self-injury (e.g., wall/object punching performed with the intent to hurt oneself; Kimbrel et al., 2018). Additionally, as one might expect, NSSI rates appear to be higher among clinical and/or treatment-seeking SMV samples who are likely to experience mental health comorbidities (Bryan, Rudd, et al., 2015; Gromatsky et al., 2021; Kimbrel et al., 2018; Nock et al., 2017; Villatte et al., 2015).

Lifetime NSSI prevalence tends to be higher in veterans than active-duty service members (Jones et al., 2019). However, this difference may reflect the influence of time, given that veterans are older on average and, therefore, their lifetime prevalence captures a longer period of time than active-duty service members. Despite consistent evidence of higher NSSI prevalence among young adults than adults in civilian samples (Swannell et al., 2014), results are mixed among SMVs regarding associations between NSSI and age such that further examination is required (Bryan & Bryan, 2014; Bryan, Rudd, et al., 2015; Calhoun et al., 2017; Cunningham et al., 2021; Patel et al., 2021; Sacks et al., 2008; Turner et al., 2019). It is possible that NSSI rates may be underestimated among individuals who are still serving in the military and may be more reticent to disclose NSSI history out of fear of negative career consequences, including discharge (Zinzow et al., 2013). In support of this hypothesis, SMVs are wary of seeking mental health treatment and disclosing issues like self-directed violence (Coleman et al., 2017). Furthermore, given possible overrepresentation of United States (U.S.) samples in the literature, a comparison between NSSI prevalence of SMVs in the U.S. versus other countries is warranted.

As with civilian samples, several methodological factors may also pose considerable barriers to accurately estimating NSSI prevalence in SMVs. Across all populations, the ability to gain more precise estimates and detect phenomena of interest – especially those with low base rates – increases with sample size. Furthermore, estimates may be occluded due to how NSSI is operationalized across studies and time – especially whether it is measured as a concept distinct from suicidal self-directed violence. Due to their strong association, NSSI is often examined alongside suicide outcomes in SMVs but appears to be less frequently a primary focus of research or clinical assessment (Green et al., 2017). However, the progression of the field of self-directed violence has highlighted the value of studying NSSI as a distinct mental health construct (American Psychiatric Association, 2013). Therefore, NSSI prevalence rates may increase with publication year due to improved detection ability

from evolving terminology (i.e., better operationalization), public awareness of NSSI, and newer methodologies for its measurement.

Endorsement of NSSI history may vary based on how data is collected (e.g., self-report, clinician-administered interview, chart review). Similarly, measures may assess the presence of self-injury history dichotomously ("yes" or "no") or inquire about specific methods of NSSI. Meta-analytic results of civilian samples suggest NSSI prevalence rates are higher when studies use instruments that are self-report (vs. interview), dichotomize the presence or absence of NSSI, and assess a greater number of NSSI methods (Swannell et al., 2014). Self-report instruments may afford a sense of privacy to facilitate disclosure; however, they may also result in false positives due to lack of clarity about the definition of NSSI. Notably, emerging evidence suggests greater engagement in non-traditional forms of NSSI among men, who constitute the majority of SMVs. While NSSI behaviors common among civilians (e.g., cutting) are also frequently endorsed in military samples, several other methods less common among civilians (e.g., burning, hitting oneself) are also prevalent – including "indirect" methods like wall/object punching. Perceived anonymity of data collection is also associated with NSSI prevalence (Swannell et al., 2014) and may be especially influential among SMVs who may fear potential repercussions of reporting traditionally stigmatized behaviors. Military beliefs and training often inhibit disclosure of self-directed violence by increasing fear of stigma and depicting at-risk individuals as burdensome, unreliable, shameful, and weak (Ganzini et al., 2013). Thus, examination of these methodological factors would add important nuance to understanding NSSI prevalence among SMVs.

Current Study

To better understand the extent to which existing literature examines NSSI as a distinct concept among military personnel, we conducted a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Page et al., 2021) compliant systematic review to identify articles meeting inclusion criteria. We then conducted a meta-analysis and meta-regression to clarify lifetime NSSI prevalence rates in SMVs. Based on existing literature, we hypothesized NSSI prevalence would be moderated by demographic and methodological factors. We specifically expected higher prevalence rates among veterans (compared to active-duty service members), in larger samples, in samples from the U.S., and in clinical (vs. community) samples. We anticipated NSSI prevalence would also be associated with recency of publication, anonymity of data collection, quality of NSSI operationalization, degree to which NSSI was the research focus, use of self-report (vs. interview or chart review), and if one or more NSSI method was assessed. Due to the mixed literature, we did not have a priori hypotheses regarding the potential influence(s) of age, gender, or race.

Method

Study Identification

Identification and retrieval of studies was conducted in accordance with the PRISMA statement (Moher et al., 2009). The meta-analysis was pre-registered through PROSPERO (CRD42021270888). A comprehensive search strategy, which employed both subject headings and keywords, was developed and run by a medical librarian (SW) in MEDLINE

Ovid (1946- March 2021), Embase Ovid (1947- March 2021), PsycINFO Ovid (1806- March 2021), and Web of Science Core Collection (1900- March 2021) databases on March 18, 2021, with no date restrictions (Appendix A). Search results were exported and de-duplicated into Covidence (www.covidence.org), software that manages citation screening and review.

Eligibility Criteria & Study Selection

For the purposes of this review, NSSI was defined as any self-directed violence performed intentionally without suicidal intent. Articles presenting prevalence rates with broad definitions (e.g., self-directed violence, self-harm behavior, risky behavior) where there was not a clear delineation of intentional self-directed violence without suicidal intent were excluded. Articles were eligible for inclusion if they were written in English, were original research articles published in peer-reviewed journals, included a distinct sample of military personnel, and reported lifetime prevalence rate(s) for NSSI. We did not restrict inclusion criteria based on when NSSI occurred (e.g., before, during, or after military service) and, thus, NSSI could have occurred at any point in an individual's lifetime. Meta-analyses, review articles, and studies without original quantitative data (e.g., case studies) were excluded. Search terms were intentionally broad (e.g., "self-harm," "self-directed violence") to identify all potentially relevant articles. This approach has been adopted by similar meta-analyses of NSSI (K. R. Fox et al., 2015) because researchers use different terms to describe the behavior. Furthermore, studies primarily exploring suicidal thoughts and behaviors may also include data for NSSI without mentioning so in the abstract. For this reason, articles moved to full text review if they mentioned any self-directed violence (suicidal or nonsuicidal). Appendix A details search criteria terms used to identify potentially eligible papers in each database.

After de-duplication, the searches yielded 811 articles. Two reviewers (MG & STL) independently screened titles and abstracts against the inclusion and exclusion criteria. To ensure reliability between reviewers, a series of training exercises was conducted prior to commencing screening including pilot screening of a random sample of 20 citations. Conflicts about the eligibility of an article were resolved by a third reviewer (KHD). Full texts were independently reviewed by two of three possible reviewers (KHD, MG, & CM) for all articles that passed title/abstract screening, following the same training procedure. Discrepancies about the eligibility of an article were resolved by the third reviewer. Articles were excluded during the full-text review if they were not peer-reviewed, did not include a distinct military sample, did not distinguish NSSI from other self-directed violence, or did not report a lifetime NSSI prevalence rate. Articles were also excluded if the samples they described were believed to be represented in another included publication. This was done by comparing authors, sample size, age, and NSSI prevalence rate(s). Among duplicate samples, the sample included in analyses was initially selected based on whether NSSI was the primary focus of analyses, followed by which had more comprehensive demographic and methodological information detailed. A flow chart of study identification and reasons for exclusion is depicted in Figure 1. Forty-two studies were included with a total of 47 distinct study samples from which data were extracted (see Appendix B for reference list of included studies).

Article coding categories were defined prior to data extraction and included the following: publication year, sample size (military participants only); percentage of male participants; percentage of White participants; mean age of participants; country where data were collected; funding source; military sample type (veteran vs. active-duty service member); study sample type (clinical vs. community); whether data was collected anonymously; primary research focus (NSSI, suicide, or other); quality of NSSI operationalization; NSSI measure name; NSSI measure type (self-report, interview, or chart review); and whether one or more specific NSSI method was assessed. Whenever possible, if articles did not explicitly report whether methods of NSSI were assessed, coders referenced the NSSI measure cited by the researchers to infer this information (unless they reported adopting a modified version, in which case this information was treated as missing).

Studies were coded for quality by rating items relevant for observational studies from the Crombie quality appraisal tool (Crombie, 1996) and summing these items for a study quality score (range 0–7) with higher scores reflecting higher study quality and use of methods less prone to bias. Study quality ratings are important to implement when estimating prevalence rates as various study design and methodology factors impact risk of bias and thus influence prevalence estimates (Munn et al., 2015). Given the considerable heterogeneity and lack of standardized reporting across studies, quality ratings can serve as a proxy to capture how much of the heterogeneity in prevalence rates are due to differences in individual study characteristics. Reviewers subjectively evaluated how well authors defined NSSI in line with the currently accepted definition (e.g., distinct from suicidal behavior; American Psychiatric Association, 2013). To prevent redundancy with other variables (e.g., measure type, measure name), this subjective rating corresponded to the quality of NSSI conceptualization by authors rather than by specific measure/item used to index NSSI. Response options of NSSI operationalization were “poor,” “adequate,” and “very good.”

All articles were independently double-coded (KHD & TFH). A third reviewer (MG) resolved discrepancies in objective categories by consulting the original article and in subjective categories (i.e., study quality, NSSI operationalization) through a final consensus meeting. Most studies were high in quality and followed study procedures likely resulting in low risk of bias (85.7% of studies rated as 5 or higher in study quality).

We originally intended to examine past-year NSSI prevalence in addition to lifetime prevalence. However, following the same data extraction process outlined above, only 10 samples were yielded. Thus, we elected to focus solely on lifetime data. We do, however, provide some general observations about past-year data to inform future research as more data become available.

Data Analysis

Analyses were conducted using Comprehensive Meta-Analysis Version 3 (Borenstein et al., 2013) based on the procedures recommended by Borenstein and colleagues (2021). Lifetime NSSI prevalence rates, defined as the proportion of the sample endorsing NSSI at any point during their life, was the effect size of interest. All analyses were performed as two-tailed significance tests based on a threshold of 0.05, unless otherwise noted. A random effects model was used because true effect sizes were assumed to differ across studies

(Borenstein et al., 2010; Schmidt et al., 2009). This approach was deemed appropriate due to the expected large amount of between-study variance resulting from the wide range of methodologies used across studies. If a study reported findings from multiple samples, those samples were included independently.

Results include prevalence rates and 95% confidence intervals (CIs) for each included study, as well as the weighted mean prevalence and 95% CIs across studies (Borenstein et al., 2021). I^2 was used to measure the ratio of total variance across the study estimates that is a result of heterogeneity instead of chance, with values greater than 75% indicating high inconsistency (Higgins et al., 2003). We tested for publication bias using rank correlation (Begg & Mazumdar, 1994) and the Trim and Fill method (Duval & Tweedie, 2000). We examined several categorical moderators by estimating the effect size at each level of the moderator, including both demographic and methodological characteristics (i.e., clinical vs. community sample, country, SMV status, anonymity of data collection, research focus, quality of NSSI operationalization, method of NSSI assessment, the assessment of one or more NSSI method). We used random effects meta-regression to test several continuous moderators (i.e., % male, % White, mean age, publication year, sample size) by examining the moderator as the independent variable and prevalence rate as the dependent variable.

Results

Forty-seven samples drawn from 42 articles met inclusion criteria. In total, lifetime NSSI prevalence estimates were derived from 91,492 participants representing five countries (United States, United Kingdom, Germany, Israel, and Turkey) over 44 years (1977 to 2021, median publication year = 2018). Most studies were conducted in the United States (78.57%) and a majority of publications were focused on NSSI (69.05%). Median sample size was 313 individuals (range: 39 to 38,507), and the overall average age was 34.09 years (range of averages: 19.0 to 55.6 years). Participants were predominantly male (77.18%) and White (69.27%). Over half were drawn from a community setting (55.32%) and nearly a third from a clinical setting (29.79%).

Lifetime Nonsuicidal Self-Injury Prevalence

Based on the 47 included samples, the prevalence rate of lifetime NSSI among SMVs ranged from 0.15% to 55% (Figure 2). The overall mean prevalence of lifetime NSSI among SMVs was 15.76% (95% CI [12.66%, 19.45%]).

As expected, there was high heterogeneity across the included samples (I^2 = 98.93%; Higgins et al., 2003). Sensitivity analysis examined whether any of the included samples were outliers by calculating what the pooled effect size would be based on the exclusion of each sample. The exclusion of any included sample resulted in a small change in the mean prevalence rate, such that the mean prevalence rate ranged from 15.23% to 16.95%. Because no effect sizes fell outside of the CIs, no samples were considered outliers. The rank correlation tests for publication bias were conducted by examining the correlation between effect size and standard error (Begg & Mazumdar, 1994). As recommended, this was conducted with a continuity-correction and as a one-tailed significance test (Borenstein et al., 2013). Results suggested publication bias did not impact analyses (Kendall’s tau =

−0.06, $p = 0.26$). The Trim and Fill method estimates the number of studies missing as a result of publication bias and calculates what the mean effect size would be if those studies were included (Duval & Tweedie, 2000). This test estimated that zero samples were missing and, therefore, the adjusted pool estimate did not change. Overall, it is unlikely that publication bias significantly impacted the present results.

Moderator Analysis

Demographic Characteristics.—We examined whether lifetime prevalence of NSSI differed depending on several demographic characteristics. We compared samples using veterans to samples using activity-duty service members (Table 1). Among the 47 included samples, 16 used a veteran sample and 22 used an active-duty sample. Nine samples could not be included in this analysis because they used a sample that did not fit into one of these categories. Two samples included reservists, and an additional seven had combined samples of service members and veterans. The between-class effect was not statistically significant ($Q_b[1] = 0.33$, $p = 0.57$), with a mean prevalence of 15.08% for active-duty samples and a mean prevalence of 17.64% for veteran samples.

The country in which the study was conducted was also examined as a moderator variable (U.S. vs. other). Among the 47 included samples, 37 were conducted in the U.S. and 10 were conducted in another country. The between-class effect was not statistically significant ($Q_b[1] = 0.00$, $p = 0.99$), with a mean prevalence of 15.81% for studies conducted in the U.S. and a mean prevalence of 15.77% for those conducted in another country.

The source of study sample was also considered as a moderator variable. Clinical samples encompassed those drawn from inpatient and/or outpatient mental health settings whereas community samples included those recruited from broader sources (e.g., non-psychiatric Veterans Health Administration [VHA] settings, mailing lists), online research, and school/university settings. Among the 47 included samples, 14 were recruited from clinical settings and 26 were recruited from a community setting. Six studies were excluded because they included participants recruited from both clinical and community settings, and an additional study was excluded because it took place in a military prison setting (Winstead & Parker, 1977). The between-class effect was statistically significant ($Q_b[1] = 14.44$, $p < .001$), with a mean prevalence of 28.14% for studies conducted with participants from clinical settings and 11.28% for studies conducted with participants from community settings.

We also examined several demographic characteristics as continuous moderators. The percentage of male participants in the sample was not associated with prevalence rate ($Q = 0.01$, $df = 1$, $p = 0.91$), nor was the percentage of White participants in the sample ($Q = 2.20$, $df = 1$, $p = 0.14$), or mean age of the sample ($Q = 1.07$, $df = 1$, $p = 0.30$).

Methodological Factors.—We examined if NSSI lifetime prevalence differed by several methodological factors (Table 2). We first explored the moderating role of the primary focus of each study. Of the 47 included samples, NSSI was the primary focus of 33, suicide was the primary focus of 12, and two primarily focused on another topic. The between-class effect was statistically significant ($Q_b[2] = 69.29$, $p < 0.001$) with a mean prevalence of

15% for studies focused on NSSI, 14.75% for those focused on suicide, and 43% for those focused on another topic.

We also considered anonymity of data collection as a moderator. Among the 47 included samples, nine used anonymous data collection and 38 did not. The between-class effect was not statistically significant ($Q_b[1] = 0.62$, $p = 0.43$) with a mean prevalence of 13.63% for anonymous studies and 16.3% for studies that were not anonymous.

Additionally, we examined the quality of NSSI operationalization as a moderator. Of the 47 included samples, four were categorized as "poor," 15 were categorized as "adequate," and 28 were categorized as "very good." The between-class effect was not statistically significant ($Q_b[2] = 5.77$, $p = 0.06$) with a mean prevalence of 14.8% for studies classified as "poor," 9.97% for those classified as "adequate," and 19.8% for those classified as "very good."

We also tested the number of NSSI methods assessed as a moderator. This variable was dichotomized to identify studies that assessed one or more specific NSSI methods versus none. Of the 47 included samples, 23 studies did not assess NSSI methods and 13 assessed one or more specific method of NSSI. Additionally, 11 did not report number of NSSI methods assessed and therefore could not be included in this analysis. The between-class effect was not significant ($Q_b[1] = 3.01$, $p = 0.08$) with a mean prevalence of 13.94% for those that did not assess any methods and 21.31% for those assessing one or more method.

We examined the method of NSSI assessment as a moderator. Among the 47 included samples, two used chart review, 15 used an interview format, and 30 used self-report. The between-class effect was statistically significant ($Q_b[2] = 7.63$, $p = 0.02$) with a mean prevalence of 7.84% for chart review, 23.56% for interview, and 13.44% for self-report. Lifetime NSSI prevalence for each sample was typically derived using a specific assessment instrument versus a study-generated item/measure ($n = 7$). There was a great deal of heterogeneity in specific NSSI assessment tools used (i.e., over 11 different measures), the most common of which was a variation or item(s) drawn from the Self-Injurious Thoughts and Behaviors Interview (SITBI, Nock et al., 2007; $n = 10$) which was typically administered as a self-report ($n = 9$). The NSSI item from the Columbia Suicide Severity Rating Scale (C-SSRS, Posner et al., 2011; $n = 6$) and the Deliberate Self-Harm Inventory (DSHI, Gratz, 2001; $n = 5$) were also frequently used.

We also examined certain methodological characteristics as continuous moderators. Sample size and publication year were both significantly associated with prevalence rate ($Q = 4.98$, $df = 1$, $p = 0.03$; $Q = 4.20$, $df = 1$, $p = 0.04$, respectively). As sample size increased, prevalence rate decreased (coefficient = −0.00005, $p = 0.03$). As publication year increased, prevalence rate increased (coefficient = 0.03, $p = 0.04$).

Past-Year Nonsuicidal Self-Injury Prevalence—As discussed above, only 10 samples were identified that provided a prevalence rate for NSSI occurring in the past year. Thus, we will only provide overview statistics for these studies. Among the 10 samples, prevalence rate of past-year NSSI among SMVs varied considerably, ranging from 1.13% to 34.58%.

The overall mean prevalence of past-year NSSI among SMVs was 5.04% (95% CI [2.48%, 9.97%]). There was high heterogeneity across the included samples (I^2 = 98.69%; Higgins et al., 2003). Sensitivity analysis revealed the exclusion of any included sample resulted in a small change in the mean prevalence rate, such that mean prevalence rate ranged from 3.91% to 5.95%. Because no effect size fell outside the CIs, no samples were considered outliers. The rank correlation (Begg & Mazumdar, 1994) suggested publication bias did not impact analyses (Kendall's tau = −0.04, p = 0.43). The Trim and Fill method (Duval & Tweedie, 2000) estimated zero samples were missing and, therefore, the adjusted pool estimate did not change. Overall, it is unlikely publication bias significantly impacted the present results.

Discussion

Although an abundance of literature exists examining NSSI among civilians (K. R. Fox et al., 2015; Swannell et al., 2014), prior research has yet to provide a precise estimate of the lifetime prevalence among military personnel. The present meta-analysis addressed this gap and identified 47 distinct samples across 42 unique studies that met inclusion criteria. Key findings are presented in Table 3. Results revealed that 15.76% of SMVs reported lifetime history of NSSI with comparable rates between active-duty service members (15.08%) and veterans (17.64%). Notably, average lifetime prevalence in SMVs was nearly three times that observed in epidemiological and meta-analytic studies of adult civilian counterparts (4.86–5.9%; Klonsky, 2011; Liu, 2021; Swannell et al., 2014), suggesing that SMVs represent a population subgroup at particularly high risk of NSSI. There was a wide range in lifetime prevalence rates of NSSI. For example, one study evidenced very low rates of NSSI (0.15%) among a very large sample of U.S. Army recruiters (Silva et al., 2017). However, the authors of that study noted that these findings are consistent with the stringent requirements for this position. Notably, despite the range in prevalence rates observed, sensitivity analyses suggested the prevalence rate of each individual sample did not significantly impact the estimated mean prevalence rate.

As expected, higher lifetime NSSI prevalence was observed among samples drawn from clinical versus community settings. These findings are consistent with evidence from individual studies of high NSSI prevalence among more acute and/or treatment-seeking SMV samples, who often experience mental health comorbidities (Bryan, Rudd, et al., 2015; Gromatsky et al., 2021; Kimbrel et al., 2018; Nock et al., 2017; Villatte et al., 2015). Findings should be considered alongside literature that suggests NSSI is strongly associated with PTSD (Bentley et al., 2015; Kimbrel et al., 2014), a common mental health condition among trauma-exposed populations like military personnel (Fulton et al., 2015). Additional research is necessary to better understand this relationship among SMVs and how risk may be conferred.

Present findings also suggest interviews yielded significantly higher estimates of lifetime NSSI among SMVs compared to self-report or chart review instrument(s). This is contrary to our hypotheses and prior meta-analyses of civilians evidencing higher NSSI prevalence rates using self-report instruments (Swannell et al., 2014). While self-report instruments may yield false positives inflating NSSI prevalence rates, interviews may afford the

opportunity to parse out more nuanced forms of NSSI. They also encourage rapport building between the assessor and SMV, which may in turn facilitate disclosure, a challenge that may be particularly relevant for military personnel discussing traditionally stigmatized topics (Ganzini et al., 2013).

Both publication year and sample size were significant moderators of lifetime NSSI prevalence. Greater prevalence among more recently published articles may reflect increases in NSSI or improvements to the conceptualization, public awareness, and measurement of NSSI as a distinct construct. Contrary to expectations, greater sample size was significantly associated with *lower* lifetime NSSI prevalence suggesting that as sample size increased, studies consistently had smaller prevalence rates. While analyses demonstrated no single study unduly influenced the overall prevalence rate estimate, the large sample size and very small prevalence rate of the Silva et al. (2017) study may have impacted this specific moderation analysis. Furthermore, larger sample sizes are more likely to be obtained by recruiting from the community versus clinical settings, which may have contributed to this finding. Therefore, although the effect of sample size was significant, it was very small and should be re-examined as increasing interest in NSSI among SMVs yields larger studies examining prevalence rates.

Contrary to expectations and prior research suggesting that lifetime NSSI is more prevalent among veterans than active-duty service members (e.g., Jones et al., 2019), average lifetime NSSI prevalence was comparable between these two groups. NSSI often occurs in the presence of other mental health conditions associated with functional impairment (Bentley et al., 2015; Ose et al., 2021). Thus, it is expected that individuals engaging in NSSI during their military service may lose service member status and consequently be underrepresented in active-duty samples. Newer studies using large national samples of service members specifically assess NSSI (e.g., Army STARRS; Nock et al., 2017). However, NSSI may be harder to detect in military behavioral health settings where it may not be systematically assessed (e.g., compared to suicidal thoughts and behaviors). Active-duty samples included in analyses may have been more likely to be drawn from clinical settings (half of service member samples versus approximately a third of veteran samples). Furthermore, comparable prevalence rates between service members and veterans observed in our analyses may be influenced by the relatively large size of included service member samples (e.g., those that are nationally representative), and correspondingly greater power.

Due to the mixed literature observed among SMVs, we had no a-priori hypotheses regarding demographic variables of gender, age, or race, and analyses indicated comparable prevalence rates across these factors. Females are typically underrepresented in the military but tend to be overrepresented in civilian NSSI literature. However, while samples tended to be predominantly male, lifetime NSSI prevalence was not moderated by gender. Though younger civilians evidence higher NSSI rates compared to older individuals, even when comparing lifetime prevalence rates (Swannell et al., 2014), age was not a significant moderator in our analyses. This suggests NSSI is a relevant treatment target among SMVs of all ages and service eras. On average, 69.3% of all samples with available data were White. While this information was drawn from several countries, this statistic is comparable to the U.S. Department of Defense annual demographic data (70.2%; Department of Defense,

2020) and slightly lower than veteran data (78.6%; Department of Veterans Affairs, 2022). Thus, NSSI is an important mental health outcome relevant to SMVs across racial and ethnic identities.

A comparison of U.S. versus non-U.S. samples suggested similar lifetime NSSI prevalence despite the size of the former's military forces and potentially greater representation in the NSSI literature. A small number of studies (n = 6) were conducted in countries that, at the time of data collection, had compulsory military service – most of which recruited from clinical populations/settings (n = 4). Due to these factors, planned comparisons using compulsory versus non-compulsory service as a moderator were not conducted. However, it is possible that prevalence rates of mental health outcomes like NSSI may be higher among countries with compulsory military service due to greater national representation in these samples. Thus, additional research may be warranted to explore this possibility.

Prior literature suggests military personnel may fear disclosure of traditionally stigmatized topics (Coleman et al., 2017; Ganzini et al., 2013), including self-directed violence, that one might expect to be tempered by anonymous research methods. However, in contrast with findings from NSSI meta-analyses among civilians (Swannell et al., 2014), anonymity of data collection was not a significant moderator of lifetime NSSI prevalence among SMVs. This could be a consequence of mistrust and deep and pervasive concerns among SMVs about the true anonymity of data collection and potential repercussions that make disclosure feel risky – despite the promise of anonymity. Similar challenges may exist for suicide prevention resources, such as the Veteran's Crisis Line, which is a safe and available support and ideal avenue for those that wish to remain anonymous (Predmore et al., 2017). Furthermore, anonymous assessments would presumably need to be conducted using self-report methods, which we found to be associated with lower prevalence.

Contrary to civilian findings (Swannell et al., 2014), assessment of one or more NSSI method was not associated with higher lifetime NSSI prevalence in our analyses. Evaluating specific NSSI methods would be expected to aid in NSSI identification and measurement by providing exemplars and clarifying the types of behaviors of interest. However, certain non-traditional or "indirect" forms of self-injury (e.g., wall or object punching with the intent to hurt oneself) appear more prevalent among men and veterans (Kimbrel et al., 2018). These are typically not assessed using traditional measures of NSSI commonly used by included studies and, consequently, may have resulted in underestimated SMV prevalence rates. Furthermore, while we did ensure that studies sufficiently operationalized NSSI according to inclusion criteria, we deferred to the original study's authors in their classification of NSSI and did not further scrutinize the specific function or motivation for NSSI. No study to date has comprehensively reported the various functions that NSSI serves among SMVs, marking an important avenue for future research.

The quality of NSSI operationalization was also not a significant moderator of lifetime NSSI in SMVs. Few studies were determined to operationalize NSSI poorly, and many (especially those published in the last decade) operationalized NSSI very well. Studies that did not adequately assess and/or report NSSI as a distinct construct (n = 92) were excluded in the full-text review phase and subsequent analyses. Thus, included studies may have been

more likely to better operationalize NSSI, potentially limiting variability of this moderator. The research focus of each publication was a statistically significant moderator of lifetime NSSI prevalence. However, this finding cannot be meaningfully interpreted as it appears largely driven by high prevalence rates among the small number of studies that focused on topics other than NSSI or suicide ($n = 2$). Notably, one of these studies was primarily aimed at understanding antisocial personality disorder (ASPD) among military inpatients and, consequently, half the sample had an ASPD diagnosis and many evidenced several significant mental health issues (Sayar et al., 2001). The other study recruited OEF/OIF veterans with deployment history using Amazon's Mechanical Turk (MTurk) and aimed to understand morally injurious experiences and self-compassion (Forkus et al., 2019). In addition to its inclusion of only OEF/OIF veterans who are generally younger and experience reintegration issues that increase risk for suicide (Sokol et al., 2021), prevalence rates may have been higher due to the average severity of reported PTSD symptoms falling within the range of probable PTSD. Thus, both these studies have characteristics resembling a clinical sample, which was a significant moderator of prevalence.

Prevalence rates were comparable between the "NSSI" and "suicide" foci groups, supporting the ability to meaningfully measure NSSI across these research foci. Nonetheless, NSSI Disorder (NSSID) has been recognized in the most recent version of the DSM-5 as a condition requiring further research (American Psychiatric Association, 2013). Research supports NSSID as a clinical diagnosis distinct from suicidal behavior linked with significant impairment and distress (Klonsky et al., 2014). Thus, future studies with a focus on NSSI would be beneficial to elucidate the etiology and prognosis of NSSID among SMVs.

Implications of Findings

Findings suggest NSSI is a relevant clinical construct among SMVs worthy of independent assessment, especially among those seeking mental health treatment (see Table 4). In addition to being a robust predictor of suicide outcomes, NSSI is also independently associated with distress, impairment, and potential for serious injury (Doshi et al., 2005; Selby et al., 2012). Furthermore, NSSI is strongly associated with PTSD (Bentley et al., 2015; Kimbrel et al., 2014), a prevalent concern among SMVs who experience high rates of trauma exposure (Fulton et al., 2015). In light of the high average prevalence rate observed in present analyses, efforts should be made to increase access to psychoeducation and treatment for NSSI among military personnel.

Assessment method was a significant moderator such that interviews yielded higher lifetime NSSI prevalence rates. While recognizing the time burden required to complete comprehensive interviews, researchers and clinicians should carefully consider their value for accurately capturing instances of NSSI in SMVs. Interviews may afford greater opportunity for building rapport that encourages disclosure among military personnel. Furthermore, while the assessment of specific NSSI methods was not a significant moderator of prevalence, SMVs may engage in non-traditional forms of NSSI that are not currently assessed by instruments developed for civilians. Thus, emerging efforts to develop

instruments specific to SMVs (e.g., Green et al., 2017) are vital to accurately estimating NSSI prevalence rates that may be deflated due to these methodological limitations.

Though anonymity of data collection was not associated with higher prevalence, it is possible that concerns about sharing information pertaining to mental health concerns (especially self-directed violence) are so strong that the promise of anonymity does not afford enough security for SMVs. For example, the experience of anonymity may differ between studies using recruitment methods that target potentially eligible SMVs prior to anonymously collecting data (e.g., mailings or emails) versus those requiring SMVs to proactively opt in (e.g., online surveys, waiting room survey boxes). Thus, researchers should carefully consider recruitment strategies alongside anonymous data collections methods.

Limitations and Future Directions

Present findings should be interpreted within the context of several limitations. First, studies which operationalized self-harm too broadly to determine whether the construct met the definition of NSSI were excluded from present analyses. It is possible this could have resulted in a bias for included studies to be more recent (median year of publication = 2018) because they might be more likely to adopt a more clearly operationalized definition of NSSI as a distinct construct from suicidal behavior. Additionally, studies that continue to study “self-harm” as a broad concept of interest (which may be more common in the United Kingdom; Kapur et al., 2013) were also excluded. Furthermore, only published studies were included in present analyses and we did not request unpublished material or conduct hand searching. Although this is a limitation of current analyses, statistical analyses suggest a publication bias was not detected.

It was also outside the scope of present analyses to examine the temporal sequence of NSSI and whether it occurred before, during, or after military service. Although some researchers have explored the timing of NSSI onset, especially in relation to suicidal behavior (e.g., Bryan, Bryan, et al., 2015), additional research is necessary to draw conclusions about its relationship with prevalence. Next, nine samples were excluded from analyses comparing service members versus veterans due to their use of aggregate SMV or reservist samples. Thus, findings may under- or overrepresent prevalence for either of these subgroups. As is often the case with studies of military personnel, men were overrepresented. Nonetheless, this mirrors the demographic composition of the military broadly and is externally valid.

Over half (26/42, 61.9%) of included studies reported some funding source supporting the specific research study and/or authors. Though samples were restricted to military personnel, sources of financial support varied. Nonetheless, most (21/26, 80.8%) reported at least some support from the Department of Veterans Affairs, Department of Defense, or a similar country-specific military source. While many SMVs are receptive to Department of Defense and Department of Veterans Affairs resources, making it a valuable source of research participants, others may experience barriers or concerns about seeking services in these settings and consequently be less likely to participate in affiliated research (A. B. Fox et al., 2015). Thus, future efforts exploring NSSI among SMVs would benefit from support by other funding sources (e.g., the National Institute of Mental Health).

Another limitation is the absence of a formal risk of bias assessment. While study quality ratings incorporated factors known to impact risk of bias (e.g., whether a study sample was representative of the population of interest), a separate standardized risk of bias assessment is recommended for future studies examining the prevalence of NSSI in SMVs. Specifically, consideration of how studies selected cohorts (e.g., self-selection vs. targeted recruitment), use of validated measures to identify NSSI, and procedures to handle missing data should be emphasized.

Although NSSI has become an important construct of interest among civilian populations, especially adolescents and young adults, similar efforts to comprehensively study NSSI are still in their infancy among military populations. Consequently, more granular comparisons and exploration of other important factors is beyond the scope of the present study. However, as research efforts grow and more data become available, there are several important directions for future research. These include exploring the relationship between NSSI prevalence and NSSI onset (especially in relation to the timing of military service), the functions of NSSI, NSSI methods used, and mental health condition comorbidities. Furthermore, efforts to understand NSSI features that encourage disclosure and treatment seeking would be especially beneficial to SMVs who may be especially wary of mental health interventions.

Conclusions

Results of this systematic review and meta-analysis establish NSSI as a significant concern among SMVs with an average lifetime prevalence of 15.76%. Rates of NSSI were comparable among active-duty service members and veterans and not moderated by age, gender, race, country, study research focus, or quality of research methods. Only study sample type, NSSI assessment method, publication year, and sample size significantly moderated prevalence rates, such that rates were higher in clinical versus community samples, when assessed with a clinical interview versus self-report or chart review, in more recent publications, and in smaller samples. Findings highlight the need for more systematic assessment of NSSI, ideally with clinical interviews, across all military service settings. Integration of NSSI assessment may be particularly important in settings with high rates of mental health comorbidities.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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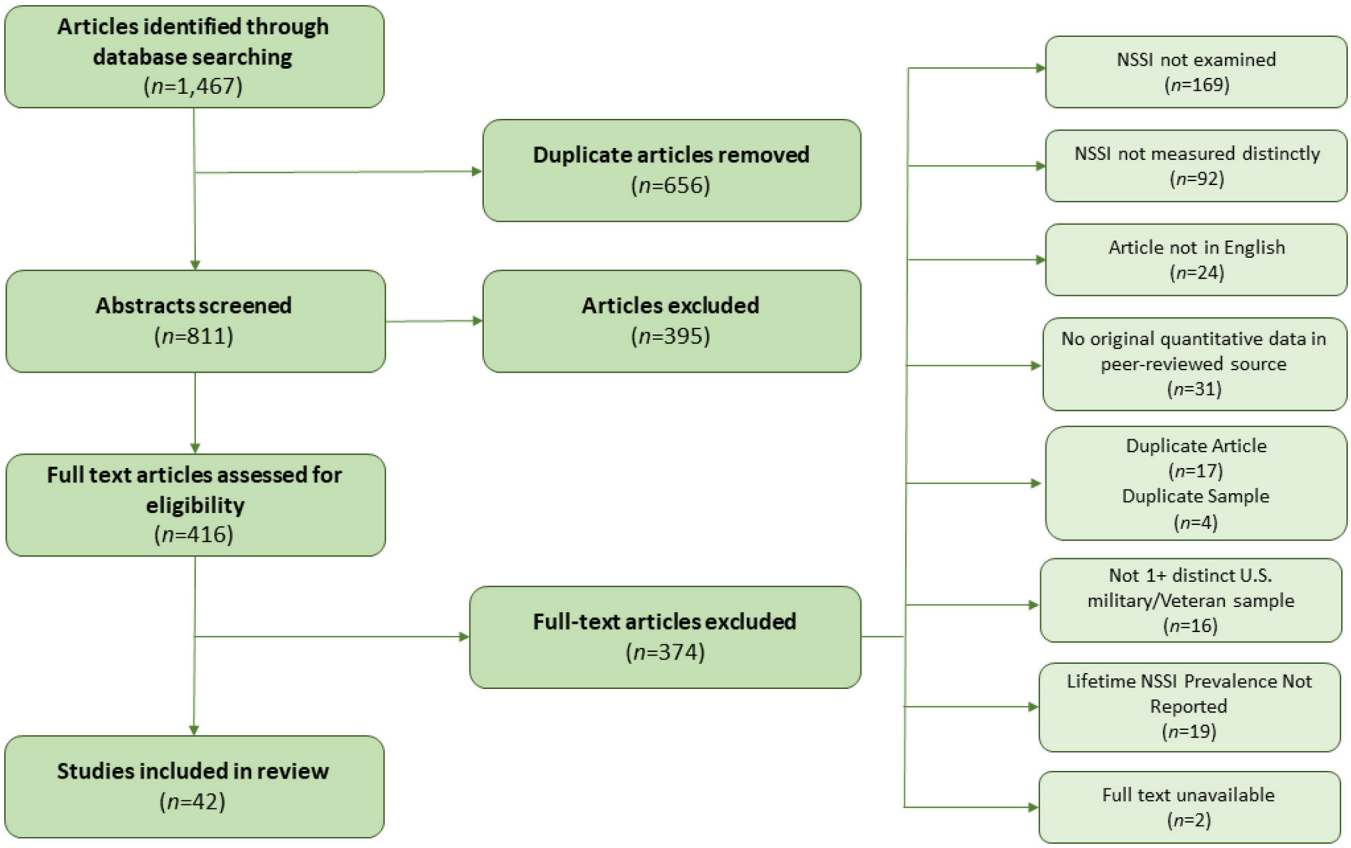

Figure 1.
PRISMA Flow Diagram detailing included and excluded papers at each study stage.

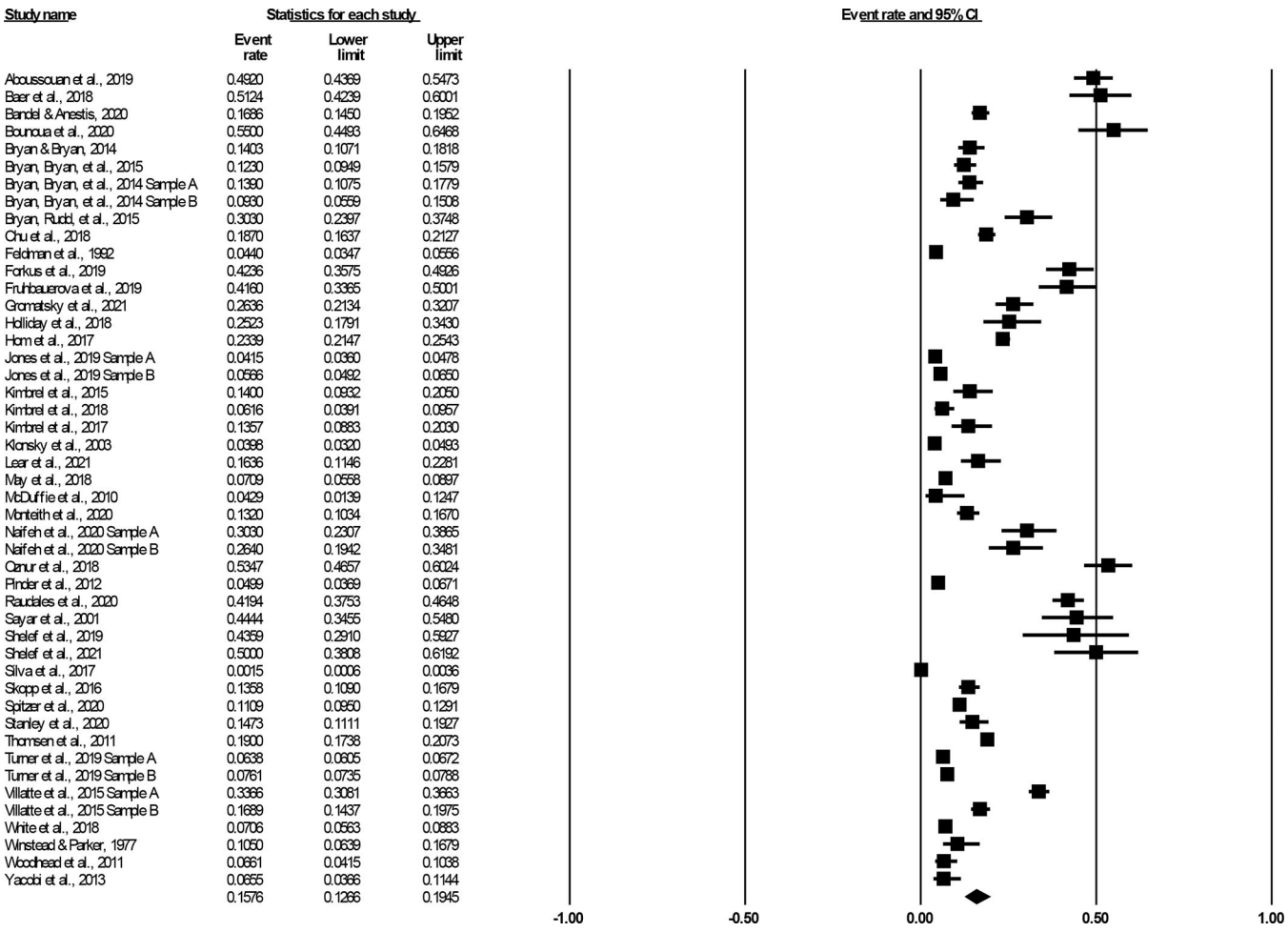

Figure 2.

Forest plot of lifetime NSSI prevalence rates (event rate) and 95% confidence intervals for the included studies.

Table 1.

Study Characteristics – Demographics

Study Name	*N*	Country[a]	Funding Source[b]	Military Status[c]	Male (%)	White (%)	Age (*M*)	Sample type[d]	Lifetime Prevalence
Aboussouan et al. (2019)	313	U.S.A.	Unfunded	Veteran	84.35	74.76	49.01	Community	49.20
Baer et al. (2018)	121	U.S.A.	VA/DoD/Military	SMV	69.42	66.94	29.80	Clinical	51.24
Bandel & Anestis (2020) [f]	858	U.S.A.	VA/DoD/Military	Active Duty	100.0	67.20	26.82	Community	16.86
Bounoua et al. (2020)	95	U.S.A.	-	Veteran	87.40	76.00	41.51	-	55.00
Bryan & Bryan (2014)	335	U.S.A.	-	SMV	70.00	82.30	36.67	Community	14.03
Bryan et al. (2015a)	422	U.S.A.	-	SMV	69.70	82.50	36.29	Community	12.30
Bryan et al. (2014) [e]	374	U.S.A.	-	SMV	71.70	82.10	36.76	Community	13.90
Bryan et al. (2014) [e]	151	U.S.A.	-	Active Duty	64.40	66.90	34.98	Clinical	9.30
Bryan et al. (2015b)	176	U.S.A.	VA/DoD/Military	Active Duty	86.90	71.00	27.53	Clinical	30.30
Chu et al. (2018)	973	U.S.A.	VA/DoD/Military	SMV	78.80	63.80	29.94	-	18.70
Feldman & Feldman (1992)	1,510	U.S.A.	-	Veteran	-	-	48.33	Clinical	4.40
Forkus et al. (2019)	203	U.S.A.	NIH/NIMH	Veteran	77.30	70.40	35.08	Community	42.36
Fruhbauerova et al. (2021)	137	U.S.A.	VA/DoD/Military	Active Duty	83.20	51.10	26.80	Clinical	41.60
Gromatsky et al. (2021)	258	U.S.A.	VA/DoD/Military	Veteran	70.93	18.99	40.79	Clinical	26.36
Holliday et al. (2018)	107	U.S.A.	-	Veteran	39.25	60.74	48.18	Community	25.23
Hom et al. (2017)	1,753	U.S.A.	VA/DoD/Military	SMV	81.50	64.80	33.44	-	23.39
Jones et al. (2019)[e,g]	4,454	U.K.	VA/DoD/Military	Active Duty	-	-	-	Community	4.15
Jones et al. (2019)[e,g]	3,319	U.K.	VA/DoD/Military	Veteran	-	-	-	Community	5.66
Kimbrel et al. (2015)	151	U.S.A.	VA/DoD/Military	Veteran	93.00	67.00	40.00	Community	14.00
Kimbrel et al. (2018)	292	U.S.A.	VA/DoD/Military	Veteran	67.47	56.85	38.70	Community	6.16
Kimbrel et al. (2017)	140	U.S.A.	VA/DoD/Military	Veteran	100.0	68.00	40.20	Community	13.57
Klonsky et al. (2003)	1,986	U.S.A.	NIH/NIMH	Active Duty	62.00	65.00	20.00	Community	3.98
Lear et al. (2021)	165	U.S.A.	VA/DoD/Military	Veteran	88.48	67.88	42.90	Community	16.36
May et al. (2018)	889	U.S.A.	Other	Reservist	84.36	83.80	-	Community	7.09
McDuffie & Brown (2010)	70	U.S.A.	-	SMV	91.43	85.71	48.00	-	4.29
Monteith et al. (2020)	439	U.S.A.	VA/DoD/Military	Veteran	0.00	73.66	55.60	Community	13.20
Naifeh et al. (2020)[e]	132	U.S.A.	VA/DoD/Military	Active Duty	84.09	65.91	-	Clinical	30.30

Study Name	*N*	Country[a]	Funding Source[b]	Military Status[c]	Male (%)	White (%)	Age (*M*)	Sample type[d]	Lifetime Prevalence
Naifeh et al. (2020)[e]	125	U.S.A.	VA/DoD/Military	Active Duty	88.80	65.60	-	Community	26.40
Oznur et al. (2018)	202	Turkey	-	Active Duty	100.0	-	22.96	Clinical	53.47
Pinder et al. (2012)	821	U.K.	VA/DoD/Military	Active Duty	87.70	-	39.16	Community	4.99
Raudales et al. (2020)	465	U.S.A.	NIH/NIMH	Veteran	71.40	69.46	38.00	Community	41.94
Sayar & Ebrinc (2001)	90	Turkey	-	Active Duty	100.0	-	21.96	Clinical	44.44
Shelef et al. (2019)	39	Israel	Unfunded	Active Duty	58.97	-	19.00	Clinical	43.59
Shelef et al. (2021)	65	Israel	VA/DoD/Military	Active Duty	61.54	-	20.40	Clinical	50.00
Silva et al. (2017)	3,428	U.S.A.	VA/DoD/Military	Active Duty	90.50	64.70	29.92	Community	0.15
Skopp et al. (2016)	523	U.S.A.	-	Active Duty	89.48	63.10	-	-	13.58
Spitzer et al. (2020)	1307	U.S.A.	-	Veteran	49.04	78.42	40.66	Clinical	11.09
Stanley et al. (2020)	292	U.S.A.	VA/DoD/Military	Active Duty	68.49	78.08	28.67	Community	14.73
Thomsen et al. (2011)	2116	U.S.A.	VA/DoD/Military	Active Duty	92.00	-	24.09	Community	19.00
Turner et al. (2019) [e]	20,369	U.S.A.	NIH/NIMH	Active Duty	88.15	-	-	Community	6.38
Turner et al. (2019) [e]	38,507	U.S.A.	NIH/NIMH	Active Duty	81.66	-	-	Community	7.61
Villatte et al. (2015) [e]	1,013	U.S.A.	VA/DoD/Military	Active Duty	73.25	71.67	-	Clinical	33.66
Villatte et al. (2015) [e]	746	U.S.A.	VA/DoD/Military	Veteran	88.47	66.49	-	Clinical	16.89
White et al. (2018)	997	U.S.A.	-	Reservist	82.50	87.20	-	Community	7.06
Winstead & Parker (1977)	139	Germany	-	Active Duty	-	51.00	21.20	-	10.50
Woodhead et al. (2011)	257	U.K.	VA/DoD/Military	Veteran	81.71	95.33	-	Community	6.61
Yacobi et al. (2013)	168	Israel	Unfunded	Active Duty	59.52	-	19.70	-	6.55

Note: Raw data was used instead of weighted estimates when both were provided (e.g., Pinder et al., 2012; White et al., 2018).

[a] U.S.A. = United States of America. U.K. = United Kingdom.

[b] Source of funding listed for study and/or author. "VA/DoD/Military" indicates funding was listed as either the Department of Veterans Affairs, Department of Defense, or other similar military agency of the country. "NIH/NIMH" indicates funding was listed as either the National Institute of Health and/or National Institute of Mental Health. "-" indicates data is unavailable for this study.

[c] SMV = active-duty service members and veterans comprised study sample. "-" indicates data is unavailable for this study.

[d] Categorized by participants drawn from clinical (inpatient and outpatient mental health settings) versus community (online, school, broad hospital sources not specific to mental health clinics) settings. "-" indicates data is unavailable, participants were drawn from inpatient and outpatient settings, or from other settings (e.g., prison).

[e] Provided prevalence estimates for two different samples.

[f] Demographics provided and analyses of this article were limited to male veterans, therefore lifetime NSSI prevalence rate was limited to the male subsample.

[g] Study phases were not independent of one another; therefore, prevalence rates were used from the most recent study phase.

Table 2.

Study Characteristics – Methodological

Study Name	Anonymous	Research Focus	NSSI Operational Rating	1+ NSSI Methods Assessed	NSSI Measure(s)[b]	NSSI Measure Format
Aboussouan et al. (2019)	No	NSSI	Very good	No	Study-Generated	Self-Report
Baer et al. (2018)	No	NSSI	Very good	No	C-SSRS	Interview
Bandel & Anestis (2020)	No	NSSI	Very good	Yes	DSHI	Self-Report
Bounoua et al. (2020)	No	Suicide	Very good	Yes	ISAS; STS; RISQ	Self-Report
Bryan and Bryan (2014)	Yes	NSSI	Very good	Yes	SITBI	Self-Report
Bryan et al. (2015a)	Yes	NSSI	Very good	-	SITBI	Self-Report
Bryan et al. (2014) [a]	Yes	Suicide	Very good	-	SITBI	Self-Report
Bryan et al. (2014) [a]	Yes	Suicide	Very good	-	SITBI	Self-Report
Bryan et al. (2015b)	No	NSSI	Very good	-	SASII	Interview
Chu et al. (2018)	No	NSSI	Very good	No	Item from SITBI	Self-Report
Feldman & Feldman (1992)	No	NSSI	Adequate	-	N/A	Chart Review
Forkus et al. (2019)	Yes	Other	Very good	Yes	DSHI	Self-Report
Fruhbauerova et al. (2021)	No	NSSI	Very good	Yes	SASI-C	Interview
Gromatsky et al. (2021)	No	Suicide	Very good	No	C-SSRS	Interview
Holliday et al. (2018)	No	NSSI	Very good	Yes	SITBI	Interview
Hom et al. (2017)	No	Suicide	Very good	No	Item from SITBI	Self-Report
Jones et al. (2019) [a]	No	NSSI	Adequate	No	Item from CIS-R	Self-Report
Jones et al. (2019) [a]	No	NSSI	Adequate	No	Item from CIS-R	Self-Report
Kimbrel et al. (2015)	No	NSSI	Very good	Yes	DSHI	Self-Report
Kimbrel et al. (2018)	No	NSSI	Very good	No	C-SSRS	Interview
Kimbrel et al. (2017)	No	NSSI	Very good	Yes	DSHI	Self-Report
Klonsky et al. (2003)	No	NSSI	Adequate	No	SNAP	Self-Report
Lear et al. (2021)	No	NSSI	Very good	Yes	SASII	Interview
May et al. (2018)	Yes	NSSI	Very good	Yes	SITBI	Self-Report
McDuffie & Brown (2010)	No	NSSI	Poor	-	Study-generated	Interview
Monteith et al. (2020)	Yes	NSSI	Very good	No	SITBI (“Abbreviated”)	Self-Report
Naifeh et al. (2020)[a]	No	NSSI	Very good	No	C-SSRS	Self-Report

Study Name	Anonymous	Research Focus	NSSI Operational Rating	1+ NSSI Methods Assessed	NSSI Measure(s)[b]	NSSI Measure Format
Naifeh et al. (2020)[a]	No	NSSI	Very good	No	C-SSRS	Self-Report
Oznur et al. (2018)	No	NSSI	Adequate	No	Study-generated	Interview
Pinder et al. (2012)	No	NSSI	Adequate	No	Study-generated	Interview
Raudales et al. (2020)	No	NSSI	Very good	Yes	DSHI	Self-Report
Sayar & Ebrinc (2001)	No	Other	Poor	-	-	Self-Report
Shelef et al. (2019)	No	Suicide	Adequate	No	C-SSRS	Interview
Shelef et al. (2021)	No	Suicide	Adequate	No	SHBQ	Interview
Silva et al. (2017)	No	Suicide	Adequate	No	-	Self-Report
Skopp et al. (2016)	No	Suicide	Poor	No	N/A	Chart Review
Spitzer et al. (2020)	No	NSSI	Very good	Yes	SITBI	Interview
Stanley et al. (2020)	No	Suicide	Very good	Yes	SITBI-SF	Self-Report
Thomsen et al. (2011)	No	NSSI	Adequate	No	Study-generated	Self-Report
Turner et al. (2019) [a]	No	NSSI	Very good	No	Study-generated	Self-Report
Turner et al. (2019) [a]	No	NSSI	Very good	No	Study-generated	Self-Report
Villatte et al. (2015) [a]	No	NSSI	Adequate	-	SASI-C; SHBQ	Interview
Villatte et al. (2015) [a]	No	NSSI	Adequate	-	SASI-C; SHBQ	Interview
White et al. (2018)	Yes	Suicide	Adequate	-	-	Self-Report
Winstead & Parker (1977)	No	NSSI	Poor	-	16PF	Self-Report
Woodhead et al. (2011)	No	NSSI	Adequate	No	-	Self-Report
Yacobi et al. (2013)	No	Suicide	Adequate	No	-	Self-Report

Note: "-" indicates data is unavailable for this study.

[a] Provided prevalence estimates for two different samples.

[b] 16PF = Sixteen Personality Factor Questionnaire "Self-mutilation" items. CIS-R=Clinical Interview Schedule Revised Form (NSSI was based on item from the deliberate self harm component of the measure). C-SSRS=Columbia-Suicide Severity Rating Scale. DSHI=Deliberate Self Harm Inventory. ISAS=Inventory of Statements About Self-Injury. RISQ=Risky, Impulsive, and Self-Destructive Behavior Questionnaire. SASI-C= Suicide Attempt Self-Injury - Count. SASII=Linehan Suicide Attempt Self Injury Interview. SHBQ = Self-Harm Behavior Questionnaire. SITBI=Self-Injurious Thoughts and Behaviors Interview (SF=Short-Form version). SNAP=Self-Harm Subscale of the Schedule for Nonadaptive and Adaptive Personality. STS=Sheehan Suicidality Tracking Scale. N/A indicates NSSI was assessed using a study-specific approach (i.e., not a standardized measure).

Table 3.

Key Findings.

• This PRISMA-compliant systematic review and meta-analysis identified 47 samples across 42 studies that reported lifetime NSSI prevalence rates in SMVs.
• A wide range of lifetime prevalence rates were observed between 0.15% and 55% with an average rate of 15.76% across all SMV samples.
• Prevalence rates were comparable between veterans and active-duty service members.
• Average prevalence rates were higher in smaller samples, newer publications, clinical versus community samples, and studies using interviews versus self-report or chart review methods.
• Prevalence rates were not moderated by age, gender, race, or country.
• Prevalence rates were also not moderated by primary research focus, quality of NSSI operationalization, anonymity of data collection, or if NSSI methods were assessed.
• NSSI is a pervasive problem among military personnel, especially in clinical settings.

Note: NSSI = Nonsuicidal self-injury. SMV = Service members and veterans.

Table 4.

Implications for Practice, Policy, and Research.

• Prioritize routine screening for NSSI among SMVs, especially in clinical settings.
• Increase access to psychoeducation and treatment for NSSI.
• Consider the use of interviews, when feasible, to assess NSSI history in patients and research participants to improve NSSI detection.
• Develop NSSI assessment instruments specific to SMVs to improve the availability and accuracy of prevalence estimates.As more literature becomes available, consider onset of NSSI in relation to military service, NSSI functions and methods, and the relationship between NSSI and other mental health constructs (e.g., PTSD).

Note: NSSI = Nonsuicidal self-injury. SMV = Service members and veterans.