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Mental Health Help Seeking Among Traumatized Individuals: A Systematic Review of Studies Assessing the Role of Substance Use and Abuse

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Abstract

Objective—Prior research has suggested that competing neurobehavioral decision-making processes might affect health outcomes among traumatized populations. Regulatory imbalances to impulsive and executive decision systems are affected by high levels of stress, including stress resulting from traumatic events. Such regulatory imbalances have been associated with addictive behaviors. However, it is not well known whether addictive behavior increases or decreases the likelihood of utilization of behavioral health services among traumatized populations. The aim of this study is to systematically review mental health utilization studies targeting traumatized populations to determine the direction of association between substance use and behavioral health utilization.

Method—Databases of literature were searched in a systematic manner, and 37 relevant studies were recovered and analyzed.

Findings—Out of the 37 relevant studies that included addictive behaviors as a predictor of utilization, 16 showed a positive significant relationship and 6 showed a negative significant relationship. Studies showing a negative significant relationship used younger samples with more recent trauma exposure.

Conclusions—Studies have shown that for the most part, substance abuse increases the likelihood of utilization, except among younger populations with more recent trauma. Longitudinal studies that assess how utilization evolves over time among traumatized populations and interacts with posttraumatic stress disorder (PTSD) and substance abuse severity are necessary to better understand how decision-making processes of traumatized individuals may increase the likelihood of chronic PTSD.

Keywords

mental health utilization; systematic review; substance use; trauma

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Approximately 61% of men and 51% of women are exposed to a traumatic event at least once during their lifetimes (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Meanwhile, a number of empirically supported treatments are available for traumatized populations (Kearns, Ressler, Zatzick, & Rothbaum, 2012); however, only around 49% actually access treatment (Wang et al., 2005). Some scholars have suggested that areas of the brain that control executive activities may be exhausted by the stress of traumatic events, which can lead to problems with decision making, irritability, impulsivity, and apathy (Manuck, Flory, Muldoon, & Ferrell, 2014). This might explain why many traumatized individuals either do not seek mental health services, delay services for long periods of time, or engage in high levels of substance use and abuse during mental health service utilization (Stewart, Pihl, Conrad, & Dougier, 1998).

Recent studies have shown that cognitive-behavioral interventions administered within 9 months of exposure may provide a window of opportunity that can prevent the development of chronic posttraumatic stress disorder (PTSD; Kearns et al., 2012). Such interventions are effective because they reduce pathological anxiety by activating fear memory and providing corrective information. However, studies have also suggested that when individuals engage in addictive behaviors after exposure to trauma, they will *discount* at much higher rates (i.e., assign greater value to short-term rewards even if long-term rewards are substantially larger) and thus will be more likely to delay behaviors that could require some effort to improve long-term rewards (such as help seeking; MacKillop et al., 2011). In addition, addictive behavior can increase anxiety and arousal and reduce traumatized individuals' ability to manage emotions or process traumatic material (Kaysen et al., 2011; Stewart et al., 1998). Therefore, it is necessary to better understand the role of substance use, abuse, and dependence when it comes to behavioral health care utilization among traumatized populations. In this study, we conduct a systematic review of studies of help seeking by traumatized populations to better understand whether substance use, abuse, and dependence increase or decrease the likelihood of behavioral health care utilization and follow-up.

Studies of behavioral health utilization commonly use some variation of Andersen's (1995) help seeking model. This model is commonly used to conceptualize factors leading to behavioral healthcare utilization and includes individual or predisposing factors (e.g., demographics, attitudes), need characteristics (e.g., perceived need or health status), and structured factors or enabling characteristics (e.g., ability to pay, availability of providers). Substance use and dependence is typically regarded as a need variable in these studies (Gelberg, Anderson, & Leake, 2000). This is likely because substance use co-occurs with a variety of different mental health disorders.

However, research related to the relationship between substance use and the development of PTSD has suggested alternative explanations for understanding behavioral health utilization (Jacobsen, Southwick, & Kosten, 2001). Although studies generally show high levels of comorbidity between PTSD and substance use, they also show that there are different pathways leading to both PTSD and substance use. The first pathway starts with substance abuse and ends later in PTSD. This pattern has been observed mostly among users of illicit substances, such as cocaine, because they repeatedly place themselves in dangerous situations (Brady, Dansky, Sonne, & Saladen, 1998). Chronic substance abuse also can lead to higher levels of

arousal, anxiety, and sensitization of neurobiological stress symptoms (Piazza & Aiozerate, 2002), which can also increase risk for PTSD. In the second pathway, PTSD precedes substance abuse. This pathway is often explained using the *self-medication hypothesis*, which states that individuals use substances as a way to treat symptoms of mental disorders (Khantzian, 1997). Studies have shown that traumatized individuals have used alcohol, cannabis, opioids, and benzodiazepine to both deal with traumatic experiences and to alleviate symptoms of PTSD (Carter & Capone, 2011). These traumatized individuals report that the escalation of substance abuse and PTSD were entwined (Jacobsen et al., 2001). As these individuals attempt to withdraw from substance use, physiological arousal prompts them to relapse back into patterns of self-medication.

Increased use of substances has also been explained by what have been referred to as competing neurobehavioral decision systems (i.e., competing regions of the brain that control decision making; Bickel, Jarmolowicz, Mueller, Gatchalian, & McClure, 2012). These regions can become dysregulated by stressors like trauma. When these regions are dysregulated, individuals have lowered capacity to inhibit impulses and thus are more likely to discount more readily. Thus, when given a choice between addictive substances (which will make them feel good in the short term) and mental health utilization (which will make them feel good in the long term), they are more likely to choose the former, especially when the trauma stressor is more recent.

Studies show that the second pathway to PTSD is much more common (i.e. PTSD leads to higher substance use; Jacobsen et al., 2001; Carter & Capone, 2011), and thus models of help seeking that incorporate aspects of behavioral economics, such as the health belief model (which examines how individuals calculate costs vs. benefits of help seeking; Wolinsky, 2014) and the culturally specific choice-making model (which examines the effect of alternative [or substitute] treatments on the utilization of mainstream treatments; Young, 1981), may help fill this gap. However, it still remains poorly understood whether traumatized individuals are choosing substance use over utilization or if substance use motivates utilization. It is also unclear how recency of trauma exposure could affect substance use and utilization patterns. The aim of this review is to identify whether, and under what circumstances, individuals choose substance use over utilization or whether, and under what circumstances, substance use motivates utilization.

Methods

Search Strategy

A four-step search strategy was used to obtain peer-reviewed papers. First, we searched databases (Academic Search Premier, Article First, JSTOR, Project Muse, Scopus, Web of Science, Psycinfo, Cinahl, Social Science Research Network, Socindex, Applied Social Sciences Index and Abstract, Social Work Abstracts, Social Service Abstracts, International Bibliography of Social Sciences, Academic Search Complete, PubMed, PILOTS, and Psychiatry Online) using the following keywords: “help seeking,” “utilization,” “Post Traumatic Stress Disorder” or “PTSD,” “trauma,” “violence,” “victim,” “crime,” “combat,” “rape,” and “war.” In addition, when available, we also filtered for “behavioral health” or “mental health.” Review studies were located through database searches and were also

reviewed to identify articles that may have been missed through electronic databases (Brewin, Andrews, & Valentine, 2000; Gavrilovic, Schutzwohl, Fazel, & Priebe, 2005; Gourash, 1978; McCart, Smith, & Sawyer, 2011; Norris, Kaniasty, & Scheer, 1990; Sabrina & Tindale, 2008; Selkirk, Quayle, & Rothwell, 2014; Suffoletta-Maierle, Grubaugh, Magruder, Monnier, & Frueh, 2003; Ullman, 2007). As Figure 1 shows, after removing duplicate studies, we analyzed abstracts of all studies identified and excluded papers that did not satisfy the first tier of our search criteria (whether studies specifically examined help seeking behavior or utilized traumatized populations). Third, we analyzed the full-text versions of all remaining studies, excluding those that (a) did not provide a specific measure of mental health service utilization, attitudes, or perceived barriers to utilization; (b) did not either provide a measure predicting utilization or the association between utilization and other variables; (c) contained no substance use measure or contained a substance use measure that was either unclear or that was not used to predict help seeking; and (d) had an unclear stratification of the traumatized population. Out of 592 articles identified through search databases and review studies as potentially relevant, 283 were given full-text reviews, 37 of which fulfilled inclusion criteria.

Results

Overall, 20 studies showed a positive relationship between substance use and utilization, 11 studies showed a negative relationship between substance use and utilization, and 6 studies showed mixed results. Twenty-two of the 37 studies showed a statistically significant relationship between substance use and utilization.

All but three studies used U.S. populations. In total, the 37 studies employed 922,196 participants, and an average of 57% per study utilized mental health services (4 studies did not provide prevalence rates of utilization), whereas 29% per study reported some type of substance use issue (including hazardous alcohol use, substance abuse, and substance dependence; 8 studies did not provide prevalence rates on substance use problems). The majority of studies utilized male populations (87% overall; 63% per study). Of the 29 studies utilizing military populations, 904,147 participants experienced possible combat (approximately 88% of this group was male overall).¹ There were 162,200 participants in the five studies on natural disaster and war (89% male overall) and 10,295 participants in the five studies on female physical/sexual assault victims (including domestic and sexual violence). One remaining study, which used a more general trauma history screen, included 100 participants who were recently incarcerated.

Recruitment Methods and Study Designs

About half ($n = 18$) of the studies relied on a clinical sample supplied by the Veterans Administration (VA). These studies either utilized a survey which was administered during intake at a VA service provider ($n=7$) or utilized Veteran Health Administration (VHA) patient registries ($n=11$). The rest used a mixture of random sampling methodology ($n = 12$),

¹There is likely overlap among observations in VA administrative data. However, the extent of overlap is unknown because studies accessed VA data from differing regions and populations. This number represents the total number of participants stated by these studies.

administrative rosters or registration lists ($n = 3$), and convenience samples ($n = 4$). For studies using random sampling methodologies or administrative rosters, response rates varied from 27% to 77% (mean 55%). Studies utilizing randomized designs generally involved about 60% military and 40% civilian populations and included the following methods to improve external validity: use of stratified probability sampling by geographic location, demographics, military characteristics, etc. ($n=5$); random digit dialing or random selection from an administrative roster ($n=5$); face-to-face interviews ($n=2$); and sampling weights ($n=7$). Studies utilizing administrative rosters only included military populations. These studies examined differences between responders and nonresponders when random sampling was not used. Differences were found between these groups in terms of age and level of education. Studies utilizing convenience samples typically recruited participants via flyer, newspaper ads and via staff. Twenty-three of the 38 studies utilized cross-sectional designs and the rest utilized longitudinal designs occurring over 6 months or more. In all cases where a longitudinal design was utilized, researchers accessed patient registries via the VA.

Measure of Mental Health Utilization

The majority of studies focused on whether individuals utilized mental health services (25 studies). Mental health services included professional and nonprofessional mental health services offered by community-based providers (including religious organizations), hospitals, and military providers (VA, Department of Defense). Other studies focused on treatment engagement ($n = 4$), treatment preference ($n = 1$), treatment delay ($n = 2$), perceived need for services ($n = 2$), and barriers to care (including unmet need and stigma; $n = 3$).

Measure of Substance Use

Studies typically either measured substance abuse as a whole or alcohol use, with two studies excepted: one that focused on drug abuse and alcoholism (Owens, Rogers, & Whitesell, 2011) and the other that used *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV*; American Psychiatric Association, 2000) measures of substance abuse and binge drinking (Amstadter, McCauley, Ruggiero, Resnick, & Kilpatrick, 2008). Otherwise, studies varied significantly when it came to measures of substance use. Because so many studies utilized VA data, the most commonly used measure was a VA administrative ICD code that essentially combines all levels of substance use problems into one category (11 studies). A *DSM-IV* measure of substance abuse or dependence (5 studies) and the Cut down, Annoyed, Guilty, and Eye-opener (CAGE) score (to identify alcoholism in six studies; Kitchens, 1994) were the next most commonly used measures, followed by the Alcohol Use Disorders Identification Test (AUDIT), (4 studies; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001), then measures of increased drinking ($n = 4$) and other types of measures Addiction Severity Index (ASI), Short Michigan Alcohol Screening Test (SMAST), Drug Abuse Screening Test (DAST), and (ASI, SMAST, DAST, and the World Mental Health Composite International Diagnostic Interview (WMH-CIDI), $n = 5$). No study differentiated between individuals according to trajectories of use, abuse, and dependence. As expected, clinical samples did, however, have a slightly higher prevalence of substance use issues (31%, using either International Classification of Diseases ICD code or CAGE

score, compared to 27%, using a variety of measures, including increased drinking) in convenience, random, and roster samples.

Length of Time of Traumatization

About half of the studies ($n = 13$) either did not assess the amount of time in which the person was traumatized (e.g., used a lifetime measure) or utilized a sample where time of trauma exposure could not be determined. For some populations, the start of events (e.g., the conflicts in Iraq and Afghanistan) did provide information about the timing of traumatization, as studies were typically conducted within 5 years of the start of conflicts in Iraq and Afghanistan. Studies of Vietnam veterans took place 8 or more years after the Vietnam War (1975). Studies using natural disaster/exposure, such as 9/11 or hurricane exposure, typically took place within 3 years of the event. Although rates of utilization were similar regardless of recency of trauma, prevalence rates of substance use issues were slightly lower for those with more recent trauma (within past 5 years; 25%) than for those with less recent trauma (lifetime measure or more than 5 years ago; 31%).

Statistics

Twenty-two of the studies shown in Table 1 (in order by sample size) identified substance abuse as significantly associated with treatment seeking. We also include studies that do not show significant findings to give the reader a more balanced picture of the evidence. Studies applied bivariate, multivariate, or both methods to determine the relationship between substance use issues and help seeking.

Positive versus negative versus mixed associations between substances use issues and help seeking—Of the 37 studies, 20 studies showed a positive relationship, 11 studies showed a negative relationship, and 6 studies showed mixed results. All but one of the studies showing a negative relationship between substance use and help seeking, utilized populations who had been traumatized within the past 5 years (7 of which experienced trauma recently or within the past year). Meanwhile, only 8 of the 20 studies showing a positive relationship utilized participants with trauma exposure within the past 5 years (see Table 2). Studies showed similar use of either substance or alcohol use disorders and virtually equal prevalence of males and females; and substance use issues (when these data were available). Studies also equally depended on clinical data, regardless of positive or negative relationship among studies reporting this item. Among samples who potentially were exposed to combat, 13 studies showed a positive relationship, 7 studies showed a negative relationship and 5 studies showed a mixed relationship. Four of the 6 studies focused on disaster, war and political violence showed a negative relationship (the remaining 2 showed a positive relationship). All studies of sexual violence (100% female samples) showed a positive relationship between substance use and mental health utilization. Random sampling was also used equally, regardless of negative or positive relationship. However, studies showing a negative relationship were slightly more likely to use younger samples (median age = 33 years vs. 44 years) and more likely to use bivariate statistical methods (54% vs. 30%), have a lower median sample size (median = 1,040 vs. 1,345), and have a lower average response rate (52% vs. 58%).

Studies showing mixed results are described in Table 3. Studies in this category typically showed that substance use increased the likelihood of utilization in some areas (such as the number of mental health visits) but not in others (such as treatment completion; DeViva, 2014; Harpaz-Rotem & Rosenheck, 2011). There were also differences depending on how substance use was measured (Ford, Adams, & Dailey, 2006), and sometimes differences between those engaging in substance use and those not were just too small to be considered either positive or negative (e.g., when $p < .95$). The qualitative study by Gibbs, Rae Olmsted, Brown, and Clinton-Sherrod (2011) was also considered under this category because there was no way of definitively assessing how alcohol use affected mental health utilization. However, the study did show how alcohol was used during early stages of trauma; that is, when members of the military have trouble accessing care (most often because of waiting lists and stigma), they substitute with use of alcohol. When alcohol use reaches a certain level of severity, these members often are forced into treatment, which thereby increases utilization rates.

Findings from subgroups of studies with statistically significant results—

Twenty-two out of the 37 studies showed a significant relationship between substance use issues and help seeking. Almost three times as many studies ($n = 16$ of 37) showed a positive significant relationship than a negative significant relationship ($n = 6$ of 37). However, studies showing a negative significant relationship were more likely to utilize samples with more recent trauma (within the past 5 years) than studies showing a positive significant relationship. Although studies showing negative results relied on younger samples (median age = 33 years vs. 44 years), studies showing a positive significant relationship showed higher rates of mental health service utilization (59% vs. 29%). Rates of substance use issues and use of substance use measures (alcohol vs. substance as a group) as well as use of clinical versus other types of samples were the same or similar regardless of direction of association. Median sample size was also slightly higher among studies showing a negative significant relationship (median = 4,320 vs. 1,696), as was average response rate (66% vs. 56%).

Discussion

The search yielded only 37 studies (out of a total of 283 where either utilization or other measures of mental health services utilization or utilization propensity were assessed), which would suggest that there is enough evidence is available to establish rigorous conclusions on the role of substance use in help seeking among traumatized populations. However, several methodological problems, including stratification by group, by time and type of trauma, different measurements of substance use, differences in substance use severity by population, and low response rates among nonclinical populations, made it difficult to compare findings from different studies. Furthermore, many studies utilized clinical samples that may have contained more severely symptomatic participants than general populations. Those studies utilizing clinical samples were the only studies to track mental health utilization over time. Nevertheless, some interesting inferences about the role of substance use on help seeking may be drawn from this review.

It appears that, for the most part, substance use issues increase the likelihood that traumatized populations will utilize mental health services, will not delay mental health services, and will feel that they have more of a need for mental health services. However, it appears that this can depend heavily on the age of the sample, the gender of the sample and the type of trauma endured and the time in which trauma occurs: Recently traumatized males (of all trauma types) and females experiencing trauma that is not interpersonal seem to be less likely to utilize services (or delay service use or have more negative attitudes about service utilization) if they are engaging in a higher level of substance use. Meanwhile, both females who experience interpersonal trauma and individuals who experienced trauma after the 5-year threshold appear to be more likely to utilize mental health services if they also have a substance use issue. Studies examining the onset of PTSD and drug use outcomes have also shown conflicting findings likely because of different measures of drug use (e.g., drug use vs. drug abuse/dependence), differences in age (e.g., early adulthood vs. late adulthood; Chilcoat & Breslau, 1998), differences in types and amount of trauma exposure (Tolin & Foa, 2006) and gender differences (Olf, et al., 2007).

Becker and Murphy's (1988) theory of rational addiction may help explain these findings. According to this model, limited resources, such as time, emotional energy, and money, are governed by individual choice processes where individuals seek to maximize lifetime utility function (a function measuring future well-being). Individuals are rational in that they consider future effects of current consumption. Younger populations may have less experience with the consequences of substance use and also do not have the knowledge about whether they have a tendency to develop a substance use problem (Leigh, 2002). Women, on the other hand, might be more likely to experience consequences of substance use after a short period of time (See Greenfield et al., 2007) while individuals in the military might be encouraged to use alcohol to cope with the stresses of combat and PTSD as part of military culture (See Ames & Cunradi, 2004). A type of *contrasting effect* may occur under these circumstances (i.e., traumatized individuals' perceptions and judgments of behavioral health services or substances are based on earlier experiences; Simonsohn, 2006).

Taking into account the preferences of traumatized "consumers" of mental health services from a menu of other commodities available to improve their well-being under differing constraints would significantly improve prevention efforts. These preferences may include preference for substance use over mental health utilization. Some of the constraints may be more obvious, such as those posed on military populations, for example, military culture, accessibility of alcohol, and systematic barriers such as waiting lists (Ames & Cunradi, 2004). Under the current VA system, the majority of resources are allocated to individuals with severe problems (through service-connected disability status; Department of Veteran Affairs, 2013), which might create enough constraints to influence decision-making processes of traumatized veterans. Among civilian populations, mental health resources are also disproportionately consumed by those with severe mental health problems via emergency department use and hospitalization (Culhane & Metraux, 2008).

More systematic resources need to be available to support increased early utilization besides just traditional social norms campaigns. Behavioral economic approaches such as working memory training (training to improve individual decision-making processes by improving

the ability to manipulate accurate representations of the contextual environment to achieve current goals) and episodic future thinking (training that teaches individuals to project representations of self into plausible future scenarios), along with already existing motivational interviewing techniques, may be useful approaches during this short window. These approaches are cost effective and help improve individuals' ability to make better long term decisions and decrease substance use (Bickel, Quisenberry, Moody, & Wilson, 2014).

Studies by Frahm et al. (2013) and Rosenheck and Fontana (2003) also showed how traumatic events can trigger help seeking among individuals with past-trauma exposure, except when those individuals have ongoing substance use problems. For such individuals, easily accessible mutual aid self-help groups need to be made available over long periods of time so that they can engage them easily as they move through different periods of increased and decreased risk. Such interventions should also focus on clients' post-treatment environment and how this environment can trigger substance abuse (Vuchinich & Heather, 2003). The challenge is therefore how to make services more appealing and accessible when traumatized individuals have just experienced trauma. Although a large number of studies have examined traumatized consumers' attitudes about treatment, one limitation of these studies is that they do not assess attitudes of trauma services among populations who were actively engaging in addictive behaviors.

This study is one of a few that systematically reviews the role of trauma and addictive behavior on behavioral health care utilization. The study is limited, however, for several reasons. First, our findings, drawn heavily from U.S. military and veteran samples, may not be generalizable to nonmilitary traumatized populations or individuals outside the United States. Studies utilizing military populations were often longitudinal but also relied heavily on VA patient registries, which typically contain patients with higher levels of mental illness and comorbidity than community samples, because the VA prioritizes veterans who have been injured through combat-related activities (Department of Veteran Affairs, 2013). Thus, substance use more likely reflects need in these populations, according to Anderson's model, because substance abuse typically is correlated with severe mental illness (Jacobson, et al., 2001). These individuals are also overwhelmingly male and have access to very different service delivery systems and types of services than civilian females who are more likely to experience sexual or domestic violence (Tolin & Foa, 2006). Many of the studies that relied on random samples, also, had low response rates (average 55%), which might have also biased results. Studies utilizing surveys also rarely showed whether there were differences between responders and nonresponders and when they did, significant differences were found in gender and education, factors that are highly correlated with help seeking (Gavrilovic, et al., 2005). Third, studies were also limited when it came to measurement, that is, they did not distinguish present substance use from past substance abuse or dependence. This made it difficult to make clear conclusions about the role of present substance use on utilization. Last, we cannot definitively conclude that a negative association between substance use and mental health utilization necessarily implies impulsive decision making; additional tests that assess whether individuals discount delayed benefits when they have been exposed to recent trauma are needed to make more solid conclusions.

Future studies using longitudinal models with large nationally representative samples that contain a diverse mix of traumatized populations as well as precise information about current substance use patterns, impulsivity, and likelihood of discounting long-term health outcomes are necessary to confirm the role of substance use, abuse, and dependence in behavioral health care utilization patterns. Such studies have the potential to apply behavioral economic principles to service utilization and therefore more effectively define and clarify how addiction changes at various points of contact with service providers.

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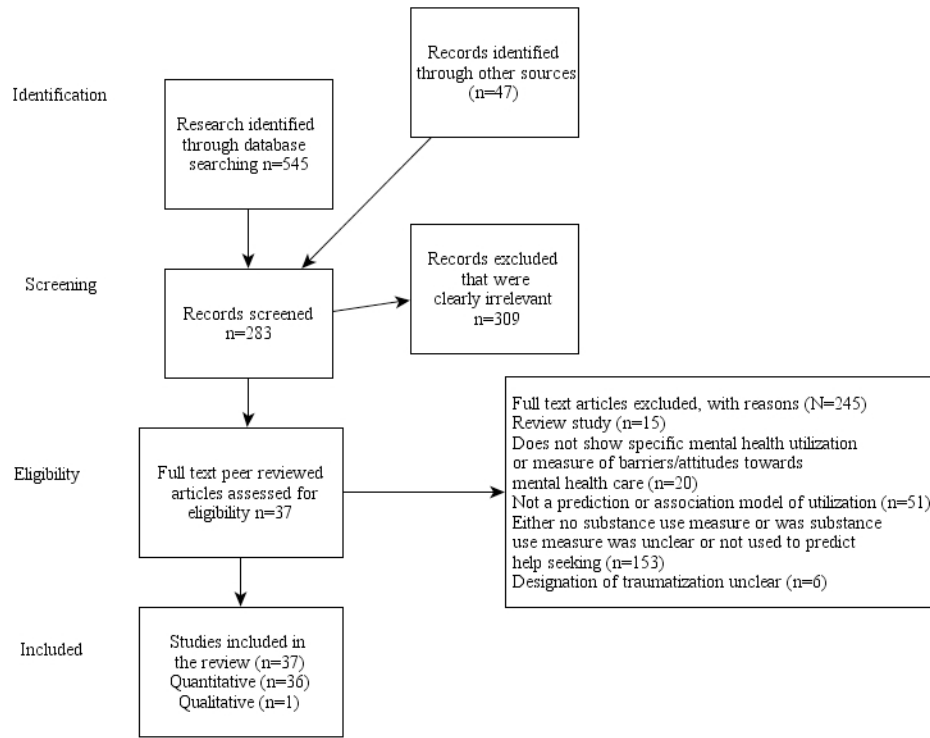


Figure 1. Search approach

Table 1
Studies That Met Inclusion Criteria (n = 37) and Whether Substance Use Had a Positive or Negative Relationship With Mental Health Utilization, Engagement, or Attitudes

Study name	Sample size	% Male	Trauma type	Recruitment	Prevalence help seeking ^b	Relationship ^a
Maguen et al. (2012)	314,717	88%	Combat	Clinical	86%	P
Rotem and Rosenheck (2011)	204,184	93%	Combat	Clinical	88%	M
Frahm et al. (2013)	153,511	92%	Disaster/war	Clinical	NA	N
Hundt et al. (2014)	130,331	88%	Combat	Clinical	100%	P
Cherneck et al. (2008)	41,412	91%	Combat	Clinical	75%	P
Ilgem et al. (2012)	16,892	97%	Combat	Clinical	100%	P
Iversen et al. (2011)	10,272	NA	Combat	Clinical	NA	N
Sareen et al. (2010)	8,441	85%	Combat	Random	23%	P
Lipsky and Caetano (2007)	7,924	0%	Domestic violence	Random	19%	N
Ford et al. (2006)	4,640	47%	Disaster/war	Random	32%	M
Rosenheck and Fontana (2003)	4,000	NA	Disaster/war	Clinical	36%	N
Washington et al. (2013)	3,598	0%	Combat	Random	49%	M
Elbogen et al. (2013)	2,937	67%	Combat	Random	26%	N
Tsan et al. (2012)	2,470	86%	Combat	Clinical	42%	P
Boscarino et al. (2004)	2,368	47%	Disaster/war	Random	12%	P
Hoff and Rosenheck (1998)	2,348	69%	Combat	Random	63%	P
Kulka et al. (1990)	2,330	69%	Combat	Random	63%	P
Fortuna et al. (2008)	1,630	52%	Political violence	Random	29%	P
Hankin et al. (1999)	1,061	100%	Combat	Clinical	68%	P
DiLeone et al. (2013)	1,040	49%	Combat	Roster	56%	N
Lu et al. (2011)	869	89%	Combat	Clinical	100%	P
Starzynski et al. (2007)	780	0%	Sexual violence	Clinical	53%	N
Naragon-Gainey et al. (2012)	618	91%	Combat	Clinical	100%	N
Amstadter et al. (2008)	556	0%	Sexual violence	Random	60%	P
Bosworth et al. (2000)	526	0%	Sexual violence	Clinical	60%	P
Erbes et al. (2007)	521	86%	Combat	Clinical	62%	N
Decker et al. (2013)	509	0%	Sexual violence	Clinical	NA	P

Study name	Sample size	% Male	Trauma type	Recruitment	Prevalence help seeking ^b	Relationship ^a
Wenzel et al. (1995)	429	100%	Combat	<i>Clinical</i>	37%	<i>P</i>
Pietrzak et al. (2009)	272	NA	Combat	Roster	26%	N
Wheatlin et al. (2014)	233	89%	<i>Combat</i>	<i>Random</i>	36%	<i>P</i>
De Viva (2014)	200	92%	Combat	Clinical	38%	M
Harpaz-Rotem et al. (2014)	167	96%	Combat	Clinical	100%	P
Erbes et al. (2009)	161	98%	<i>Combat</i>	<i>Clinical</i>	100%	<i>N</i>
Owens et al. (2011)	100	52%	<i>Mixed</i>	<i>Convenience</i>	54%	<i>P</i>
Tucker et al. (2002)	51	69%	<i>Disaster/war</i>	<i>Roster</i>	14%	<i>P</i>
Owens et al. (2009)	50	0%	Combat	Convenience	58%	M
Gibbs et al. (2011)	48	NA	Combat	Convenience	NA	M

Note. Studies are organized in order by sample size. NA = data not available. Italics indicate significant at $p < .05$.

^a Help seeking includes all forms of utilization of formal behavioral health services. Prevalence of 100% indicates that the dependent variable was treatment engagement.

^b P = positive; N = negative; M = mixed/unclear.

Table 2
Qualities of the Studies Showing Positive and Negative Relationships Between Substance Use and Measures of Mental Health Utilization (n=31)

	Positive relationship shown	Negative relationship shown
Studies	Maguen et al. (2012); Hundt et al. (2014); Chermack et al. (2008); Ilgen et al. (2012); Sareen et al. (2010); Tsan et al. (2012); Hoff et al. (1998); Kulka et al. (1990); Hanken et al. (1999); Lu et al. (2011); Amstadter et al. (2008); Bosworth et al. (2006); Decker et al. (2013); Wenzel et al. (1995); Whealin et al. (2014); Owens et al. (2010); Tucker et al. (2010); Rotem et al. (2014); Boscarino et al. (2004); Fortuna et al. (2008)	Frahm et al. (2013); Iverson et al. (2011); Lipsky and Caetano (2007); Rosenheck and Fontana (2003); Elbogen et al. (2013); Erbes et al. (2009); Pietzak et al. (2009); DiLeone et al. (2013); Starzinsky et al. (2007); Gainey et al. (2012); Erbes et al. (2007)
Substance use, <i>n</i>		
ICD code mixed substance abuse/dependence	8	3
DSM criteria: abuse	1	
DSM criteria: dependence/CAGE	5	3
AUDIT/increased drinking	2	4
Other measure (CIDI, Assist, alcohol to intoxication)	4	1
Average prevalence substance use/abuse/dependence, ^a %	26	30
Age, ^b years		
Mean	42	35
Median	44	33
Length of time from traumatic event		
Lifetime/ever	9	1
More than 5 years	3	
Within 5 years	8	9

^aMissing: positive, 2; negative, 4.

^bMissing: positive; 2, negative, 2.

Table 3
Studies Showing Mixed Findings in Regard to the Role of Substance Use (n=6)

Study	Type of trauma	Recruitment	Sample size	Details
Rotem et al. (2011)	Combat	Clinical	204,184	Proportional hazard assessing risk of dropping out for an alcohol or drug use disorder in first year is significant at .004 and .001, respectively. However, respondents with alcohol or drug disorders were also significantly more likely to have more mental health visits in the first year after diagnosis.
Ford et al. (2006)	Disaster/war	Random	4,640	Bivariate: Individuals who were current drinkers were significantly less likely to utilize behavioral health services. However, individuals who increased either smoking or drinking were significantly more likely to utilize behavioral health services. Multivariate: Positive relationship (nonsignificant) between current drinker or smoker or increase in alcohol or tobacco use.
Washington et al. (2012)	Combat	Random	3,598	Bivariate difference too slight, $p = .97$.
DeViva et al. (2014)	Combat	Clinical	200	Those with comorbid substance abuse were likely to be seen but less likely to complete treatment; results were nonsignificant.
Owens et al. (2009)	Combat	Convenience	50	Bivariate differences too small; mean SMAST score = 3.12 ($SD = 2.39$) vs. mean SMAST score = 3.05 ($SD = 1.39$).
Gibbs et al. (2011)	Combat	Convenience	48	(Qualitative study) Reported use of "self-medication" after returning from deployment and as a way of coping with general conditions of military life and separation from family and friends. For some participants, alcohol was used as "self-medication" when there were too many barriers to care—wait times, stigma, career problems. However, when alcohol use went out of control, individuals usually were sanctioned by the military and forced to seek treatment.