



The effectiveness of mental health interventions for adult female survivors of sexual assault: A systematic review



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ABSTRACT

Objective: Sexual assault is a common global problem and is associated with poor mental health. Given the high prevalence of sexual assault, it is important to understand which interventions may help survivors. This systematic review examines the effectiveness of mental health interventions for adult female survivors of sexual assault, focusing on 1) methods used to study the interventions; 2) effectiveness of interventions compared to no treatment; and 3) comparative effectiveness of interventions.

Methods: Published scientific literature was searched to identify manuscripts that investigated the effects of mental health interventions on adult female survivors of sexual assault. Articles were included if they: were in English, Spanish, or French; were published between January 1985 and December 2012; evaluated a mental health intervention; implemented the intervention with adult female survivors of sexual assault; evaluated the effectiveness of the intervention on mental health symptoms or diagnoses; and included a comparison group.

Findings: Cognitive-behavioral interventions, exposure interventions, and eye movement desensitization and reprocessing interventions were typically more effective at improving mental health than no treatment. Statistical tests of comparative effectiveness did not demonstrate that one intervention was significantly more effective than another.

Conclusions: Health providers should refer survivors of sexual assault to mental health treatments shown to be effective. Additional research on comparative effectiveness of mental health interventions is warranted.

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1. Introduction

Although specific estimates of sexual assault of adult women vary, it is clear that such violence is a common problem throughout the world

(Black et al., 2011). For example, a nationally representative survey of women in the United States (U.S.) aged 18 and older found that 1% of women reported having been raped in the past 12 months (Black et al., 2011). A representative survey of adult women in South Africa found that 2% of women reported attempted or completed rape in the past 12 months (Jewkes & Abrahams, 2002), while a study of women in Botswana and Swaziland estimated that 5% of women reported having experienced forced sex in the past 12 months (Tsai et al., 2011).

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Intimate partners are one of the most common perpetrators of sexual assault (Jewkes, Sen, & Garcia-Moreno, 2002). The World Health Organization (WHO) Multi-Country Study on Women's Health and Domestic Violence found annual prevalence estimates of intimate partner sexual assault ranging from 1% to 44% among ever-partnered women in 10 countries (Garcia-Moreno et al., 2006). A nationally representative survey of women aged 18 and older in the U.S. found that 0.6% of women reported rape by an intimate partner in the past 12 months (Black et al., 2011). Such annual prevalence estimates translate into even larger percentages of women sexually assaulted throughout their lives.

Sexual assault by individuals who are not intimate partners (e.g., acquaintances, friends, strangers) is also prevalent across countries. A WHO study estimated the global lifetime prevalence of sexual violence by non-partners as being 7%, ranging from 3% in South Asia to 21% in central sub-Saharan Africa (World Health Organization, 2013a). A review of studies from Latin America and the Caribbean found that 7% to 26% of women surveyed reported having ever experienced sexual violence from a non-intimate partner (Ellsberg, 2005).

Virtually all female sexual assault survivors experience negative psychological symptoms immediately after the assault, with some continuing to experience these symptoms for years (Dancu, Riggs, Hearst-Ikeda, Shoyer, & Foa, 1996; Kimerling & Calhoun, 1994). Problems include post-traumatic stress disorder (PTSD), depression, substance use disorders, and suicidal ideation and attempts (Bonomi, Anderson, Rivara, & Thompson, 2007; Breitenbecher, 2006; Coker et al., 2002; Dancu et al., 1996; Hankin et al., 1999; Kimerling & Calhoun, 1994; Martin, Macy, & Young, 2011; Ullman, Filipas, Townsend, & Starzynski, 2006; Weaver et al., 2007). A review of studies of adult sexual assault survivors found that between 17% and 65% exhibited symptoms of PTSD, 13% to 51% met the diagnostic criteria for depression, 13% to 49% demonstrated signs of alcohol dependence, and 28% to 61% reported illicit drug use (Campbell, Dworkin, & Cabral, 2009). In addition, sexual assault survivors consistently demonstrate high prevalence of suicidal ideation and attempts (Chan, Straus, Brownridge, Tiwari, & Leung, 2008). A survey of women in family practice clinics in the U.S. estimated that those who reported sexual assault by an intimate partner were four times more likely to have attempted suicide than women who did not report sexual assault (Coker et al., 2002). Given the high prevalence of sexual assault of women and the high burden of suffering it imposes (Lyon, 2002; Perilloux, Duntley, & Buss, 2012), it is important to understand how mental health interventions may improve the emotional well-being of survivors.

Although there is a larger body of research on the effectiveness of mental health interventions for trauma victims in general (including persons who experienced motor vehicle accidents, physical violence, etc.), information is needed that focuses exclusively on adult female survivors of sexual assault since they appear to be at heightened risk of poor mental health, in comparison to other types of trauma survivors. For example, a nationally representative survey of more than 10,000 individuals in six European countries found that among those who experienced at least one potentially traumatizing event (including combat experience, having a child with a serious illness, having been stalked, etc.), those who had been raped had more than three times the odds of meeting the diagnostic criteria for PTSD compared to those who had not been raped, after controlling for sex of the individual (Darves-Bornoz et al., 2008). Moreover, research suggests that survivors of adult (and childhood) sexual assault may have more severe and longer lasting symptomatology than other victims of crime (Gilboa-Schechtman & Foa, 2001; Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993). As such, the current review is limited to the effectiveness of mental health interventions for adult survivors of sexual assault. Given that

females comprise the overwhelming majority of sexual assault survivors, this review focuses exclusively on female survivors of sexual assault.

This systematic review seeks to address an important gap in the literature by examining research on the effectiveness of mental health interventions exclusively among adult female survivors of sexual assault, a review initiated during development of the WHO's *Responding to intimate partner violence and sexual violence against women: WHO clinical and policy guidelines* (World Health Organization, 2013b). More specifically, this review seeks to: 1) examine the characteristics and methods of studies that investigated the effectiveness of mental health interventions among adult female survivors of sexual assault; 2) summarize intervention effectiveness on improving mental health symptoms or diagnoses, compared to no treatment; and 3) summarize comparative effectiveness of interventions on improving mental health symptoms or diagnoses.

2. Methods

A systematic search was conducted to identify manuscripts that investigated the effects of mental health interventions on adult female survivors of sexual assault. Databases searched included CINAHL, Embase, PsychInfo and PubMed/MEDLINE. Search terms included: rape, sexual assault, sexual violence, counseling, therapy, and psychotherapy. Reference sections of publications were reviewed to identify other relevant manuscripts.

Articles were reviewed if they: were written in English, Spanish, or French; were published between January 1985 and December 2012; evaluated psychological or mental health interventions; implemented the intervention with adult female survivors of sexual assault; evaluated the effectiveness of the intervention on mental health symptoms or diagnoses; and included a comparison group. Excluded were studies that: focused exclusively on survivors of childhood sexual abuse; or did not include a comparison group.

Two reviewers abstracted information from eligible articles regarding the study including: authors; year of publication; interventions compared; study design; sample, including size; setting; interventions compared; outcome assessments and instruments; time points assessed; number and length of sessions; style of delivery; and results. In addition, two reviewers independently assessed aspects of study quality using the Downs and Black Checklist for Measuring Study Quality (Downs & Black, 1998). For each article, five elements of study quality were examined, including: reporting, external validity, internal validity-bias, internal validity-confounding, and power. Subscale scores were assigned for each of these five elements of study quality. An overall study quality score was created by summing the subscale scores.

3. Results

Fig. 1 shows that 13,661 articles were initially identified by the computerized searches, and that 8,866 remained after duplicates were removed. Screening these articles to see if they were appropriate for this review resulted in most (8,837) being excluded. The 29 remaining articles were examined by reading the full texts. Twenty of these articles were excluded because they did not meet all of our inclusion criteria. Nine articles met all inclusion criteria and are included in this review.

Table 1 presents information on the nine articles that met the study inclusion criteria (Anderson et al., 2010; Echeburúa et al., 1996; Foa et al., 1991; Resick & Schnicke, 1992; Resick et al., 1988, 2002, 2012; Rothbaum, 1997; Rothbaum et al., 2005).

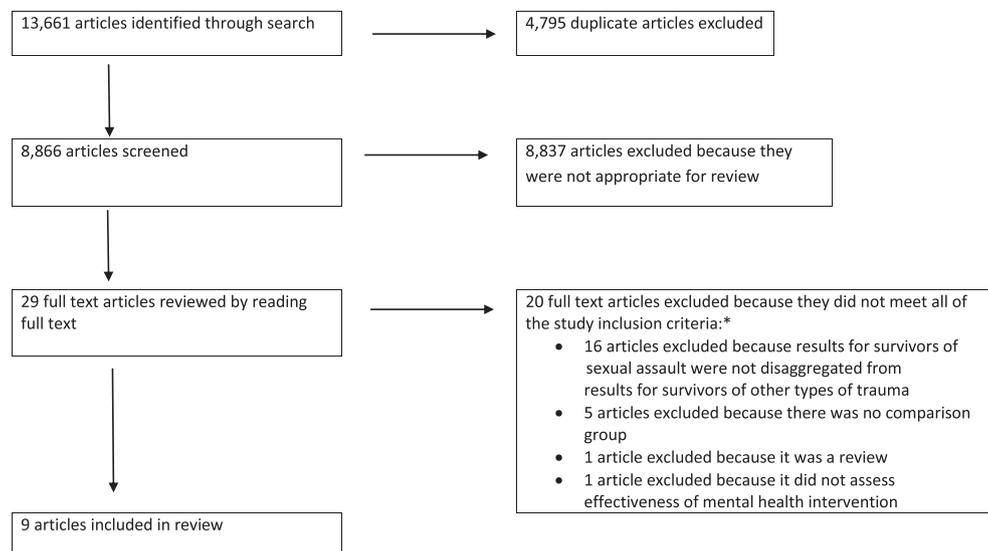


Fig. 1. Literature search results. *Articles could be excluded for more than 1 reason.

3.1. Characteristics and methods of the studies

The nine studies investigated ten interventions: Assertion Training, Clinician Assisted Emotional Disclosure, Cognitive Processing Therapy, Cognitive Restructuring and Specific Coping Skills Training, Eye Movement Desensitization and Reprocessing, Progressive Muscular Relaxation, Prolonged Exposure, Stress Inoculation Therapy, Supportive Counseling, and Supportive Psychotherapy plus Information. Five studies used a wait list control. Seven studies were randomized controlled trials (RCTs). Sample sizes ranged from 20 to 171. Eight studies employed clinic samples. Eight studies were based in the U.S., and one was from Spain. All studies assessed pre- and post-treatment outcomes. One study assessed outcomes six years after the intervention. Interventions ranged from 10 days to 12 weeks, with total treatment time ranging from 2 to 18 hours. Seven studies analyzed interventions delivered individually.

The primary mental health outcomes assessed included PTSD, depression, anxiety, and distress-fear. All studies used multiple, previously validated measures to assess mental health symptoms or diagnoses. All studies assessed PTSD symptoms and/or PTSD symptom severity. Three studies assessed PTSD symptoms and/or PTSD symptom severity with the Impact of Event Scale; two with structured interviews; one with the Clinician-Administered PTSD Scale; one with the PTSD Symptom Scale; and one with the PTSD subscale of the Derogatis Symptom Check List – Revised Scale. Rothbaum et al. (2005) combined scores on three measures (Clinician Administered PTSD Scale, PTSD Symptom Scale – Self-Report, and the Impact of Event Scale – Revised) to create a composite total symptom score to assess PTSD symptom frequency and intensity and a symptom cluster score to assess PTSD intrusion, avoidance, and hyperarousal symptoms. However, information on the reliability or validity of the total symptom score or symptom cluster score was not provided.

Six studies (Echeburúa et al., 1996; Foa et al., 1991; Resick et al., 2002, 2012; Rothbaum, 1997; Rothbaum et al., 2005) used measures that assessed PTSD diagnosis. Two studies assessed PTSD diagnosis with structured interviews, three with the Clinician-Administered PTSD Scale, and one with the PTSD Symptom Scale.

Seven studies examined depression. Two studies assessed study participants for a diagnosis of Major Depression Disorder, both using the Mood Disorder Module of the structured clinical

interview for DSM-IV (Resick et al., 2002, 2012). Seven studies used measures that assessed depressive symptoms, five with the Beck Depression Inventory and two with the Depression subscale of the Derogatis Symptom Check List (Echeburúa et al., 1996; Foa et al., 1991; Resick & Schnicke, 1992; Resick et al., 1988, 2002, 2012; Rothbaum, 1997).

Four studies used measures to assess symptoms of anxiety. Three studies used the State-Trait Anxiety Inventory, and one used the Anxiety subscale of the Derogatis Symptom Check List (Echeburúa et al., 1996; Foa et al., 1991; Resick et al., 1988; Rothbaum, 1997).

Five studies used measures to assess symptoms of distress-fear. Two used the Rape Aftermath Symptom Test, two used the distress-fear subscale of the Veronen–Kilpatrick Modified Fear Survey, and one used the Inventory of Interpersonal Problems (Anderson et al., 2010; Echeburúa et al., 1996; Foa et al., 1991; Resick et al., 1988; Rothbaum, 1997).

3.2. Study quality

Table 2 presents information on aspects of the quality of each study assessed via the Downs and Black Checklist for Measuring Study Quality (1998). The reporting quality subscale scores ranged from a low of 5 to a high of 9 across studies, with a mean score over all studies of 7.8. With one exception, all studies scored 0 on the external validity subscale, indicating low levels of external validity. Scores on the internal validity-bias subscale ranged from 3 to 6, with a mean score across all studies of 4.8. Scores on the confounding subscale range from 2 to 5 with a mean score across all papers of 3.8. With one exception, all papers scored 0 on the power subscale, indicating that they either did not report study power or did not have sufficient power. The total quality score of the studies ranged from 13 to 19, with a mean overall score of 16.6.

3.3. Effectiveness of interventions compared to no treatment or minimal attention

Seven articles compared the effectiveness of an active treatment to no treatment or minimal attention (Table 3). The treatments included: Assertion Training, Clinician Assisted Emotional Disclosure, Cognitive Processing Therapy, Eye Movement Desensitization and Reprocessing, Prolonged Exposure, Stress Inoculation Therapy, Supportive Counseling, and Supportive Psychotherapy plus

Table 1
Characteristics and methods of studies.

Authors, year of publication	Interventions compared	Study design	Sample size	Sample	Setting	Outcomes and assessment instruments	Time points assessed	Number and length of sessions	Style of delivery
Anderson et al. (2010)	Clinician Assisted Emotional Disclosure; no treatment	RCT	28	Female university students of an introductory level psychology class who reported experiencing rape at some point in their lifetime and who evidenced current global psychological distress on the outcome questionnaire	University in the Midwestern United States	PTSD: Impact of Event Scale – Revised Distress-fear: Inventory of Interpersonal Problems	Pre-treatment; post-treatment; 1 month follow-up; 3 month follow-up	4 30-minute sessions over 10 days (approximately 2 hours of total treatment)	Individual
Echeburúa et al. (1996)	Cognitive Restructuring and Specific Coping-Skills Training; Progressive Muscular Relaxation	RCT	20	Female adult survivors of attempted or completed rape that occurred 3 or fewer months previously who had a PTSD diagnosis and were seeking treatment.	Clinic settings in San Sebastian, Bilbao, and Vitoria, Spain	PTSD: structured interview; Depression: Beck Depression Inventory Distress-fear: Distress-fear subscale of modified fear survey Anxiety: State-Trait Anxiety Inventory	Pre-treatment; post-treatment; 1 month follow-up; 3 month follow-up; 6 month follow-up; 12 month follow-up	5 1-hour sessions over a 5-week period (approximately 5 h of total treatment)	Individual
Foa et al. (1991)	Stress Inoculation Therapy; Prolonged Exposure; Supportive Counseling; wait list	RCT	55	Female adult survivors of attempted or completed rape (that occurred \geq 3 months prior to study participation) who had a PTSD diagnosis.	Clinic setting in Northeastern United States	PTSD: structured interview Depression: Beck Depression Inventory Distress-fear: Rape Aftermath Symptom Test Anxiety: state anxiety subscale of State-Trait Anxiety Inventory	All four groups were assessed at pre-treatment and post-treatment. The three therapeutic groups were also assessed at 3-month follow-up.	9 bi-weekly 90 minute sessions over 4.5 weeks (approximately 13.5 h of total treatment)	Individual
Resick et al. (1988)	Stress Inoculation Therapy; Assertion Training; Supportive Psychotherapy plus Information; wait list	Non-randomized controlled trial	56	Adult females who were raped at least 3 months prior to entering the study who had rape-related fear and anxiety and who were seeking treatment.	Clinic settings in the United States	PTSD: Impact of Event Scale Depression: Derogatis Symptom Check List Psychoticism: Derogatis Symptom Check List Paranoia: Derogatis Symptom Check List Distress-fear: Veronen–Kilpatrick Modified Fear Survey Anxiety: Derogatis Symptom Check List	Participants in the active therapies were assessed at pre-treatment, post-treatment, 3 month FU and 6 month follow-up. Participants in the wait list group were assessed at pre-treatment and 6 weeks later (to correspond to post-treatment assessment of active therapies).		

Resick and Schnicke (1992)	Cognitive Processing Therapy; wait list	Non-randomized controlled trial	41	Adult female victims of completed rape (in childhood or adulthood \geq 3 months prior to the study) who reported significant PTSD symptoms related to rape and who were seeking mental health treatment.	Clinical treatment setting in the United States	PTSD: Clinician Administered PTSD Scale Depression: Beck Depression Inventory	Both groups were assessed at pre-treatment and post-treatment. The intervention group was also assessed at 3 month and 6 month follow-up.	90-minute weekly sessions for 12 weeks (approximately 18 h of total treatment)	Group
Resick et al. (2002)	Cognitive Processing Therapy; Prolonged Exposure; minimal attention	RCT	171	Adult female victims of completed rape (in childhood or adulthood \geq 3 months prior to the study) with PTSD diagnosis related to rape.	Clinical treatment setting in the United States	PTSD: Clinician Administered PTSD Scale Depression: Beck Depression Inventory	The intervention groups had 4 monitoring periods: pre-treatment, post-treatment, 3 month follow-up and 9 month follow-up. The minimal attention group was assessed pre-treatment and post-treatment.	10 60-minute and 2 90-minute sessions over 6 weeks (approximately 13 h of total treatment)	Individual
Resick et al. (2012)	Cognitive Processing Therapy; Prolonged Exposure	RCT	171	Adult female victims of completed rape (in childhood or adulthood \geq 3 months prior to the study) with PTSD diagnosis related to rape.	Clinical treatment setting in the United States	PTSD: Clinician Administered PTSD Scale; PTSD Symptom Scale Depression: structured clinical interview; Beck Depression Inventory	Pre-treatment; long-term follow-up	1 60-minute and 8-90 minute sessions held over 6 weeks (approximately 13 h of total treatment)	Individual
Rothbaum (1997)	Eye Movement Desensitization and Reprocessing; wait list	RCT	21	Adult female survivors of completed rape (in childhood or adulthood \geq 3 months prior to study participation) who met the criteria for a PTSD diagnosis related to rape.	Clinical treatment setting in the United States	PTSD: PTSD Symptom Scale Distress fear: Rape Aftermath Symptom Test Anxiety: state anxiety subscale of State-Trait Anxiety Inventory Depression: Beck Depression Inventory	Both groups were assessed at pre-treatment and post-treatment. Intervention group was also assessed at 3 month follow-up	4 weekly 90-minute sessions (approximately 6 h of total treatment)	Individual
Rothbaum et al. (2005)	Eye Movement Desensitization and Reprocessing; Prolonged Exposure; wait list	RCT	60	Adult female survivors of attempted or completed rape (in childhood or adulthood \geq 3 months prior to study participation) who met the criteria for a PTSD diagnosis related to rape.	Clinical treatment setting in the United States	PTSD: Clinician Administered PTSD Scale; scores on 3 measures (CAPS, PSS-SR, and IES-R) were combined to create a composite total symptom score and to create cluster symptom scores	The intervention groups had 4 monitoring periods: pre-treatment, post-treatment, 6 month FU and 12 month FU. The wait list group was assessed pre-treatment and post-treatment.	9 90-minute twice-weekly sessions (approximately 13.5 h of total treatment)	Individual

Table 2
Manuscript quality assessed via the Downs and Black Checklist for Measuring Study Quality (1998).

First author, year of publication	Reporting (possible range: 0–11)	External validity (possible range: 0–3)	Internal validity-bias (possible range: 0–7)	Internal validity-confounding (possible range: 0–6)	Power (possible range: 0–1)	Total score (possible range: 0–28)
Overall mean	7.78	0.14	4.78	3.78	0.11	16.56
Anderson et al. (2010)	5	0	4	4	0	13
Echeburúa et al. (1996)	9	1	3	4	0	17
Foa et al. (1991)	9	0	6	4	0	19
Resick et al. (1988)	7	0	5	2	0	14
Resick and Schnicke (1992)	8	0	4	2	0	14
Resick et al. (2002)	9	0	5	5	0	19
Resick et al. (2012)	7	0	5	5	1	18
Rothbaum (1997)	8	0	5	5	0	18
Rothbaum et al. (2005)	8	0	6	3	0	17

Note: Quality scores were assigned using the approach of Downs and Black (1998), with a modified power subscale that included 2 possible scores. For all subscale scores and the total score, higher scores indicate greater quality.

Information. All articles reported outcomes of PTSD diagnosis, symptoms, and/or symptom severity. Seven articles reported outcomes of depression diagnosis or symptoms.

One study compared Clinician Assisted Emotional Disclosure (CAED) (Anderson, Keefe, Lumley, Elliott, & Carson, 2001) to no treatment (Anderson et al., 2010). The CAED treatment model

Table 3
Effectiveness of interventions compared to no treatment or minimal attention.

Interventions compared	Authors, year of publication	Outcomes assessed			
		PTSD	Depression	Anxiety	Distress-fear
Assertion Training vs. wait list condition	Resick et al. (1988)	Statistically significant change in treatment group only in avoidance and intrusion symptoms.	Statistically significant change in treatment group only.	Statistically significant change in treatment group only in anxiety and phobic anxiety.	Statistically significant change in treatment group only in vulnerability, sexuality and social and evaluation subscales.
Clinician-Assisted Emotional Disclosure vs. no treatment	Anderson et al. (2010)	Statistically significant difference between two groups in avoidance symptoms. No difference between groups in intrusion or hyperarousal symptoms.	Not assessed	Not assessed	Statistically significant difference between two groups.
Cognitive Processing Therapy vs. minimal attention or wait list condition	Resick and Schnicke (1992)	Statistically significant change in treatment group only in symptom severity.	Statistically significant change in treatment group only in symptom severity.	Not assessed	Not assessed
	Resick et al. (2002)	Statistically significant change in treatment group only in symptom severity and % with PTSD diagnosis	Statistically significant difference between two groups at follow-up.	Not assessed	Not assessed.
Eye Movement Desensitization and Reprocessing vs. wait list condition	Rothbaum (1997)	Greater reduction in treatment group in % with PTSD diagnosis. Statistically significant difference between groups at follow-up in PTSD symptoms and symptom severity	Statistically significant difference between groups at follow-up.	No statistically significant difference between groups at follow-up.	No statistically significant difference between groups at follow-up.
	Rothbaum et al. (2005)	Statistically significant difference between groups at follow-up in % with PTSD diagnosis, total symptom score, and symptom cluster scores.	Not assessed	Not assessed	Not assessed
Prolonged Exposure vs. minimal attention or wait list condition	Foa et al. (1991)	Statistically significant difference between groups at follow-up in % with PTSD diagnosis. Statistically significant change in both groups in symptom severity.	Statistically significant change in both groups.	Statistically significant change in both groups.	Statistically significant change in both groups.
	Resick et al. (2002)	Statistically significant change in treatment group only in symptom severity and % with PTSD diagnosis.	Statistically significant change in treatment group only	Not assessed	Not assessed
	Rothbaum et al. (2005)	Statistically significant difference between groups in % with PTSD diagnosis, in total symptom scores and symptom cluster scores	Not assessed	Not assessed	Not assessed
Stress Inoculation Training vs. wait list condition	Foa et al. (1991)	Statistically significant difference between two groups in % with PTSD diagnosis, % with clinically significant improvement in PTSD, and PTSD symptom severity.	Statistically significant change over time in both groups.	Statistically significant change over time in both groups	Statistically significant change over time in both groups
	Resick et al. (1988)	Statistically significant change in treatment group only in avoidance and intrusion symptoms	Statistically significant change in treatment group only	Statistically significant change in treatment group only in anxiety and phobic anxiety.	Statistically significant change in treatment group only in vulnerability, sexuality and social and evaluation subscales.
Supportive Counseling vs. wait list condition	Foa et al. (1991)	Statistically significant change in both groups in PTSD symptom severity.	Statistically significant change in both groups	Statistically significant change in both groups	Statistically significant change in both groups
Supportive Psychotherapy Plus Information vs. wait list condition	Resick et al. (1988)	Statistically significant change in treatment group only in avoidance and intrusion symptoms.	Statistically significant change in treatment group only.	Statistically significant change in treatment group only anxiety and phobic anxiety	Statistically significant change in treatment group only in vulnerability, sexuality, and social and evaluation symptoms.

integrates emotion focused therapy (EFT) and emotional disclosure (Anderson et al., 2001). In this study, two EFT modules were adapted to focus on disclosure of sexual trauma narratives and emotional focusing and processing of sexual trauma (Anderson et al., 2010). Those receiving CAED scored significantly lower in PTSD avoidance and reported significantly fewer distress-fear problems. There were no statistically significant differences in PTSD intrusion or hyperarousal symptoms.

Two studies examined the effectiveness of Stress Inoculation Therapy compared to a wait list (Foa et al., 1991; Resick et al., 1988). Stress Inoculation Therapy (SIT) is a cognitive-behavioral treatment designed to enhance one's ability to prepare for and respond to stressful events (Veronen & Kilpatrick, 1983). The SIT intervention involved instruction in muscle relaxation, controlled breathing, thought-stopping, cognitive restructuring, guided self-dialogue, covert modeling and role playing. Foa and colleagues found that the SIT group experienced a significantly greater reduction in the percentage of patients who maintained a PTSD diagnosis and in PTSD symptom severity compared to the control group (Foa et al., 1991). There were statistically significant differences between groups in the percentage of patients with clinically significant levels of PTSD symptom severity improvement. Both groups showed significant improvement in depressive symptoms, anxiety and distress-fear with no significant difference between groups (Foa et al., 1991). Similarly, Resick and colleagues found that the SIT group evidenced statistically significant improvement in PTSD avoidance and intrusion symptoms while the control group showed no statistically significant improvement on these assessments (Resick et al., 1988). However, Resick and colleagues found that anxiety and fear-distress symptoms decreased significantly in the SIT group, while no statistically significant changes were observed in the control group (Resick et al., 1988).

One study examined the effectiveness of Assertion Training (AT) (Lange & Jakubowski, 1976) compared to a wait list condition (Resick et al., 1988). The AT intervention included an explanation of how assertive responses can reduce fear and avoidance. Rational Emotive Therapy principles and social support in the context of assertion and nonassertion were discussed, and role-play and feedback were used to practice assertive responses (Resick et al., 1988). The AT group showed statistically significant improvement in PTSD avoidance and intrusion, anxiety, and fear-distress; the control group showed no statistically significant improvement in these areas (Resick et al., 1988).

Two studies examined the effectiveness of Cognitive Processing Therapy (CPT) (Resick & Schnicke, 1992; Resick et al., 2002). This intervention includes education about PTSD symptoms, exposure, and cognitive therapy (Resick & Schnicke, 1993). The CPT group experienced significantly greater reduction in PTSD symptom severity and improvement in depression symptoms, and was significantly less likely to maintain a PTSD diagnosis, compared to the control group (Resick & Schnicke, 1992).

Three studies assessed the effectiveness of Prolonged Exposure Therapy to minimal attention or wait list (Foa et al., 1991; Resick et al., 2002; Rothbaum et al., 2005). Prolonged Exposure (PE) Therapy involves education, breathing retraining, and behavioral and imaginal exposures (Foa, Hearst, Dancu, Hembree, & Jaycox, 1994). The PE group was significantly less likely to maintain a PTSD diagnosis and showed significantly greater reductions in PTSD symptom frequency and intensity and PTSD intrusion, avoidance, and hyperarousal symptoms compared to the control group (Foa et al., 1991; Resick et al., 2002; Rothbaum et al., 2005). One study found that those who received PE evidenced significantly greater reductions in PTSD symptom severity compared to the control group (Resick et al., 2002), while another found that both PE and control groups demonstrated significant reductions in PTSD symptom severity and improvement in distress-fear and anxiety, with no significant

difference between groups (Foa et al., 1991). Similarly, one study (Foa et al., 1991) found that both groups showed significant improvement in depressive symptoms, with no significant differences between groups, while another study (Resick et al., 2002) found a statistically significant difference in the level of depressive symptoms between groups post-treatment.

Two studies assessed the effectiveness of Eye Movement Desensitization and Reprocessing (EMDR) compared to wait list (Rothbaum, 1997; Rothbaum et al., 2005). In EMDR, one imagines a traumatic scene, focusing on anxiety sensations and rehearsing negative thoughts while following the therapist's finger moving back and forth (Pitman et al., 1993). Rothbaum found that at post-treatment, 10% of those that received EMDR maintained a PTSD diagnosis compared to 88% of the control group (Rothbaum, 1997). Those who received EMDR showed statistically significantly greater improvement in PTSD and depressive symptoms and PTSD symptom severity compared to the control group. No significant differences between groups were found in improvement of anxiety or distress-fear symptoms (Rothbaum, 1997). Rothbaum and colleagues found that 25% of those that received EMDR maintained a PTSD diagnosis, compared to 90% of the control group (Rothbaum et al., 2005). Those who received EMDR had greater improvement in PTSD symptom frequency and intensity and in PTSD intrusion, avoidance, and hyperarousal symptoms compared to the control group (Rothbaum et al., 2005).

One study examined the effectiveness of Supportive Counseling compared to wait list (Foa et al., 1991). The Supportive Counseling (SC) intervention involved teaching general problem-solving techniques (Foa et al., 1991). At post-treatment, 90% of the SC group and 100% of the control group maintained a PTSD diagnosis. Both groups showed significant improvement in PTSD symptom severity, depressive, anxiety and distress-fear symptoms, with no significant differences between groups (Foa et al., 1991).

One study examined the effectiveness of Supportive Psychotherapy plus Information (SP) compared to wait list (Resick et al., 1988). This intervention involved group discussions to normalize the participants' reactions to sexual assault and provide support (Resick et al., 1988). Those who received SP demonstrated statistically significant reductions in PTSD avoidance and intrusion symptoms, as well as anxiety and distress-fear symptoms (Resick et al., 1988). The control group evidenced no significant reductions in these symptoms.

3.4. Comparative effectiveness of interventions

Table 4 shows that six studies examined the comparative effectiveness of nine interventions (Assertion Training, Cognitive Processing Therapy, Cognitive Restructuring and Specific Coping Skills Training, Eye Movement Desensitization and Reprocessing, Progressive Muscular Relaxation, Prolonged Exposure, Stress Inoculation Therapy, Supportive Counseling, and Supportive Psychotherapy plus Information).

Echeburúa and colleagues compared the effectiveness of Cognitive Restructuring and Specific Coping Skills Training to Progressive Muscular Relaxation (Echeburúa et al., 1996). The Cognitive Restructuring and Specific Coping Skills Training intervention involved explaining normal reactions to sexual assault, modifying negative thoughts, Progressive Muscular Relaxation, cognitive distractions and exposure (Bernstein & Borkovec, 1973; Foa, Steketee, & Rothbaum, 1989). The Progressive Muscular Relaxation intervention involved instruction in techniques to systematically relax the muscles throughout the body. No statistically significant difference between groups in the percentage of participants with a PTSD diagnosis at 12-month follow-up was observed. PTSD symptom severity scores were significantly lower in the Cognitive Restructuring and Specific Coping Skills Training group compared to the Progressive Muscular Relaxation group. Symptoms of depression, anxiety and

Table 4
Comparative effectiveness of interventions.

Interventions compared	Authors, year of publication	Outcomes assessed			
		PTSD	Depression	Anxiety	Distress-fear
Stress Inoculation Training vs. Assertion Training	Resick et al. (1988)	Statistically significant change over time in both groups in avoidance and intrusion symptoms with no difference between groups.	No statistically significant change over time in either group.	Statistically significant change over time in both groups in anxiety and phobic anxiety with no difference between groups.	Statistically significant change over time in both groups in vulnerability and sexuality symptoms. No statistically significant change in either group in social and evaluation symptoms.
Stress Inoculation Training vs. Prolonged Exposure therapy	Foa et al. (1991)	Statistically significant change over time in both groups in PTSD symptom severity.	No difference between groups.	No difference between groups.	No difference between groups.
Stress Inoculation Training vs. Supportive Counseling	Foa et al. (1991)	Statistically significant change over time in both groups in PTSD symptom severity. Greater % with clinically significant improvement in PTSD in SIT group.	No difference between groups.	No difference between groups.	No difference between groups.
Stress Inoculation Training vs. Supportive Psychotherapy Plus Information	Resick et al. (1988)	Statistically significant change over time in both groups in avoidance and intrusion symptoms with no difference between groups.	No statistically significant change over time in either group.	Statistically significant change over time in both groups in anxiety and phobic anxiety with no difference between groups.	Statistically significant change over time in both groups in vulnerability and sexuality symptoms with no difference between groups. No statistically significant change in either group in social and evaluation symptoms.
Prolonged Exposure vs. Cognitive Processing Therapy	Resick et al. (2002)	Statistically significant change over time in both groups in PTSD symptoms, PTSD symptom severity and % with PTSD diagnosis.	Statistically significant change over time in both groups in depressive symptoms.	Not assessed	Not assessed
	Resick et al. (2012)	Statistically significant change over time in both groups in PTSD symptoms, PTSD symptom severity and % with PTSD diagnosis.	Statistically significant change over time in both groups in depressive symptoms and % with MDD diagnosis.	Not assessed	Not assessed
Prolonged Exposure vs. Supportive Counseling	Foa et al. (1991)	Statistically significant change over time in both groups in PTSD symptom severity.	Statistically significant change over time in both groups.	Statistically significant change over time in both groups.	Statistically significant change over time in both groups.
Prolonged Exposure vs. EMDR	Rothbaum et al. (2005)	Statistically significant change over time in both groups, with no significant difference between groups.	Not assessed	Not assessed	Not assessed
Assertion Training vs. Supportive Psychotherapy plus Information	Resick et al. (1988)	Statistically significant change over time in both groups in avoidance and intrusion symptoms with no difference between groups.	No statistically significant change over time in either group.	Statistically significant change over time in both groups in anxiety and phobic anxiety with no difference between groups.	Statistically significant change over time in both groups in vulnerability and sexuality symptoms. No statistically significant change over time in either group in social and evaluation symptoms.
Cognitive Restructuring vs. Progressive Muscular Relaxation	Echeburúa et al. (1996)	Statistically significant difference between two groups.	Statistically significant change over time in both groups.	Statistically significant change over time in both groups.	Statistically significant change over time in both groups.

distress-fear improved significantly in both groups with no significant differences between groups at 12-month follow-up.

The effectiveness of Stress Inoculation Therapy was compared to Supportive Counseling, Assertion Training, Supportive Psychotherapy plus Information, and Prolonged Exposure Therapy. Across studies, all treatments were associated with statistically significant improvements in PTSD symptoms or diagnosis, depression, anxiety, and distress-fear symptoms with no significant differences between SIT and comparison treatments. The SIT group showed significantly greater improvement in PTSD symptom severity compared to the SC group from pre-treatment to post-treatment; however, no significant differences between groups were observed between pre-treatment and 3 month follow-up.

The effectiveness of Prolonged Exposure Therapy was compared to Cognitive Processing Therapy, Supportive Counseling, Eye Movement Desensitization and Reprocessing, and Stress Inoculation Therapy. Across studies, treatments were associated with statistically

significant improvements in PTSD symptoms or diagnosis, depression, anxiety, and distress-fear symptoms with no significant differences between PE and comparison treatments. Resick et al. (2012) conducted long-term follow-up (mean = 6.5 years [SD = 1.22]) of participants from their original study comparing the effectiveness of PE and CPT (Resick et al., 2002). At long-term follow-up, there was a significant decrease in the percentage of participants who met the criteria for PTSD or current diagnosis of MDD with no statistically significant differences between groups. From post-treatment to long-term follow-up, the CPT group evidenced no change in PTSD symptoms, while the PE group showed a moderate, statistically insignificant decrease in PTSD symptoms. There was no significant difference in the rates of change in endorsement of PTSD symptoms, PTSD symptom severity, or depressive symptoms between groups from post-treatment to long-term follow-up. PTSD symptom severity and depressive symptoms did not change significantly from post-treatment to long-term follow-up.

One study compared the effectiveness of Assertion Training and Supportive Psychotherapy plus Information (Resick et al., 1988). Both groups demonstrated statistically significant improvements in PTSD avoidance and intrusion symptoms, anxiety, and distress-fear between pre-treatment and six-month follow-up, with no statistically significant differences between groups. There was no statistically significant difference between groups in depressive symptoms.

4. Discussion

This review identified nine articles assessing the effectiveness of mental health interventions for adult female survivors of sexual assault. This is a small number of studies given the importance of this problem (Black et al., 2011; Garcia-Moreno et al., 2006).

The reviewed studies had several methodological strengths. Seven utilized a RCT design. Multiple, standardized assessment instruments were used in all studies. Multiple outcomes were assessed in most studies.

The reviewed studies also had several methodological limitations. As most studies focused on sexual assault at least three months prior to study entry, results may not be generalizable to survivors who seek treatment immediately post-assault. Because all but one study was comprised of a clinic sample, generalizability to survivors not in care may be limited. As this review was limited to studies with a control group, a substantial number of studies that did not include a control group were excluded from this review. In addition, geographic diversity of the study samples was limited with all studies conducted in high-income countries and all but one study conducted in the U.S. The focus of this paper on controlled studies, coupled with the fact that most of these studies were conducted within the U.S., may impact the generalizability of the findings. Given that sexual violence is a global problem, research is critically needed on the effectiveness of mental health treatment for survivors of sexual assault in low- and middle-income countries, particularly as the appropriateness and effectiveness of treatment strategies may vary based by country, culture, or region.

The results of the assessment of study quality using the Downs and Black Checklist found that most of the studies scored relatively high (demonstrating strength) in the domains of reporting, internal validity-bias, and internal validity-confounding. However, studies scored much lower (demonstrating limitations) in the domains of external validity and power. External validity is a common limitation of mental health intervention research in part due to the difficulty of obtaining a study sample representative of the source population. Thus, the generalizability of study findings is limited. In addition, conclusions that can be drawn from these studies were often limited by small sample sizes and limited power. Future research with larger sample sizes and more representative samples is greatly needed.

Examination of the effectiveness of interventions in comparison to no treatment or minimal attention found that several treatments can improve the mental health of adult female survivors of sexual assault. Seven treatments (Assertion Training, Clinician-Assisted Emotional Disclosure, Cognitive Processing Therapy, Eye Movement Desensitization and Reprocessing, Prolonged Exposure Therapy, and Stress Inoculation Therapy, Supportive Psychotherapy plus Information) were associated with significantly greater reductions in the percentage of participants with a PTSD diagnosis, symptoms, and/or symptom severity compared to a control group.

Although examined less often, depressive symptoms improved with Cognitive Processing Therapy and Eye Movement Desensitization and Reprocessing, while anxiety symptoms improved with Assertion Training and Supportive Psychotherapy plus Information. Only Supportive Counseling demonstrated no statistically significant improvement in PTSD, depression, or anxiety symptoms.

Statistical tests of comparative effectiveness did not demonstrate one intervention as significantly more effective than another. However, it is notable that Cognitive Processing Therapy and Prolonged Exposure Therapy were associated with improvement in psychological symptoms up to six years after treatment. Long-term follow-up was not conducted with other treatments evaluated.

Concerns have been raised regarding the potential for exposure therapies, such as Prolonged Exposure Therapy, to lead to worsening of PTSD symptoms and premature discontinuation of treatment. A review of studies for the treatment of PTSD found no difference in drop-out rates among exposure therapy, cognitive therapy, Stress Inoculation Therapy, and EMDR (Hembree et al., 2003). In addition, controversy persists over the mechanisms involved in EMDR and whether EMDR is meaningfully different than standard exposure therapies. A study and meta-analysis investigated the question of whether the eye movements in EMDR are essential to its effectiveness and concluded that eye movements were critical to the effectiveness of EMDR (Jeffries & Davis, 2013; Lee & Cuijpers, 2013). However, other studies have reached different conclusions (Davidson & Parker, 2001; Hembree & Foa, 2003). Additional research on this topic is needed.

The strength of conclusions drawn regarding the effectiveness of mental health treatments for adult female survivors of sexual assault is limited by the small number of studies identified and the studies' methodological limitations described previously. Nonetheless, it is noteworthy that findings from this review are consistent with research focused on multiple types of trauma survivors as well as with the treatment of trauma in children. A systematic review of RCTs of psychological treatment of PTSD found that trauma-focused Cognitive Behavioral Therapy (TF-CBT) or Exposure Therapy, EMDR, and Stress Management were effective in treatment of PTSD (Bisson & Andrew, 2007). Similarly, the WHO guidelines on psychological interventions for adults with PTSD recommend TF-CBT, EMDR, or stress management (including SIT) (Tol, Barbui, C., & van Ommeren, M., 2013). Similarly, TF-CBT has the largest evidence base for the treatment of PTSD in children as well as the treatment of mental health symptoms in children related to sexual abuse (Cummings, Berkowitz, & Scribano, 2012; Murray, Nguyen, & Cohen, 2014). A recent Cochrane review of the effectiveness of mental health interventions among children and adolescents with PTSD (some of whom experienced childhood sexual abuse) found that CBT had the greatest efficacy in reducing PTSD-related symptoms (Gilles, Taylor, Gray, et al., 2012).

Although treatments were found to be similarly effective, treatments varied in delivery style, the number and length of sessions, and mental health outcomes assessed. For example, the effectiveness of Assertion Training and Supportive Psychotherapy plus Information was assessed as group-based interventions only while the effectiveness of Clinician-Administered Emotional Disclosure, Cognitive Restructuring and Specific Coping Skills Training, Progressive Muscular Relaxation, Prolonged Exposure Therapy, Supportive Counseling, and Eye Movement Desensitization and Reprocessing was assessed only as individually-delivered interventions. In contrast, the effectiveness of Cognitive Processing Therapy and Stress Inoculation Therapy was assessed in both individual and group delivery settings. In addition, the number and length of sessions of the interventions varied. For example, Clinician-Assisted Emotional Disclosure was implemented in four 30-minute sessions over ten days, for approximately 2 hours of total treatment, while Cognitive Processing Therapy was implemented through twelve weekly 90-minute sessions for approximately 18 hours of total treatment. While all treatments were evaluated in relation to improvement in PTSD diagnosis or symptoms, fewer were evaluated in relation to improvement in anxiety or depressive symptoms. In selecting a treatment, clinicians should consider the available evidence, the presenting mental health issue, and patient preferences. Clinicians should work to identify the treatment that best meets the patients' needs and circumstances.

However, given the limited evidence base of the effectiveness of these interventions with adult female survivors of sexual assault, providers are encouraged to rigorously evaluate the interventions' effects to assure that they are improving the mental health of survivors. Given the prevalence of and wide-ranging mental health problems associated with sexual assault and limited availability of mental health services and providers in many countries, additional research on the effectiveness and comparative effectiveness of training non-specialists to provide commonly used mental health interventions is warranted.

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