



Review article

Interventions to treat posttraumatic stress disorder in partnership with primary care: A review of feasibility and large randomized controlled studies

T.J. Hoedt^{a,*}, K.A. Stephens^a, S.D. Vannoy^b, J. Unützer^a, D. Kaysen^a^a University of Washington, Department of Psychiatry and Behavioral Sciences, United States of America^b University of Massachusetts Boston, Department of Counseling and School Psychology, United States of America

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ABSTRACT

Objective: Evidence-based therapies for posttraumatic stress disorder are underutilized and at times unavailable in specialty settings. We reviewed the literature on interventions to treat PTSD within primary care to make recommendations on their effectiveness as treatment modalities or ways to improve engagement in specialty care.

Method: We searched PubMed, PsychInfo, CINHAL, and Cochrane Reviews databases using search terms related to PTSD and primary care. We excluded clinical guidelines and studies of screening only or subthreshold PTSD. **Results:** 524 articles were identified. Twenty-one papers on 15 interventions met review criteria. Seven interventions focus on individual therapies studied via small feasibility studies to prepare for full-scale intervention research. Eight describe treatment programs in primary care based on collaborative care that included medication management, tracking outcomes, referral services, and for some psychotherapy (versus psychotherapy referral). Ten interventions were feasibility studies which precludes meaningful comparison of effect sizes. Of the four RCTs of treatment programs, only two including some psychotherapy found improvements in PTSD symptoms.

Conclusion: More research is needed to adapt treatment for PTSD to primary care. Collaborative care may be a promising framework for improving the reach of PTSD treatments when psychotherapy is offered within the collaborative care team.

1. Introduction

Posttraumatic stress disorder (PTSD) affects many patients coming into primary care. Among U.S. adults in epidemiological studies lifetime prevalence of PTSD is 6.8% [1], while in primary care the point prevalence of PTSD has ranged from 2 to 39.1% with the median point prevalence falling at 12.5% across studies in a recent systematic review [2]. Patients with comorbid conditions such as chronic pain, major depression, anxiety, and irritable bowel syndrome who are often seen in primary care may face an even higher prevalence of PTSD [3]. This higher prevalence in primary care highlights the importance of this setting for identifying and managing PTSD [2].

The first line approaches for treatment of PTSD in published treatment guidelines are evidence-based psychotherapies that are trauma-

focused [4–7]. These treatments typically involve either exposure, which can involve imaginal or in vivo exposure, and/or cognitive restructuring [4]. Evidence-based psychotherapies for PTSD are typically delivered by master's and doctoral level clinicians with advanced mental health training. Treatment typically involves 8–12 sessions that are 50–90 min. Medications such as selective serotonin reuptake inhibitors (SSRIs) and other antidepressants are recommended typically as second line treatments for PTSD [4,5,7] unless trauma-focused psychotherapy is not available or not of interest to the patient [4], with one guideline specifically recommending against the use of drug treatment as first line treatments in place of trauma-focused psychotherapy [6]. A 2008 Institute of Medicine report also found limited evidence to support pharmacotherapy for PTSD but sufficient evidence to support the efficacy of exposure therapies [8].

Acronyms: BA, behavioral activation; CBT, cognitive behavioral therapy; CPT, cognitive processing therapy; PCL, PTSD checklist; PCP, primary care physician; PE, prolonged exposure therapy; PHQ-9, Patient Health Questionnaire (9 item); PST, problem solving therapy; PTSD, posttraumatic stress disorder; RCT, randomized controlled trial; SIT, stress inoculation therapy; WED, written emotional disclosure

* Corresponding author at: Department of Psychiatry and Behavioral Sciences, University of Washington, School of Medicine, Box 356560, Seattle, WA 98195-6560, United States of America.

E-mail address: thoedt@uw.edu (T.J. Hoedt).

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Although some with PTSD may use mental health services such as those attending a specialty clinic for PTSD [9] and those filing a claim for PTSD-related disability benefits [10], many exposed to trauma who later develop PTSD do not seek mental health treatment [11]. Despite data regarding the efficacy of psychotherapy, of those with PTSD, less than half complete a referral to specialty care and only about a third receive specialty mental health care [12–14]. Traditional models of referral to a specialty mental health setting may not be effective for reaching the majority of individuals with PTSD.

Primary care is thus an important setting to address PTSD. Individuals with PTSD may seek medical care for comorbid physical complaints [15] and primary care addresses comorbid health conditions that bring individuals with PTSD into the health care system [9,16]. There is a robust literature suggesting individuals will turn to primary care with psychological and behavioral issues, hence primary care acts as a de facto mental health system [17]. Stigma around mental disorders is an issue worldwide [18] including in the U.S. Comorbid conditions that bring individuals with PTSD to primary care range from cardiovascular and pulmonary diseases [19,20], to diabetes [21], and sleep disturbance [22]. PTSD is associated with high rates of somatic concerns, which may be another reason patients present in primary care [13]. Many patients with depression, which is often co-morbid with PTSD [23], also prefer to seek treatment in primary care [14,24].

To reach patients in primary care, treatments developed for mental health specialty settings will need to be adapted to work within the constraints and demands of primary care. One area where this has been successfully accomplished is the treatment of depression through collaborative care in primary care. Collaborative care for depression, originally adapted from models for chronic illness management in primary care [25,26], has been generalized and shown effective in treating anxiety and depression [27–30]. Collaborative care improves treatment in primary care by transforming an acute primary care model to an extended model involving care management and psychiatric consultation in primary care [31]. Successful collaborative care can be defined through five core principles: patient-centered team care, population-based care, measurement-based treatment to target with a tool such as a patient registry, evidence-based care, and accountable care. A care manager uses a registry to track patient progress. Typically someone on the care team offers basic behavioral activation and counseling to augment pharmacotherapy. The care manager may take on this role, in particular if he/she is a psychologist or social worker, or a counselor may partner with the team to offer psychotherapy. The care manager also consults regularly with a psychiatric consultant to help the primary care provider with medication management. Collaborative care can also lead to improvements in depression for those with comorbid PTSD despite their worse depression severity at baseline [32] over a longer treatment time-frame [33]. The success of collaborative care for depression treatment and treatment of anxiety [27] suggests it may be a promising direction in the development of care for PTSD.

In this review, we set out to assess the state of the literature on treatments for PTSD adapted to primary care and the effectiveness of well-studied interventions. We reviewed existing published PTSD intervention studies offered in primary care or studies that suggested the intervention was suitable for primary care. We aimed to highlight the state of intervention findings in the peer-reviewed literature to 1) treat individuals with PTSD in primary care, and/or 2) enhance utilization of specialty mental health treatment by improving patient identification and delivering stepped-care interventions to alleviate symptoms and facilitate referrals.

2. Methods

We conducted a narrative review of literature in PubMed, PsychInfo and CINHAL databases and Cochrane Reviews while also reaching out to colleagues for additional studies meeting our study criteria. Search strategies included keywords – posttraumatic stress disorder, PTSD, and

primary care, as well as MeSH Terms in PubMed – primary health care [MeSH] and stress disorder, post traumatic [MeSH] (see attachment A for full search details). Articles were included if they focused on an intervention incorporated in primary care to treat individuals in primary care for their diagnosed PTSD or an intervention developed in another setting but suggested for use in primary care to treat PTSD. Treatment could be done in partnership with specialty care or other settings, but involvement, or proposed involvement, of primary care in some part of PTSD treatment was necessary for inclusion. Exclusion criteria included non-English language, a focus only on screening for PTSD without health system changes to improve treatment, clinical guidelines, and articles focused only on subthreshold PTSD or trauma exposure. Studies were included regardless of participant age, population (i.e., military, veteran, and community settings), and whether the study was an RCT. No date restriction was set prior to the August 31, 2016 search date. Articles were compiled and reviewed by the first author with findings presented to co-authors to confirm relevance to the paper in terms of conforming to inclusion and exclusion criteria.

3. Results

3.1. Brief description of studies

Our review highlighted 15 interventions offered in primary care or identified as a promising intervention for integration into primary care. Seven interventions focused on individual therapies such as shortened psychotherapy or self-management that may be compatible with primary care (Table 1). The other eight interventions focused on models of delivering treatments for PTSD (Table 2), all of which were based on the collaborative care model. Individual therapy studies were mostly feasibility studies/small pilots ranging from 6 to 80 participants, three of which randomized participants to treatment versus control [34,35,52]. These early feasibility studies focused on whether the intervention was acceptable to providers and patients, completion rates, and rates of adverse events and all described the interventions as feasible and worth further study. Treatment program studies were larger studies ranging from 58 to 566 participants with PTSD. Five of these studies were randomized controlled trials (RCTs) [36–39,67]. Four of these RCTs focused specifically on PTSD, yet only the two studies that involved psychotherapy within the model of care (versus referral to psychotherapy) showed at least a modest decrease in PTSD symptoms compared the control group [37,39]. Another treatment program RCT focused on several anxiety disorders, including PTSD based on the DSM-IV, showed significant results for older adults with PTSD [40] but not a significant difference for the entire subsample with PTSD as a primary condition [41]. Three studies explored feasibility of a new treatment program [42,43,68]. Some treatment programs included a focus on a comorbid condition such as chronic pain or depression [38,39,42,43]. Of these 15 interventions 10 were feasibility studies which preclude a meaningful comparison of effect sizes. Eleven studies in Tables 1 and 2 were conducted in an active military or veteran population.

3.2. Psychotherapy and medication management

All individual therapy studies focused on psychotherapy, self-management strategies, and/or brief mindfulness training (Table 1). Therapies examined included an adaptation of cognitive restructuring [44], a cognitive behavioral therapy derived from components of Prolonged Exposure Therapy and Cognitive Processing Therapy [45], Behavioral Activation [46], and two interventions guided by patients through either an internet self-help CBT based on Stress Inoculation Therapy [34] or a self-guided telehealth writing intervention on combat known as Written Emotional Disclosure [35]. Of the two self-guided interventions, one included an in-person session with telephone follow-up with a therapist or nurse [34]. The WED intervention did not include contact with a therapist though the authors noted adding therapist

Table 1
Individual therapies/specific treatment interventions treating PTSD in primary care.

Intervention	Feasibility, RCT or both	N	Military/veteran/civilian	Comparison group	Psychotherapy	Providers involved	# sessions	Main findings	Articles
CBT-PC	Feasibility	10 referred by PCP or self-referred for PTSD treatment; diagnosis not stated	Not described	NA	Adaptation of cognitive restructuring	PCP or nurse but also masters-level behavioral health clinicians	6 approximately 60 min sessions and homework assigned at first 5 sessions	PTSD symptoms declined at 6 weeks and 3 months while depression symptoms declined at 3 months.	Prins et al., 2009 [44]
PE-PC	Feasibility	15 with PTSD (in 2011) 24 with PTSD (in 2015)	Active military	NA	Modified CBT based on PE and CPT	BHC in primary care	4 clinic sessions - 30 min each - and 30 min homework at least 3 times per week	2011: Of the 10 who completed, 50% did not meet criteria for PTSD at 1 month post-treatment. 2015: Of the 17 who completed, 17 were followed at 6 mo. and 11 at 1 yr. Improvements in PTSD, depression and global mental health functioning were maintained at 6 mo. and 1 yr. Completers may be healthier than non-completers.	Cigrang et al., 2011 [45] Cigrang et al., 2015 [69]
DE-STRESS (in 2004) DESTRESS-PC (in 2015)	Feasibility and two parallel arm RCT (2004); Two parallel arm RCT with blinded assessment (2005)	23 being treated for PTSD; diagnosis not stated (in 2004) 80 with PTSD (in 2015)	Not described (in 2005) veterans (in 2015)	Control type not specified (in 2004) Optimized Usual Care (in 2015)	Modified form of stress inoculation therapy delivered via the internet and based on CBT	Therapist (2004) nurse (2015)	2 h in-person session, 5 brief telephone check-ins, email support, 56 online logins (45 min each) over 8 weeks (2004) 18 online logins (45–60 min each) over 6 weeks and CM telephone follow-up every 2 weeks (2015)	Early description of the intervention did not report outcomes (in 2004). Decrease in PTSD symptoms at 12 weeks but no difference at 18 weeks (in 2015). Those who logged into online treatment more showed greater improvement in PTSD symptoms (in 2015).	Litz et al., 2004 [34] Engel et al., 2015 [70]
WED	Feasibility and two parallel arm RCT	31 with PTSD or subthreshold PTSD	Veterans	Time management narratives online	Self-guided telehealth writing intervention on combat that can be self-administered in primary care visit (session 1) then completed online	Research staff	3 online independent writing sessions, each 20 min	After excluding participants who sought behavioral health treatment (1 WED, 4 control), remaining participants did not show significant improvement on PTSD scores or other outcomes of interest. Emotional content within the writings was associated with a more positive PTSD symptom change.	Possemato et al., 2011 [35]
BA	Feasibility	6 with PTSD and depression	Veterans	NA	BA	Doctoral-level psychologist	8 sessions ranging from 45 to 90 min	PTSD symptoms as assessed by clinician and patient measures declined	Jakupcak et al., 2010 [46]
Latinas Saludables	Feasibility	28 Latina women with trauma exposure and PTSD and/or depression	Civilian	NA	BA, motivational interviewing, and additional cognitive behavioral techniques	Bilingual/bicultural research assistants with psychology background trained and supervised by the study PI	90 min individual session offered over 2–3 visits followed by 5 group sessions, each 90 min; each group session included craft activity to increase group cohesiveness as means to reduce social isolation	27 women completed individual sessions and 24 completed at least 1 group session. 19 completed 4 or 5 group sessions. Individual sessions appeared to prepare participants for the group sessions and resolve some of their concerns about group sessions. Women offered	Kaltman et al., 2016 [47]

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Table 1 (continued)

Intervention	Feasibility, RCT or both	Military/veteran/civilian	N	Comparison group	Psychotherapy	Providers involved	# sessions	Main findings	Articles
PCbMP	Feasibility and two parallel arm RCT	Veterans	62 with PTSD or subthreshold PTSD	Primary care usual care	No psychotherapy; intervention involved brief mindfulness training	Physician who is a certified instructor in mindfulness-based stress reduction	4 weekly 90 min in-person group session	positive feedback and ways to improve the intervention. Depression and PTSD symptoms both declined. 20 of 36 randomized to the intervention attended at least 1 session. Based on randomization, decrease in PTSD was similar and decrease in depression greater for the intervention group. Among completers there as a greater reduction in PTSD and depression.	Possemato et al., 2016 [52]

PCP = primary care provider; CBT = cognitive behavioral therapy; PE = prolonged exposure therapy; CPT = cognitive processing therapy; BHC = behavioral health clinician.
 CBT-PC = cognitive behavioral therapy - primary care.
 PE-PC = prolonged exposure for primary care.
 DE-STRESS = delivery of self training and education for stressful situations.
 WED = written emotional disclosure.
 BA = behavioral activation.
 PCbMP = primary care brief mindfulness program.

assistance is an important next step [35].

All treatment programs included a focus on medication management, with five also including psychotherapy (Table 2). Medication management in the treatment programs centered on care manager follow-up for patients and oversight from a consulting psychiatrist (Table 2). One study included additional consults from a pharmacist [37] while one included consulting psychiatrists for a population with chronic pain [43]. The psychiatrist and psychologist in the chronic pain study offered a variety of treatment recommendations to the PCP including medication management recommendations about opioids and non-opioids, but referred patients to a psychiatrist for complex prescribing needs [43]. Psychotherapies in treatment programs included CBT [36], BA [43], and CPT [37]. The STEPS-UP study offered differing levels of psychotherapy including: 1) BA, problem solving and motivational interviewing, 2) care manager assisted online cognitive-behavioral self-management, 3) CBT by phone, and 4) in-person psychotherapy [39].

3.3. Packaging treatments

Delivery of evidence-based therapies for PTSD via video teleconferencing and computer-assisted CBT are examples of how PTSD treatments can be packaged to meet the needs of primary care [36,37]. Treatment packaging may differ in terms of treatment format (e.g. number of sessions), providers involved, and technology (e.g. video teleconference equipment).

The number and length of sessions along with delivery format (e.g., in-person) varied considerably across the 15 studies. When adapting treatment formats to potentially fit primary care settings, studies shortened psychotherapy interventions, utilized patient-guided self-help, and offered care either in-person or via telehealth (e.g. by phone or video teleconferencing). Interventions in Table 1 varied in the time dedicated to psychotherapy from 4 to 6 thirty minute sessions of CBT [45], to a full length BA intervention with 8 sessions lasting 45–90 min [46]. One intervention in Table 1 included group in-person sessions that followed with 2–3 in-person sessions [47]. One patient-guided intervention involved internet self-help CBT with an initial in-person meeting and short phone contact follow-up [34], while another included a self-guided telehealth writing intervention on combat experiences that can be self-administered in primary care during the first visit (session 1) and then completed online (sessions 2–3) [35]. Three interventions also used homework sessions between meetings with clinicians as a part of psychotherapy [34,44,45]. Treatment program studies in Table 2 often included full length psychotherapy (e.g., CPT, BA and CBT) [36,37,43]. The STEPS-UP trial offered more and less intense psychotherapy in the form of BA or problem solving with a care manager, care manager assisted online cognitive-behavioral self-management, telephonic CBT, or psychotherapy in primary care [39]. Long-distance delivery of psychotherapy was included for three interventions [34,37,39].

The providers varied across these studies as well (Tables 1 and 2). Studies describing individual therapies (Table 1) rarely addressed who would provide the therapy within a primary care setting. Instead Table 1 includes the type of provider who offered the intervention in the study (e.g., doctoral-level psychologist), with the exceptions of CBT-PC where the investigators suggested PCPs with a non-mental health background or a master's level psychotherapist in the role of therapist [44] and Latinas Saludables which was designed for someone without a license [47]. Treatment programs often suggested a type of provider for each role (e.g. nurse 'care facilitator' acting as a care manager, consulting psychiatrists, consulting pharmacist) (Table 2). Care managers in these studies assisted in keeping patients engaged and tracking outcomes through regular outreach to patients.

Using technology to assist delivery of treatments, track patient outcomes, and facilitate communication between providers is another aspect of packaging. Technology assisted with the delivery of

Table 2
Treatment Program Interventions Treating PTSD in Primary Care

Study	Feasibility, RCT or both	Military/ Veteran/ Civilian	N	Comparison group	Psychotherapy and # Sessions	Medication	Collaborative care components	Providers involved	Main findings	PTSD Effect Sizes for RCTs	Articles
CALM	Two parallel arm RCT with blinded assessment	Civilian	1004 anxiety patients (n = 181 with PTSD, 61 of which had primary diagnosis of PTSD)	usual care	computer assisted CBT delivered in-person by an anxiety clinical specialist; offered 6 - 8 weekly sessions to interested patients	medication management with consulting psychiatrist	1) care manager (CM), 2) measurement informed treatment using a registry of anxiety and depression outcome measures	anxiety clinical specialist (CM), consulting psychiatrist, consulting psychologist, and PCP	Those in intervention showed greater improvement in global anxiety symptoms at 6, 12 and 18 mos. Effect sizes for those with PTSD suggested improvement though findings were not statistically significant. Among those over 60 yrs of age with PTSD, the intervention was more effective than usual care.	For n = 61 with primary PTSD diagnosis 18 mos. PCLC - 40.40 intervention versus 46.07 usual care (p = 0.609) for the n = 31 older adults with PTSD favored the intervention (F(3,25) = 3.02, (p < 0.05)) (Wetherell)	Roy-Byrne et al., 2010 [36] Craske et al., 2011 [41] Wetherell et al., 2013 [40]
RESPECT-MH	Feasibility	Active Military	80 with PTSD and / or depression	NA	none	medication management with consulting psychiatrist	1) CM, 2) measurement informed treatment using PHQ-9 and PCL measures	nurse 'care facilitator' (CM), consulting psychiatrist, and PCP	48 patients had at least 1 follow-up PHQ-9 in the first 10 wks and 21 at least 1 follow-up PCL in this period. PCPs on average referred 3.15 patients to the program.	Engel et al., 2008 [42]	
RESPECT PTSD	Two parallel arm RCT with blinded assessment	Veteran	195 with PTSD	usual care	none	medication management with consulting psychiatrist	1) CM, 2) measurement informed treatment using PHQ-9 and PCL measures, 3) PCP signs off on outcomes in EHR	doctoral-level psychologist (CM), consulting psychiatrist, and PCP	Those in the intervention showed no difference in symptoms but did receive more mental health visits, more use of antidepressants, and higher outpatient pharmacy costs.	Adjusted difference in PDS accounting for time, site and treatment X site interaction = -0.6 (p = 0.79)	Schnurr et al., 2013 [38]
IMPROVE	Feasibility	Veteran	58 with chronic pain and PTSD diagnosis or significant PTSD symptoms	NA	BA delivered in-person; up to 8 sessions offered, each 75 - 90 min (time includes some other CM tasks)	recommendations about opioids and adjunctive non-opioid pain medications offered to the PCP, and those with complex prescribing needs were referred to a psychiatrist on the team	1) CM, 2) consults between physiatrist and psychologist / care manager for these patients with comorbid chronic pain with recommendations on treatment strategies offered to the PCP via email or EHR	psychologist (CM), physiatrist, and PCP	Those who completed the intervention (n = 30) showed significant improvement in pain, PTSD, mental health and quality of life measures.		Plagge et al., 2013 [43]
TIDES/PTSD	Feasibility	Veteran	20 with PTSD or subthreshold PTSD	NA	BA and therapist guided bibliotherapy, both via telephone	management with consulting psychiatrist	1) CM, 2) measurement informed treatment using PHQ-9 and PCL measures tracked in patient's EHR	nurse (CM), psychiatrist, and PCP	Model was successfully implemented and acceptable to staff and patients. Number of CM calls		Hoerster et al., 2015 [68]

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Table 2 (continued)

Study	Feasibility, RCT or both	Military/Veteran/Civilian	N	Comparison group	Psychotherapy and # Sessions	Medication	Collaborative care components	Providers involved	Main findings	PTSD Effect Sizes for RCTs	Articles
TOP	Two parallel arm RCT with blinded assessment	Veteran	265 with PTSD	usual care	CPT via interactive video; offered 12 sessions of CPT to interested patients	medication management with consulting psychiatrist and pharmacist	1) CM, 2) measurement informed treatment using a decision support system that tracked PCL outcomes, 3) PCP updates through the EHR and signatures when needed for clinical action	nurse (CM), psychologist, psychiatrist, pharmacist, and PCP	was correlated with number of psychiatry visits and reduction in PTSD symptoms. Those in the intervention had greater improvement on the PTSD measure at 6 and 12 mos. Attending at least 8 CPT sessions fully mediated the intervention effect at 12 mos.	PDS lower in intervention versus usual care at 6 mos (B = -3.81; p=0.002) and 12 mos (B = -2.49; p=0.04)	Fortney et al., 2015 [37]
VISA	Two parallel arm RCT with blinded assessment	Civilian	404 with PTSD	usual care enhanced through education about trauma, PTSD, and evidence-based psychopharmacology	none	medications entered in computer registry; CM has weekly supervision meeting with psychiatrist where treatment plans are discussed; some patients referred to psychiatrist for medication evaluation	1) CM with basic MI training, 2) symptom monitoring, 3) connecting patients with community resources, 4) CM enhancing communication with the primary care team and specialty mental health clinicians (e.g., through clinic meetings, patient visits, email and EHR)	bachelor-level, non-clinical, bilingual (English/Spanish) CM, psychiatrist, primary care clinicians and specialty mental health clinicians	Those in the intervention showed no difference in PTSD diagnosis or symptoms at 6 and 12 mos; both showed improvement. Those who engaged in CM received more mental health visits and medication prescriptions compared to patients with no engagement.	PTSD outcomes based on the CAPS: % with diagnosis at 12 mos 43.3 versus 39.4 usual care (p=0.34); PTSD symptom severity at 12 mos 46.9 versus 44.2 usual care (p=0.33)	Meredith et al., 2016 [67]

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Table 2 (continued)

Study	Feasibility, RCT or both	Military/Veteran/Civilian	N	Comparison group	Psychotherapy and # Sessions	Medication	Collaborative care components	Providers involved	Main findings	PTSD Effect Sizes for RCT's	Articles
STEPS-UP	Two parallel arm RCT	Active Military	666 with PTSD and / or depression (n = 566 with PTSD)	usual care was RESPECT-Mil	1) CM trained in BA, problem solving and MI, 2) CM assisted online cognitive-behavioral self-management, 3) telephonic CBT, and 4) psychotherapy in primary care or specialty setting; # sessions not given	medication management with consulting psychiatrist	In addition to RESPECT-Mil (described above): 1) CM patient engagement training, 2) stepped psychotherapy interventions, 3) registry to support tracking symptoms, 4) additional support from central telepsychologist for CBT and CM to follow mobile patients	nurse (CM), PCP, psychologist, and psychiatrist	Those in the intervention showed 1) greater decrease in PTSD and depression symptoms, though differences were modest, 2) improved somatic symptoms and mental health-related functioning and 3) increased telephone health contacts and appropriate medication use. Mental health service use increased in both primary care and specialty mental health. Comorbid depression and PTSD was associated with higher service use in the intervention but not usual care. Those with moderate to high combat exposure were less likely to be in the group who improved, compared to group with persistent symptoms.	PDS lower in intervention versus usual care at 12 mos (-6.07 versus -3.54; p = 0.003) as was % with at least 50% improvement in PDS at 12 mos (73 versus 49; p = 0.02)	Engl et al., 2016 [39] Belsler et al., 2016 [66] Bray et al., 2016 [65]

BA = behavioral activation; CAPS = Clinician Administered PTSD Scale; CM = care manager; EHR = electronic health record; MI = motivational interviewing; PCIC = PTSD Checklist Civilian; PDS = PTSD Diagnostic Scale

CALM = Coordinated Anxiety Learning and Management
 RESPECT-Mil = Re-Engineering Systems of Primary Care for PTSD and Depression in the Military
 RESPECT-PTSD = Re-engineering Systems for the Primary Care of PTSD
 IMPROVE = Integrated Management of Pain and PTSD in Returning OEF/OIF/OND Veterans
 TIDES/PTSD = Translating Initiatives for Depression into Effective Solutions (TIDES)—adapted for Iraq/Afghanistan War veterans with PTSD symptoms
 TOP = Telemedicine Outreach for PTSD
 VISA = Violence and Stress Assessment
 STEPS-UP = Stepped Enhancement of PTSD Services Using Primary Care

psychotherapy both in-person and long-distance [34–37,39,68]. Technology also assisted delivery of care through use of registries to help track patients and outcomes [36,37,39]. Three treatment program studies also mentioned communicating with PCPs via the electronic medical record [37,38,43], while one used the electronic medical record and several other modalities to communicate with the primary care team [67].

4. Discussion

Delivery of care through primary care settings is a promising strategy for improving access to PTSD treatment, yet our review found few studies overall and an emphasis on small feasibility studies rather than more rigorous trials. Since publication of an earlier review on this topic [48] there has been an increase in the number of interventions developed for PTSD in primary care and several larger clinical trials have been published in the last few years evaluating some of these interventions (i.e., TOP, ViStA and STEPS-UP). Four clinical trials of collaborative care-based interventions have focused on PTSD (i.e., RESPECT-PTSD, TOP, ViStA, and STEPS-UP), with the two incorporating psychotherapy showing at least modest effects on PTSD outcomes (i.e., TOP and STEPS-UP). Findings suggest further research is needed in this important and developing field. The literature on collaborative care more generally [27] and PTSD-focused collaborative care trials incorporating psychotherapy (i.e., TOPS and STEPS-UP) highlight potential directions for continued development of these models to reach patients with PTSD in primary care. TOPS, for example, highlights the promise of distance delivered full-length CPT within a collaborative care model while STEPS-UP highlights the promise of stepped care and offering diverse psychotherapy options for patients to select. The STEPS-UP trial highlights the potential to incorporate brief psychotherapies for PTSD to potentially improve engagement in care for some with PTSD who may not engage in full-length CPT. Table 1 offers brief therapies that may be developed and further tested within such stepped care interventions. This remains a promising avenue for further study. In addition, more research is needed on these models outside the populations in which they were studied to further assess the potential utility of these models across these populations (i.e., veteran, active military and civilian).

4.1. Implications for practice

Findings from treatment program studies suggest a benefit to integrating psychotherapy into collaborative care programs versus attempting to simply increase referrals to specialty mental health. Findings from the small feasibility studies of brief therapies are not robust enough to yet highlight implications for practice. These brief therapies hold potential as both a means to engage individuals in full-length psychotherapy for PTSD and as a possible brief alternative to these therapies for at least some patients, though further research is needed (Table 3).

Collaborative care has been well substantiated by over 70 randomized control trials [49] as effective for improving outcomes, reach, and lowering costs of care compared to treatment as usual for depression and generalized anxiety. Collaborative care offers pharmacological expertise as well though psychotherapy components of collaborative care may confer more benefit for many patients with PTSD. Psychiatric consultants can help support pharmacologic interventions and treatment of comorbid psychiatric and physical conditions. Yet unlike outcomes for depression, evidence-based PTSD pharmacologic interventions have only modest effect sizes [50] as compared to effect sizes seen for pharmacologic interventions for depression and large effect sizes for psychotherapies for PTSD. Given potentially limited evidence to support pharmacology for PTSD, collaborative care teams will ideally include someone experienced in evidence-based psychotherapy components specific for PTSD much like the TOP RCT [37]. Given the

prevalence of PTSD in primary care that approximates that of depression and limited number of specialty mental health providers [2], established collaborative care programs could enhance care through offering psychotherapy for PTSD either in-person or remotely.

4.2. Future research

Based on our review, primary care can increase access to PTSD interventions yet further research is needed and underway to determine the most promising collaborative care models for PTSD (Table 3). Future studies should evaluate the appropriate doses of psychotherapy to account for a heterogeneous patient population (Table 3). Several studies are looking at strategies to offer a lower, but still effective, dose of psychotherapy that might fit within primary care [44,45]. The PTSD literature has consistently shown patients with PTSD who receive an adequate dose of psychotherapy tend to improve. This aligns with research evaluating tailoring the dose of psychotherapies to the needs of individual patients, even with manualized treatments [51]. CPT has been effective in getting patients to good end state functioning in as few as 4 sessions, whereas some patients may need as many as 18 sessions [51]. Studies in the review did not alter protocols based on early response, but patient-centered primary care is an appropriate environment to address this heterogeneity around treatment response.

Future studies can also assess ways to effectively engage primary care patients in treatment for PTSD (Table 3). Shortened therapies such as self-management techniques [34,35] and brief mindfulness interventions [52] may engage a subgroup of patients, stabilize symptoms, and encourage them to engage in evidence-based behavioral interventions. Engagement research may also focus on modifications for diverse cultural groups and those with comorbidities (e.g., pain) that may distract from PTSD treatment and/or help bring them to care. Adaptations may be needed for specific cultural groups, for example recent south-east Asian immigrants [53] and some in the Latino community who may have different terminology around PTSD and preferences for treatment [54]. The Latinas Saludables intervention, for example, included five group sessions intended, in-part, to reduce social isolation among immigrant Latina women and ended each group with a culturally responsive craft activity to improve engagement in the group [47]. Participants also responded positively to the culturally responsive vignette used in the intervention. Further study of comorbid pain, which is often comorbid with PTSD, is also needed. Some studies have shown PTSD improves in conjunction with chronic pain by addressing avoidance related to both pain behaviors and PTSD [55,56]. PTSD interventions that also address comorbid pain may improve engagement.

Future research should address staffing and technology to adequately support care while broadening the reach of PTSD interventions. Questions arise on who can be adequately trained to offer complicated PTSD behavioral treatments with primary care and the level of supervision and support that will reduce burnout and turnover among providers (Table 3). Studies have looked at delivery of psychotherapy by the care manager [36,43], a behavioral health consultant in primary care [45], a remote psychologist [37], referral to specialty care [38,43], some level of self-care guided by a therapist or nurse [34], unlicensed providers with some background in psychology [47] and the potential for shortened psychotherapy to be offered by a PCP [44]. PTSD behavioral treatments are time consuming to learn and to deliver. Training resources required to support evidence-based behavioral skills may be difficult to sustain in current primary care environments. Given the supervision structures within collaborative care, potential benefits of telehealth for psychotherapies such as CPT, and patient registries to track patient outcomes, collaborative care models should be a logical comparison group in any studies comparing providers suited to delivering these complicated treatments. Technology surfaced in the review as a way to improve patient reach and facilitate treatment with a limited number of trained PTSD providers, thus studies will need to focus on both technology and appropriate providers to deliver these

Table 3
Implications for practice and future research.

Practice	Some collaborative care studies in primary care that have effectively offered psychotherapy improved PTSD symptoms for these patients. Collaborative care offers pharmacological expertise as well, though psychotherapy components of collaborative care may confer more benefit for many patients with PTSD. Brief interventions focused on shortened psychotherapy, self-management techniques, or a brief mindfulness intervention are developing but are not yet tested as a strategy to engage and possibly treat patients with PTSD in primary care.
Research	Significantly more research is needed on brief interventions for PTSD within primary care to test their effectiveness in engaging or treating patients with PTSD who prefer to access primary care over specialty mental health. More research is needed on PTSD treatment through collaborative care models in primary care as well, though the research base is more extensive in this area compared to brief intervention feasibility studies. Future studies should assess the appropriate doses of psychotherapy to account for a heterogeneous patient population that may benefit from differing doses. Most of the large studies were conducted in a military population, thus future research should replicate promising models in the civilian population. Future studies can also assess whether shortened psychotherapies effectively engage primary care patients in other therapies for PTSD. Future research should address who can be adequately trained to offer complicated PTSD behavioral treatments with primary care and the appropriate level of supervision and support that will help reduce burnout and turnover among providers. Technology to support care such as virtual reality and mobile health apps did not surface in the review but remains an important area to study. As interventions develop, studies should assess the long-term costs and benefits of such interventions. Such studies should include focus on supervision/support costs for such care.

interventions. Technologies that did not surface in our review but remain an important area to study include virtual reality and mobile health apps [57–59].

Finally, future research should assess the long-term costs and benefits of such interventions with a focus on supervision and other support costs (Table 3). Addressing PTSD in primary care is a patient-centered approach for some patients. Patient-centered care focuses on the patient's needs, culture, values, and preferences while accounting for patient heterogeneity [60,61]. Our review highlighted that more research is needed to outline the most effective patient-centered models for reaching and treating a heterogeneous group of patients through primary care. Supervision and support costs when attempting to reach and treat patients with PTSD in primary care will be especially important to capture and will help complete the picture of short and long-term cost-effectiveness of these new models.

In conclusion, collaborative care may be a useful model for offering PTSD treatment within and in partnership with primary care when psychotherapy is offered within the collaborative care team, yet many gaps remain regarding best strategies when developing interventions to address PTSD in primary care. This review offers many insights worth considering as models are tested in primary care. Studies such as the ACE study [62] and developments in trauma informed care [63] highlight both the reluctance of providers to address trauma alongside providers growing familiarity with the impact that trauma has on overall well-being. Efforts to treat PTSD in partnership with PCPs will need to work against this resistance and offer education and support to providers hesitant they may 'open the pandora's box' of emotions related to trauma in a short office visit [64]. Adding mental health resources to the care team will help accommodate PCPs' busy schedules while serving as trained resources to patients, families and clinicians in primary care. Well executed PTSD treatment strategies developed in partnership with primary care are likely worth the investment as the long term health effects of untreated PTSD are considerable.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.genhosppsych.2019.05.008>.

Declaration of Competing Interest

No conflicts of interest to disclose.

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Appendix A. Search strategy

We present a more thorough overview of our search strategy below to allow for replication of these findings.

Overview:

We conducted a narrative review of literature in PubMed, PsychInfo and CINHAL databases while also reviewing Cochrane Reviews and reaching out to colleagues for additional studies meeting our study criteria. Search strategies included keywords – post-traumatic stress disorder, PTSD, and primary care, as well as MeSH Terms in PubMed – primary health care [MeSH] and stress disorder, post traumatic [MeSH]. Articles were included if they focused on an intervention incorporated in primary care to treat individuals in primary care for their diagnosed PTSD or if it was an intervention designed and suggested for use in primary care to treat PTSD. Treatment could be done in partnership with specialty care or other settings, but involvement, or proposed involvement, of primary care in some part of PTSD treatment was necessary for inclusion. Exclusion criteria included non-English language, a focus only on screening for PTSD without health system changes to improve treatment, clinical guidelines, and articles focused only on subthreshold PTSD or trauma exposure. Participants could come from any age range and from the military or civilian community. No date restriction was set prior to the August 31, 2016 search date. Articles were compiled and reviewed by the first author with findings presented to co-authors to confirm relevance to the paper in terms of conforming to inclusion and exclusion criteria.

Database search strategy:

With each database search, titles were first reviewed for potential relevance, abstracts were reviewed when there was any doubt about possible relevance, and full articles were reviewed for the remaining articles. In each step articles were excluded based on the inclusion and exclusion criteria described above. Clinical guidelines were searched for additional references to include.

Overview of search terms in each database:

1. Search PubMed
 - a. (post traumatic stress disorder [MESH] OR PTSD OR post traumatic stress disorder) AND (primary health care [MESH]); limit English, humans
2. Search CINHAL and PsychInfo
 - a. primary care AND (post traumatic stress disorder OR ptsd OR posttraumatic stress disorder OR post-traumatic stress disorder); limit English, humans, exclude Medline (for CINHAL search); limited to posttraumatic stress disorder as major heading and

primary health care as a subject

- Also searched Cochrane Reviews for all reviews on post traumatic stress disorder/PTSD and then reviewed these articles for any related to primary care

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