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Expanding the role of gadget delivered social support for improving symptoms of post-traumatic stress disorder in refugees or immigrants: insight from meta-analysis and perspective of Islam

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ABSTRACT

Post-traumatic stress disorder (PTSD) and related psychological symptoms are common among refugees and immigrants who experience traumatic events before, during and after displacement. Limited access to face-to-face mental health care has prompted the use of digital interventions as scalable alternatives. This meta-analysis evaluates the effectiveness of internet- and mobile-based psychosocial interventions in reducing depression, anxiety and insomnia among displaced populations. Following PRISMA 2020 guidelines, four randomised controlled trials, involving 788 participants, were included. Pooled analyses demonstrated significant reductions in depressive symptoms (PHQ-9), anxiety (GAD-7) and insomnia severity (ISI) after digital interventions. Sensitivity analyses confirmed the stability of these findings. The results highlight the potential of culturally adapted, gadget-delivered interventions to overcome treatment barriers and provide accessible mental health support to refugees. These findings support wider integration of digital psychosocial tools within refugee health programmes to address unmet mental health needs.

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KEYWORDS

Gadget; immigrant; PTSD; psychosocial; refugee

Introduction

“Do you suppose that you will enter Paradise untouched by the suffering endured by the people of faith who passed away before you? They were afflicted by misery and hardship and were so convulsed that the Messenger and the believers with him cried out: ‘When will Allah’s help arrive?’ They were assured: ‘Behold, Allah’s help is close by.’” (Qur’an 2:214). Every person who goes through life will inevitably face difficulties and challenges. The stress experienced by individuals is caused by various stressors in life. Numerous

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events can lead to traumatic experiences, where one might feel sudden fear and loss. Sudden changes make it difficult for people to adapt to those changes, leading to severe stress or post-traumatic stress disorder (PTSD) (Fakhriya, 2022).

PTSD is a mental disorder that develops after being exposed to an extreme threatening or horrific event. Many individuals show remarkable resilience and ability to heal post-exposure to trauma (Bisson et al., 2015). Depressive disorders are highly prevalent and significantly associated with reduced quality of life (Ünlü Ince et al., 2013). In an individual's life, traumatic events prevalence ranges from 61% to 80%. In the aftermath of trauma, PTSD occurs in approximately 5% to 10% of the population (Mann et al., 2024). Symptoms include persistent disruptive memories, trauma-related avoidance of stimuli, and negative changes in cognition and mood. Patients with PTSD are at increased risk of poor physical health (Bisson et al., 2015).

PTSD is the most common lasting and harmful stress response to trauma, dominated by negative emotions such as anxiety, fear, and depressive symptoms (Otis et al., 2024). It often co-occurs with major depressive disorder (MDD) and generalised anxiety disorder (GAD), which share core symptoms like concentration difficulties, sleep disturbances, and irritability (Ahmadi et al., 2023; Wang et al., 2023). This overlap is not coincidental; recent findings indicate that PTSD is highly comorbid with depression and anxiety, and may even act as a risk factor for the onset of these conditions over time (Ma et al., 2025). Reflecting this symptom convergence, the DSM-5 has expanded the diagnostic criteria for PTSD to include features like persistent negative beliefs and a depressed mood (Zoellner et al., 2013). Given this overlap, tools like the PHQ-9 and GAD-7 serve as clinically relevant complements to PTSD-specific measures such as the PCL-5 and CAPS-5 (Ahmadi et al., 2023).

At present, the incidence of natural disasters such as floods, earthquakes, tsunamis, severe storms, hurricanes, and droughts is on the rise, as are man-made disasters. These disasters and catastrophes cause the mass exodus of people in the form of migration (Safi Keykaleh et al., 2017). Refugees are at the urgency of developing psychological symptoms and mental disorders in association with the various challenges that they experience before, during, and after migration (Purgato et al., 2021). The Qur'an emphasises the importance of fulfilling agreements and treaties (Qur'an 5:1), a principle that can be extended to international commitments concerning the rights and protection of refugees. It provides guidance on dealing with refugees and migrants, praising those who assist people in distress, while obligating Muslims to protect refugees as exemplified in Qur'an 9:100 and 9:117. In line with the principle of justice, which is the foundation of Islamic regulations (Qur'an 42:15, 16:90), and fairness even towards people of different faiths (Qur'an 5:8), vulnerable individuals, including non-Muslim refugees, are entitled to humane treatment, dignity, and protection. Prior to their health needs, refugees and immigrants need adequate access to mental health services and support programs that can serve as prevention of poor psychosocial health outcomes, including depression, anxiety, PTSD, and behavioural problems (Fawzi et al., 2009).

In response to such challenges, studies are intended to figure out the effectiveness of mental health interventions in treating psychological symptoms experienced by refugees. Although face-to-face non-trauma-focused cognitive behavioural therapy (CBT) may show good results for the short term, many individuals with PTSD are not able to access this treatment due to various factors, such as lack of therapists, far distance from treatment centres (geographical location), mobility issues, or being unable to

attend therapy during working hours due to work or childcare (Ehlers et al., 2020, 2023). Additionally, refugees are at high risk for developing mental illnesses due to language and cultural barriers. There is a need for specifically adapted intervention for treating refugees' mental health conditions. Internet-based applications in refugee mother tongues would be a potential to improve the outcomes of it (Nosè et al., 2017).

Mobile phones are widely used as a communication tool by people around the world, with 5.35 billion internet users worldwide, which amounted to 66.2 percent of the global population (Statista, 2024). However, mobile phone significance goes beyond mere communication, as they are now being adopted in psychosocial therapy involving vulnerable individuals (Wang et al., 2005). Mobile phone-based interventions allow real-time self-monitoring and management, with large scale. Web-based psychological interventions can facilitate access to treatments that are empirically supported, cost-effective, and clinically efficacious (Proudfoot et al., 2013).

Hence, presented with the increasing accessibility of technology and the urge to explore the appropriate treatment for stressed refugees, this study aims to assess the efficacy of internet and mobile applications for reducing symptoms of PTSD in refugees and immigrants.

Material and methods

This systematic review and meta-analysis was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines and statements. This review protocol was published in PROSPERO with ID number CRD42025633358.

Eligibility criteria

Inclusion and exclusion criteria were established to determine the relevance of the data before conducting a literature search. The inclusion criteria were (1) population, refugees or immigrants with mental health problems due to disaster or war; (2) intervention, application/website contains social support or guidance intervention for mental health issues; (3) comparison, any groups that received conventional consultation; (4) outcome, improvement in PTSD symptoms measured with any instrument; and (5) study design, randomised controlled trials. Exclusion criteria are (1) full-text articles not available; (2) study protocol or review; and (3) preliminary studies.

Sources and data search

The literature search was conducted using seven databases such as PubMed, Scopus, Web of Science, ProQuest, Wiley, and Ebscohost. The search was conducted until 10 December 2024. All terms were MeSH (Medical Subject Headings) compliant and combined with Boolean operators, resulting in the following keywords: ("Refugee" OR "Immigrant"), ("Telemedicine" OR "Mobile" OR "Application" OR "Telehealth" OR "Online" OR "Internet"), and ("Depression" OR "Stress" OR "Traumatic" OR "Mental"). Advanced method searches were conducted on databases that provided these features (Table 1).

Table 1. Search strategies.

Databases	Keywords
SCOPUS	(religiosity OR spirituality) AND (smoking OR tobacco OR alcohol OR addiction OR drugs) AND (randomised OR randomized OR quasi OR observational OR cohort OR case control OR cross-sectional OR Prospective OR retrospective)
Taylor&Francis	(religiosity OR spirituality) AND (smoking OR tobacco OR alcohol OR addiction OR drugs) AND (randomised OR randomized OR quasi OR observational OR cohort OR case control OR cross-sectional OR Prospective OR retrospective) Filter: Last 10 years, Health and social care, article only
Science direct	(religiosity OR spirituality) AND (smoking OR tobacco OR alcohol OR addiction OR drugs) AND (randomised OR randomized OR quasi OR observational OR cohort OR case control OR cross-sectional OR Prospective OR retrospective)
Google scholar	(religiosity OR spirituality) AND (smoking OR tobacco OR alcohol OR addiction OR drugs) AND (randomised OR randomized OR quasi OR observational OR cohort OR case control OR cross-sectional OR Prospective OR retrospective)
EbsCohost	(religiosity OR spirituality) AND (smoking OR tobacco OR alcohol OR addiction OR drugs) AND (randomised OR randomized OR quasi OR observational OR cohort OR case control OR cross-sectional OR Prospective OR retrospective)
PubMed	#1 (religiosity OR spirituality) #2 spirituality[MeSH Terms] #3 #1 OR #2 #4 (smoking OR tobacco OR alcohol OR addiction OR drugs) #5 (randomised OR randomized OR quasi OR observational OR cohort OR case control OR cross-sectional OR Prospective OR retrospective) #6 #3 AND #4 AND #5
COCHRANE library	#1 (religiosity OR spirituality) #2 spirituality[MeSH Terms] #3 #1 OR #2 #4 (smoking OR tobacco OR alcohol OR addiction OR drugs) #5 (randomised OR randomized OR quasi OR observational OR cohort OR case control OR cross-sectional OR Prospective OR retrospective) #6 #3 AND #4 AND #5

Study selection

Search results from each database were collected and organised collectively using Rayyan.ai software. After deduplication, the remaining articles were screened by title and abstract. All articles were then pooled for screening based on eligibility criteria. The rationale behind the exclusion of each article at each stage was stated in the accompanying PRISMA diagram. The entire literature search and study selection process was carried out by DFFA, MFH, ZNS, and MFNP. Any disagreement was resolved through joint discussion, and in case of conflicts, AN acted as a mediator.

Data extraction and analysis

The five researchers (AN, DFFA, MFH, ZNS, and MFNP) extracted data from each study, starting with data tabulation in a spreadsheet by MFH, after which DFFA examined the data collected for eligibility. Data extracted included the first author name and year of publication, study location, subjects, intervention type, duration of treatment, treatment outcome, and *p*-value of each study outcome. The results of data extraction from each study were presented qualitatively and quantitatively in tabular format. The pooled studies were then further reviewed to assess methodological quality by two independent reviewers (D.F.F.A. and M.F.H.) using the Cochrane risk-of-bias tool for randomised trials version 2 (RoB 2). Discrepancies in decisions were then resolved with the involvement

of a third reviewer (A.N.). The results of the Risk of Bias (RoB) assessment were then visualised using robvis (15).

Quantitative data synthesis (meta-analysis)

Primary quantitative analysis was performed using Review Manager 5.4.1 (Cochrane Collaboration, UK). Outcomes were analysed with a fixed effect model (FEM) if the level of heterogeneity (I^2) was below 50% and with a random effect model (REM) if the level of heterogeneity (I^2) was greater than 50%. For effect size, the mean difference (MD) was used, with a 95% confidence interval (CI) considered that a significant p -value was less than 5% ($p < .05$). For all meta-analysis, forest plots were presented. Heterogeneity was investigated using Higgins' I^2 value, which indicates heterogeneity can be classified as negligible (0%–25%), low (25%–50%), moderate (50%–75%), or high (>75%). Any high heterogeneity results will then be further analysed by conducting a sensitivity test. If there are uncertain data reporting results, such as the absence of SD (change from baseline value), because such information is often not available in the experiment report and must be inputted again. Missing values were calculated from similar trials that were included in the same meta-analysis. In this case, we first calculated the correlation using the following formula: $\text{Corr} = (\text{SD}^2 \text{ baseline} + \text{SD}^2 \text{ follow-up} - \text{SD}^2 \text{ change}) / (2 \times \text{SD baseline} \times \text{SD follow-up})$. The SD of the change from the base value is then calculated using the formula: $\text{SD change} = \sqrt{[\text{SD}^2 \text{ baseline} + \text{SD}^2 \text{ follow-up} - (2 \times \text{Corr} \times \text{SD baseline} \times \text{SD follow-up})]}$.

Result

Study selection results and risk of bias assessment

After the search process in seven databases, 464 articles were collected. A total of 143 duplicate articles were removed, leaving 321 articles for manual selection based on title and abstract. A total of 305 articles were excluded, because they met the exclusion criteria or did not meet the inclusion criteria by reading the title and abstract. This left 16 articles to be accessed and read in full. A comprehensive article assessment was conducted on 16 articles. A total of eight articles had population or intervention that was not in line with the objectives of this review, four studies had study designs that were also inappropriate. The final result of the selection process was four inclusion articles. Details of the selection process can be seen in [Figure 1](#).

Three of the inclusion studies showed a low risk of bias after being analysed using RoB 2.0, while one study showed a high risk of bias. Details of the risk of bias analysis results can be seen in [Figure 2](#). This is because there is a lot of missing data in the study and there is no clear explanation as to the reason.

Data synthesis

There were 788 participants collected from the four inclusion studies that were analysed comprehensively. Four randomised controlled trials (RCTs) were included, featuring interventions such as Step-by-Step and Internet-based Cognitive Behavioural Therapy (ICBT).

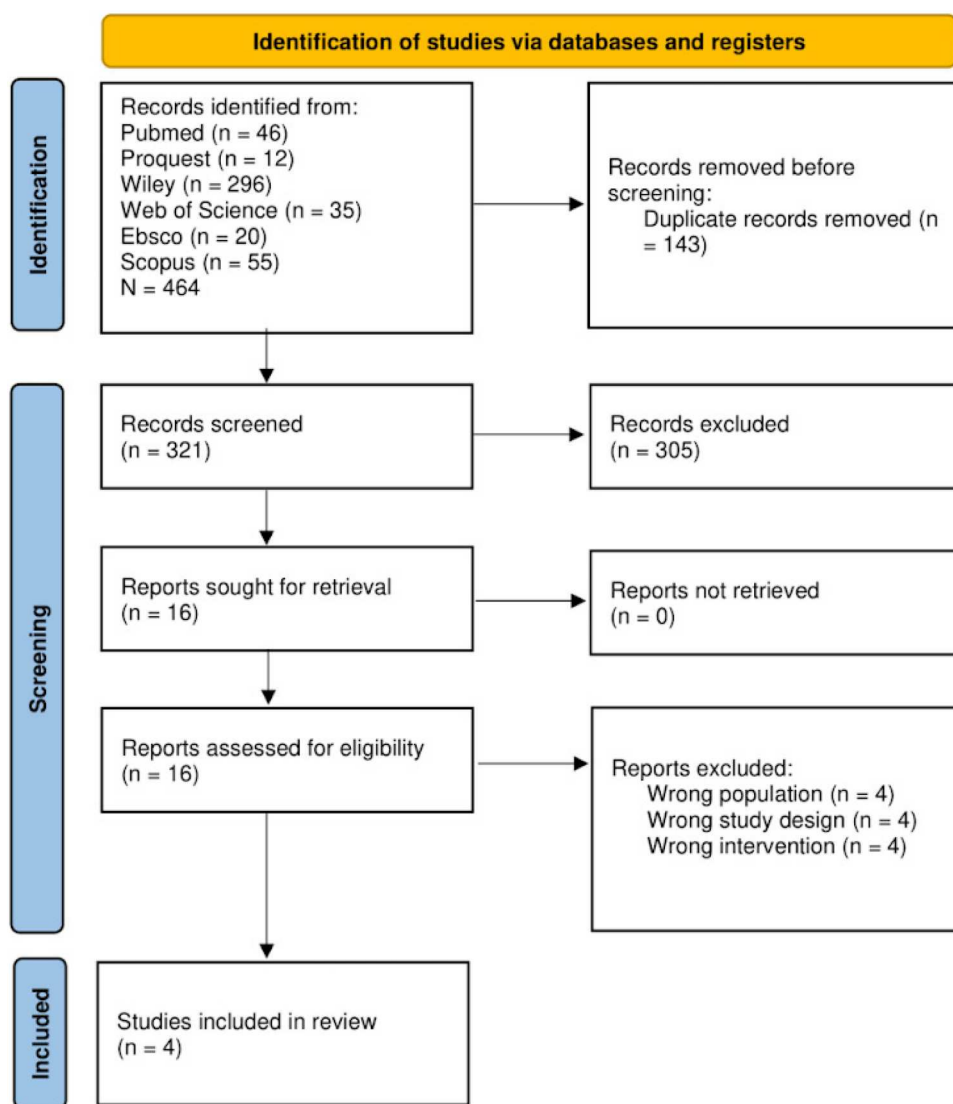


Figure 1. PRISMA flow diagram.

These treatments were delivered through structured modules accessed via internet-connected devices, emphasising accessibility and cultural adaptability. The studies spanned diverse populations, including displaced Syrians in Lebanon, Arabic-speaking individuals in Sweden, and Kurdish-speaking immigrants, with sample sizes ranging from 50 to 569 participants. Control conditions included enhanced care as usual (ECAU), psychoeducational materials, and waitlist groups, allowing for robust comparisons of intervention outcomes.

The interventions consistently demonstrated significant reductions in depression symptoms across studies. Pim Cuijpers et al. (2022) reported a substantial decrease in PHQ-9 scores with a p -value $<.001$, sustained over three months post-treatment, highlighting the durability of the effects. Similarly, Nygren et al. (2019) found marked

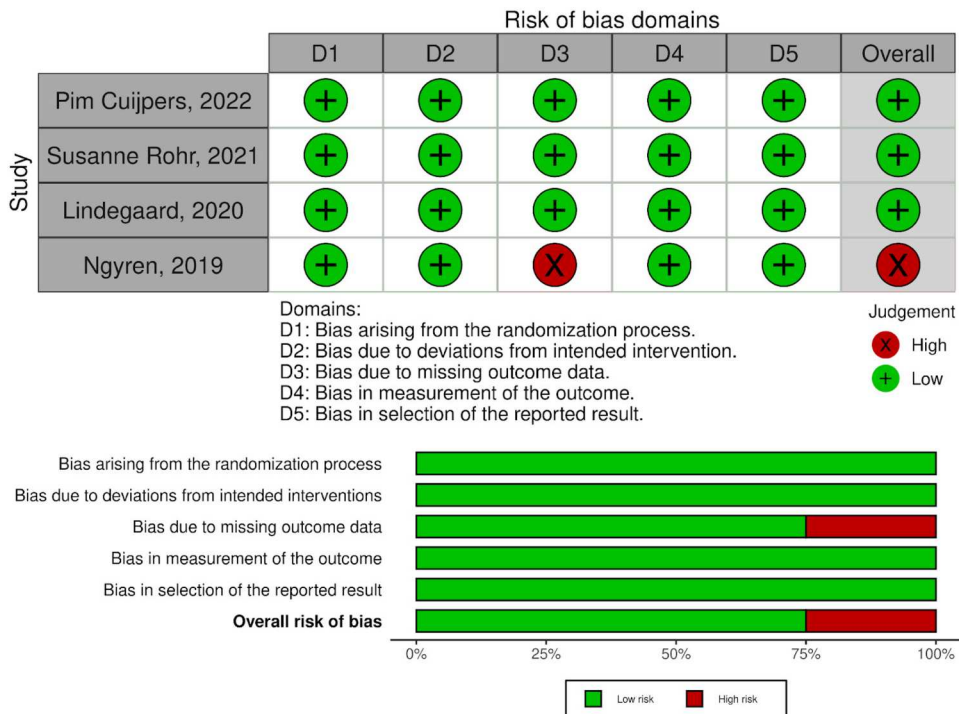


Figure 2. Traffic plot of risk of bias assessment.

improvements in depression severity using the Beck Depression Inventory (BDI-II), with p -values $<.001$ post-intervention and sustained up to 11 months. Lindegaard et al. (2021) and Susanne Rohr et al. (2021) also reported significant reductions in depression scores. However, Rohr's PHQ-9 results ($p = .039$) were less robust compared to longer intervention periods, potentially indicating the importance of treatment duration for achieving more substantial effects. Anxiety outcomes, as measured by tools such as GAD-7, demonstrated significant reductions in several studies. Cuijpers et al. (2022) and Nygren et al. (2019) both observed p -values $<.05$ for anxiety reductions, while Lindegaard et al. (2021) reported moderate improvements in measures such as PSS-14 and IES-R. However, some anxiety-related outcomes, such as the IES-R score in Lindegaard's study ($p = .59$), did not reach statistical significance, reflecting variability in the interventions' effectiveness for anxiety. Rohr et al. (2021) reported mixed results for GAD-7, with some metrics failing to reach significance. Overall, these findings suggest that while the interventions effectively reduce anxiety, their impact may be less consistent than on depression symptoms. The results for PTSD-specific symptoms were mixed, with notable variability between studies. Cuijpers et al. (2022) demonstrated significant reductions in PTSD Checklist (PCL-5) scores with p -values $<.001$, while Lindegaard et al. (2021) reported non-significant effects on the Post-Traumatic Diagnostic Scale (PDS-5), particularly at shorter follow-ups. This inconsistency could be attributed to differences in intervention design or population characteristics. Despite these mixed results, the studies highlight the potential of gadget-delivered interventions to address trauma-related symptoms when tailored appropriately to the target population.

Additional findings, such as sleep quality, stigma reduction, and overall well-being, revealed additional benefits of these interventions. For example, Lindegaard et al. (2021) observed significant reductions in self-stigma measures (SSMIS-AG, SSMIS-AP) with p -values $<.001$, indicating that these treatments not only address clinical symptoms but also help mitigate psychosocial barriers to recovery. Similarly, Nygren et al. (2019) found significant improvements in insomnia severity (ISI, $p <.001$), suggesting that these interventions can contribute to better overall functioning and quality of life. The studies also provided insights into the importance of cultural adaptation for the success of gadget-delivered interventions. Tailoring content to align with cultural norms and values, such as focusing on family-oriented activities for Kurdish participants or providing Arabic-language modules, appeared to enhance engagement and treatment effectiveness. The inclusion of culturally relevant examples and language-specific adaptations likely played a critical role in ensuring the interventions' acceptability and impact among the target populations. The intervention durations varied across studies, ranging from four weeks to three months, influencing the outcomes. Longer durations, as seen in Cuijpers et al. (2022) and Nygren et al. (2019), tended to yield more durable and significant effects compared to shorter interventions like Rohr et al. (2021). This suggests that sufficient time is needed to achieve meaningful and lasting improvements, particularly for complex conditions like PTSD. Future research should explore optimal intervention durations to maximise effectiveness while maintaining feasibility for displaced populations. More detailed information on the inclusion studies can be seen in Table 2.

Forest plot

There are three aspects of mental health improvement that we assessed with the meta-analysis (Figure 3). The first was an assessment of the reduction in depression levels in refugees post-intervention as measured by the PHQ-9. All studies provided the results of the assessment using this instrument. The meta-analysis showed that there was a significant reduction in depression in refugees post-intervention (pooled MD 4.05, 95% CI [1.91, 6.20], $p <.0002$, $I^2 = 99\%$). The second assessment corresponded to a reduction in anxiety levels measured using the GAD-7. The results of the meta-analysis also showed that there was a trend towards a significant reduction in anxiety levels in refugees post-intervention (pooled MD 2.81, 95% CI [.41, 5.20], $p <.02$, $I^2 = 100\%$). The latter was an assessment of the reduction in insomnia severity using the ISI instrument. Meta-analysis of the two studies assessing this showed a significant reduction in the intervention group (pooled MD 2.89, 95% CI [2.53, 3.24], $p <.00001$, $I^2 = 0\%$).

As part of the sensitivity analysis, this meta-analysis was re-run with certain data adjusted or removed to assess the stability and consistency of previous results. Due to the high heterogeneity, we performed a sensitivity analysis by excluding the weights from studies that caused high heterogeneity or also known as outlier studies (Figure 4). This resulted in still significant results with lower heterogeneity in each outcome (PHQ-9, pooled MD 3.45, 95% CI [3.25, 3.65], $p <.00001$, $I^2 = 0\%$; GAD-7, pooled MD 3.39, 95% CI [3.08, 3.69], $p <.0001$, $I^2 = 61\%$; ISI, pooled MD 2.89, 95% CI [2.53, 3.24], $p <.00001$, $I^2 = 0\%$).

Table 2. Data extraction.

First author, year	Cuijpers et al. (2022)	Rohr et al. (2021)	Lindegard et al. (2021)	Nygren et al. (2019)
Origin	Lebanon	Germany	Sweden	Sweden
Population	Syrian displaced people, above 18 years of age, residing in Lebanon	18- to 65-year-old Syrian refugees experiencing at least one traumatic event with PDS-5 score of 11–59	Arabic-speaking individuals in Sweden who have elevated symptoms of depression and/or anxiety as determined by their scores on the PHQ-9 and GAD-7	Kurdish (Sorani) speaking, >18 years old, depressive symptoms as the primary concern
Sample size, <i>n</i> (<i>Trial/Control</i>)	569 (283/286)	133 (65/68)	36 (18/18)	50 (25/25)
Age, Mean (SD)	31.4 (8.5)	33.0 (11.0)	40.5 (11.4)	33.0 (6.8)
Trial	31.6 (8.9)	33.7 (11.4)	34.7 (10.9)	34.72 (9.5)
Control	Step-by-Step (designed to treat depression through an internet-connected device)	Self-help app use via person-specific log-in data and work through the modules	Self-help Internet-based cognitive behavioral therapy (ICBT)	ICBT
Intervention type				
Administration	WHO's "Step-by-Step" digital program, which provided psychosocial support through a digital platform. The program included five behavioural activation-based therapy sessions, supported by non-specialist helpers, aimed at reducing depression and improving the well-being of Syrian refugees in Lebanon	Use of the self-help app regularly for 4 weeks on demand and work through the modules	Contains seven modules targeting the following problem areas: anxiety, depression, insomnia, stress, emotion regulation, worry and intrusive memories/flashbacks, as well as an introductory module and a maintenance module	Culturally adapted ICBT tailored for a Kurdish-speaking immigrant population in Sweden. The program included seven modules emphasising behavioural activation and culturally relevant content, supported by therapists through a secure online platform, effectively reducing depressive symptoms while addressing cultural and language barriers
Control type	Enhanced Care As Usual (ECAU)	Psychoeducational reading material (CG)	Waitlist control group (WCG)	Waitlist control group (WCG)
Intervention duration	3 months	4 weeks	8 weeks	8 weeks
Finding	PHQ-9 • Posttest: $p < .001$ • 3 months: $p < .001$WHO-DAS • Posttest: $p < .001$ • 3 months: $p < .001$GAD-7 • Posttest: $p < .001$ • 3 months: $p = .001$WHO-5	PDS-5 • 4 weeks: ($p = .52$) • 4 months: ($p = .79$)PHQ-9 • 4 weeks: ($p = .77$) • 4 months: ($p = .68$)GAD-7 • 4 weeks: ($p = .106$) • 4 months: ($p = .180$)PHQ-9	BDI-II: • PHQ-9 $p = .039$ • GAD-7 $p = .09$ • PSS-14 $p = .012$ • ISI $p = .01$	BDI-II: • Posttest: $p < .001$, • 11 months: $p > .05$PHQ-9; • Posttest: $p < .001$, • 11 months: $p < .05$AGAD-7; • Posttest: $p < .05$BAI; • Posttest: $p < .05$ISI;

(Continued)

Table 2. Continued.

First author, year	Cuijpers et al. (2022)	Rohr et al. (2021)	Lindegard et al. (2021)	Nygren et al. (2019)
	• Posttest: $p < .001$ • 3 months: $p < .001$PCL-5 • Posttest: $p < .001$ • 3 months: $p = .002$PSYCLOPSh • Posttest: $p < .001$ • 3 months: $p = .003$	• 4 weeks: ($p = .77$) • 4 months: ($p = .68$)PHQ-15 • 4 weeks: ($p = .32$) • 4 months: ($p = .87$)SSMIS-AG • 4 weeks: ($p < .001$) • 4 months: ($p = .05$)SSMIS-AP • 4 weeks: ($p < .001$) • 4 months: ($p = .01$)	• IES-R • $p = .59$ • BBQ • $p = .10$	• Posttest: $p < .001$

p -value was obtained from comparison pre- vs post-intervention.

Bold values indicate statistically significant p -values ($p < 0.05$).

PDS; Post-traumatic Diagnostic Scale for DSM-5; PHQ-15; Symptoms of Depression; GAD-7; Generalized Anxiety Disorder; PHQ-19; Physical Health Questionnaire; GSE: general self-efficacy; BAI: Beck Anxiety Inventory; ISI: Insomnia Severity Index; PHQ-9; Patient Health Questionnaire-9; BDI-II: Beck Depression Inventory-II; HDRS-17: 17-Item Hamilton Depression Rating Scale; CGI-S: Clinical Global Impressions-Severity of Illness scale; CGI-I: Clinical Global Impressions-Improvement scale; Q-LES-Q: Quality of Life Enjoyment and Satisfaction Scale; SSMIS-AG: Self-Stigma of Mental Illness Scale--stereotype agreement; SSMIS-AP: Self-Stigma of Mental Illness Scale--stereotype application; WHODAS: WHO Disability Assessment Schedule-12; WHO-5: WHO Wellbeing Index; PSYCHLOPS; Psychological Outcomes Profile; PCL-5; PTSD Checklist for DSM-5.

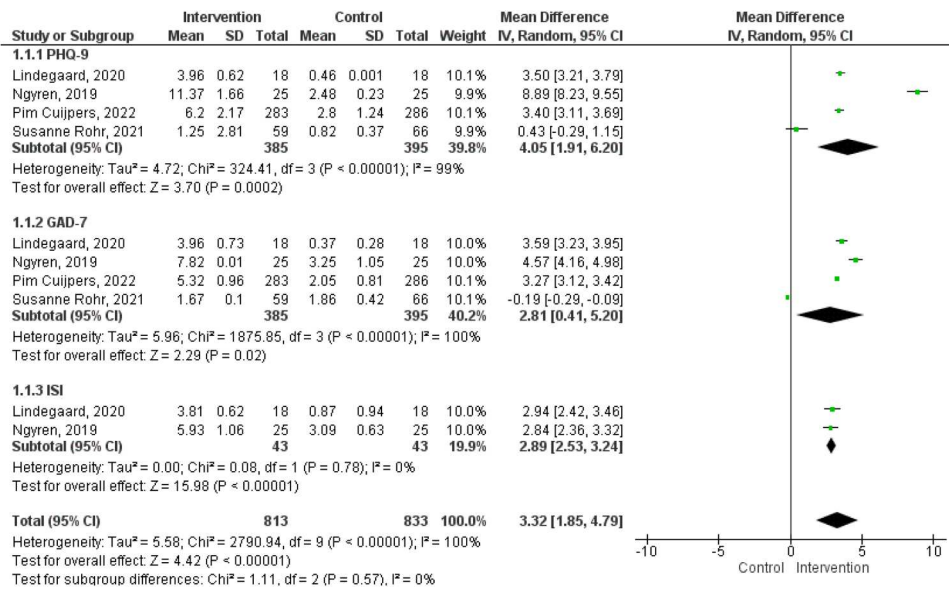


Figure 3. Forest plot before sensitivity analysis.

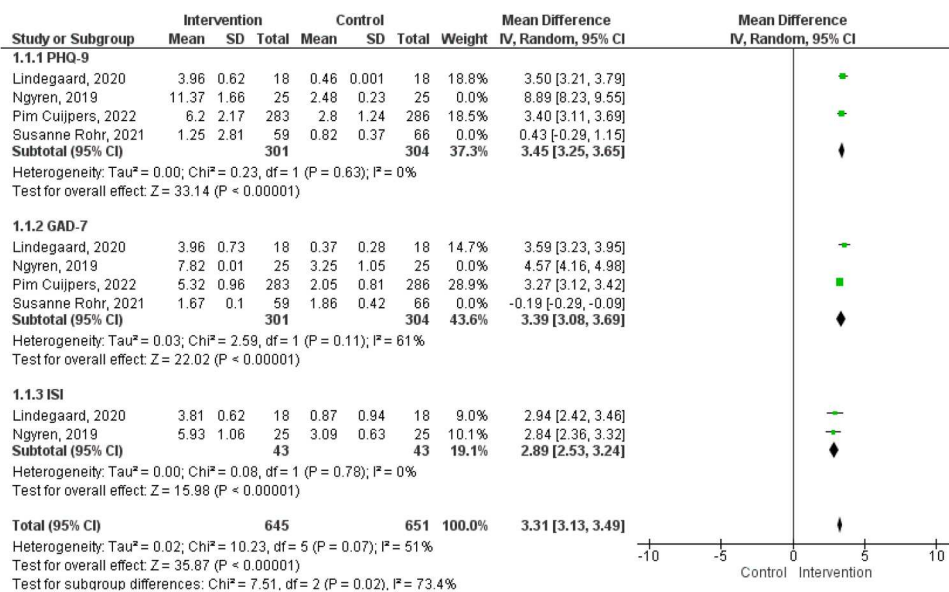


Figure 4. Forest plot after sensitivity analysis.

Discussion

Depression, anxiety, and insomnia in refugees

The Insomnia Severity Index (ISI) is measured in this study as there is a well-established link between insomnia, depression, and anxiety. Another parameter being measured in this study is the ISI. This sleep disorder linked to mental health quality, especially

depression and anxiety, has been well established: insomnia itself is one of the major symptoms present in anxiety patients. A study stated that more than 90% of PTSD sufferers who had a history of having been in war have mentioned experiencing symptoms of sleeplessness (Luo et al., 2024). Hence, taking insomnia into account when measuring depression and anxiety in refugees is important. Our study showed a significant decrease in ISI score, meaning therapy delivered via application and internet also helped refugees fixing their insomnia, which indirectly improved their anxiety.

In this context, our study focused on how supporting therapy delivered via application and internet impacted insomnia and anxiety symptoms. The intervention did not aim to address the full diagnostic criteria of PTSD. Our findings showed a significant decrease in PHQ-9, GAD-7, and ISI scores among refugee participants, suggesting improvements in depression, anxiety, and sleep quality, respectively. While PTSD was mentioned in relation to the refugees' background and vulnerability, the intervention primarily targeted sleep disturbance and psychological distress.

Previous studies have attempted to confirm these findings. In the context of treating depression, most ICBT studies to date have used waitlist controls, followed by treatment-as-usual comparators. As waitlist participants receive no active intervention during the trial but complete symptom assessments, the superior outcomes in ICBT groups may reflect the benefits of acquiring cognitive and behavioural skills (Webb et al., 2017). Moreover, our findings are also consistent with previous meta-analysis, which demonstrated significant improvement in both depression and anxiety comorbidities in patients receiving ICBT, with stable effect sizes across between- and within-group comparisons (Komariah et al., 2022; Ye et al., 2015).

The importance of social support in Islamic perspective

Anxiety may be felt in those who feel alone as refugees. It was discovered that loneliness was a predictor of social anxiety and that it was mediated by depression and emotion dysregulation separately and in combination (Eres et al., 2023). One form of support that can be accommodated to relieve anxiety is network support. A social support network is any support that comes from people who know one another and has a favourable emotional impact, serving as a significant positive psychosocial component and increasing life satisfaction (Portugal et al., 2016). Islam has brought this concept as in the Quran surah Ad-Dhuha: 3, "Your Lord has not forsaken you, nor has He become hateful of you". Through this verse, Allah tells us that Allah remains with Rasulullah and has not abandoned him, as the polytheists accuse; the loneliness felt by Rasulullah was responded to with this verse, which is a form of social support in the form of network support that Allah gave to Rasulullah. In practice, the world has also supported refugees worldwide in many forms, such as those provided by the United Nations High Commissioner for Refugees (UNHCR). The emerging Islamic Philanthropies under the UNHCR apply the concept of social support according to the Sharia law. Through these enormous supports in harmony, refugees will obtain security and may be able to improve their quality of life.

Strength and limitation

This research presents a comprehensive synthesis of RCTs evaluating gadget-mediated psychosocial interventions targeted at refugees and immigrants, emphasising their

effectiveness in alleviating symptoms of depression, anxiety, and insomnia. A salient advantage lies in the incorporation of culturally tailored interventions, which augments external validity and guarantees applicability across varied refugee demographics. The adherence to PRISMA guidelines, the evaluation of risk of bias, and the execution of sensitivity analyses further bolster methodological rigor, thereby enhancing the reliability and clinical applicability of the resultant findings.

Nevertheless, several limitations warrant consideration. The limited quantity of eligible studies alongside the heterogeneity in types of interventions, demographic populations, and outcome metrics has resulted in pronounced variability, potentially constraining the generalisability of the aggregated results. Furthermore, the brevity of follow-up intervals in the majority of trials precludes definitive conclusions regarding the long-term sustainability of the benefits derived from the interventions. The possibility of publication bias and the dependence on self-reported measures additionally introduce risks of both over- and under-estimation of the treatment effects.

It is important to note that not all of the included studies applied strict diagnostic criteria for PTSD in their inclusion process. Instead, several studies primarily recruited participants who presented with depressive symptoms, anxiety, or insomnia, provided that they were immigrants or refugees with a history of displacement due to disaster or armed conflict. This methodological diversity reflects the clinical reality that psychological distress among refugees often manifests in overlapping syndromes rather than in isolated diagnostic categories. While this may limit the extent to which our findings can be generalised exclusively to patients with PTSD, it also highlights the broader utility of gadget-delivered psychosocial interventions in addressing a spectrum of trauma-related symptoms within refugee populations.

Implication and future direction

The empirical results accentuate the feasibility of internet- and mobile-enabled interventions as scalable and economically viable substitutes for conventional in-person therapies, particularly for refugee cohorts who experience restricted access to mental health services. These interventions not only mitigate primary psychiatric symptoms but also provide adaptability and cultural sensitivity, thereby aligning with the psychosocial and spiritual requirements of displaced populations. Health policy architects and humanitarian entities ought to contemplate the integration of such methodologies into refugee health initiatives, bolstered by training programs for non-specialist facilitators and the establishment of synergies with community-oriented care.

Prospective investigations should endeavour to broaden the evidentiary framework through extensive, multinational RCTs characterised by prolonged follow-up durations to evaluate the sustainability of outcomes. Additionally, further inquiry is warranted into the manner in which religious or spiritual paradigms, exemplified by those embedded in Islamic doctrines, can be effectively assimilated into digital interventions to augment engagement and efficacy. Furthermore, sophisticated analytical methodologies such as meta-regression could elucidate moderators of treatment response, including variables such as age, gender, cultural context, and the severity of trauma, thereby informing the customisation of digital psychosocial support for refugees.

Conclusion

This review provides evidence that emphasises the positive influence of religiosity on the prevention of bad lifestyle habits, particularly substance use such as drugs, alcohol, and nicotine, as well as internet and gaming addictions. Higher levels of religiosity were shown to be associated with a decrease in the incidence of substance use and may prevent future addictions that have the potential to cause harm. However, further studies with uniform methods of presenting results are needed so that meta-regression and subgroup analyses can be conducted to obtain more specific result based on sample characteristics.

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

- Ahmadi, A., Ponder, W. N., Carbajal, J., Schuman, D. L., Whitworth, J., Yockey, R. A., & Galusha, J. M. (2023). Validation of the PCL-5, PHQ-9, and GAD-7 in a sample of veterans. *Journal of Occupational & Environmental Medicine*, 65(8), 643–654. <https://doi.org/10.1097/JOM.0000000000002898>
- Bisson, J. I., Cosgrove, S., Lewis, C., & Roberts, N. P. (2015). Post-traumatic stress disorder. *BMJ*, 351(November), h6161. <https://doi.org/10.1136/bmj.h6161>
- Cuijpers, P., Heim, E., Ramia, J. A., Burchert, S., Carswell, K., Cornelisz, I., Knaevelsrud, C., Noun, P., van Klaveren, C., van't Hof, E., Zoghbi, E., van Ommeren, M., & Chammay, R. El. (2022). Effects of a WHO-guided digital health intervention for depression in Syrian refugees in Lebanon: A randomized controlled trial. *PLoS Medicine*, 19(6), 1–15. <https://doi.org/10.1371/journal.pmed.1004025>
- Ehlers, A., Wild, J., Warnock-Parkes, E., Grey, N., Murray, H., Kerr, A., Rozental, A., Beierl, E. T., Tsiachristas, A., Perera-Salazar, R., Andersson, G., & Clark, D. M. (2020). A randomised controlled trial of therapist-assisted online psychological therapies for posttraumatic stress disorder (STOP-PTSD): trial protocol. *Trials*, 21(1), 1–13. <https://doi.org/10.1186/s13063-020-4176-8>
- Ehlers, A., Wild, J., Warnock-Parkes, E., Grey, N., Murray, H., Kerr, A., Rozental, A., Thew, G., Janecka, M., Beierl, E. T., Tsiachristas, A., Perera-Salazar, R., Andersson, G., & Clark, D. M. (2023). Therapist-assisted online psychological therapies differing in trauma focus for post-traumatic stress disorder (STOP-PTSD): A UK-based, single-blind, randomised controlled trial. *The Lancet Psychiatry*, 10(8), 608–622. [https://doi.org/10.1016/S2215-0366\(23\)00181-5](https://doi.org/10.1016/S2215-0366(23)00181-5)
- Eres, R., Lim, M. H., & Bates, G. (2023). Loneliness and social anxiety in young adults: The moderating and mediating roles of emotion dysregulation, depression and social isolation risk. *Psychology and Psychotherapy: Theory, Research and Practice*, 96(3), 793–810. <https://doi.org/10.1111/papt.12469>
- Fakhriya, S. D. (2022). Post traumatic stress disorder Dalam Perspektif Islam. *Psikoborneo: Jurnal Ilmiah Psikologi*, 10(1), 231. <https://doi.org/10.30872/psikoborneo.v10i1.7293>
- Fawzi, M. C. S., Betancourt, T. S., Lilly, M., Michelle, K., Kerim, M., Anna, C. M., Catherine, O., & Mukherjee, J. S. (2009). Depression and post-traumatic stress disorder among Haitian immigrant students: Implications for access to mental health services and educational programming. *BMC Public Health*, 9(1), 1–11. <https://doi.org/10.1186/1471-2458-9-482>
- Komariah, M., Amirah, S., Faisal, E. G., Prayogo, S. A., Maulana, S., Platini, H., Suryani, S., Yosep, I., Arifn, H. (2022). Efficacy of internet-based cognitive behavioral therapy for depression and anxiety among global population during the COVID-19 pandemic: A systematic review and meta-analysis of a randomized controlled trial study. *Healthcare*, 10(7), <https://doi.org/10.3390/healthcare10071224>
- Lindegaard, T., Seaton, F., Halaj, A., Berg, M., Kashoush, F., Barchini, R., Ludvigsson, M., Sarkohi, A., & Andersson, G. (2021). Internet-based cognitive behavioural therapy for depression and anxiety

- among Arabic-speaking individuals in Sweden: A pilot randomized controlled trial. *Cognitive Behaviour Therapy*, 50(1), 47–66. <https://doi.org/10.1080/16506073.2020.1771414>
- Luo, J., Chen, Y., Tao, Y., Xu, Y., Yu, K., Liu, R., Jiang, Y., Cai, C., Mao, Y., Li, J., Yang, Z., Deng, T. (2024). Major depressive disorder prediction based on sleep-wake disorders symptoms in US adolescents: A machine learning approach from national sleep research resource. *Psychology Research and Behavior Management*, 17, 691–703. <https://doi.org/10.2147/PRBM.S453046>
- Ma, Q., Xie, M., Llamocca, E., Luo, Y., Xiao, L., Tang, Y., Tao, S., Wu, Y., Huang, Y., Yin, Y., Liu, Y., Liu, S., Deng, R., Qiao, C., Wei, M., Chen, Y., Cai, J., Gui, H., Wang, Q. (2025). Impact of post-traumatic stress disorder symptoms, childhood adversities and stressful life events on depressive and anxiety symptoms: Insights from the UK Biobank. *Frontiers in Psychiatry*, 16, 1488320. <https://doi.org/10.3389/fpsy.2025.1488320>
- Mann, S. K., Marwaha, R., & Torrico, T. J. (2024). Posttraumatic stress disorder. *Clinical Psychology: A Global Perspective*, 191–208. <https://doi.org/10.1002/9781394259229.ch12>
- Nosè, M., Ballette, F., Bighelli, I., Turrini, G., Purgato, M., Tol, W., Priebe, S., & Barbui, C. (2017). Psychosocial interventions for post-traumatic stress disorder in refugees and asylum seekers resettled in high-income countries: Systematic review and meta-analysis. *PLoS One*, 12(2), e0171030. <https://doi.org/10.1371/journal.pone.0171030>
- Nygren, T., Brohede, D., Koshnaw, K., Osman, S. S., Johansson, R., & Andersson, G. (2019). Internet-based treatment of depressive symptoms in a Kurdish population: A randomized controlled trial. *Journal of Clinical Psychology*, 75(6), 985–998. <https://doi.org/10.1002/jclp.22753>
- Otis, N. P., Walter, K. H., Glassman, L. H., Ray, T. N., Kobayashi Elliott, K. T., & Michalewicz-Kragh, B. (2024). Comorbidity of depression and posttraumatic stress disorder: Outcomes from a randomized controlled trial of surf and hike therapies Among service members. *Psychological Trauma: Theory, Research, Practice, and Policy*, 16(Suppl. 3), S688–S697. <https://doi.org/10.1037/TRA0001673>
- Portugal, F. B., Campos, M. R., Correia, C. R., Gonçalves, D. A., Ballester, D., Tófoli, L. F., Mari, J. d. J., Gask, L., Dowrick, C., Bower, P., & Fortes, S. (2016). Social support network, mental health and quality of life: A cross-sectional study in primary care. *Cadernos de Saúde Pública*, 32(12), e00165115. <https://doi.org/10.1590/0102-311x00165115>
- Proudfoot, J., Clarke, J., Birch, M.-R., Whitton, A. E., Parker, G., Manicavasagar, V., Harrison, V., Christensen, H., Hadzi-Pavlovic, D. (2013). Impact of a mobile phone and web program on symptom and functional outcomes for people with mild-to-moderate depression, anxiety and stress: A randomised controlled trial. *BMC Psychiatry*, 13(1), 1–12. <https://doi.org/10.1186/1471-244X-13-312>
- Purgato, M., Carswell, K., Tedeschi, F., Acarturk, C., Anttila, M., Au, T., Bajbouj, M., Baumgartner, J., Biondi, M., Churchill, R., Cuijpers, P., Koesters, M., Gastaldon, C., Ilkkursun, Z., Lantta, T., Nosè, M., Ostuzzi, G., Papola, D., Popa, M., ... Barbui, C. (2021). Effectiveness of self-help plus in preventing mental disorders in refugees and asylum seekers in Western Europe: A multinational randomized controlled trial. *Psychotherapy and Psychosomatics*, 90(6), 403–414. <https://doi.org/10.1159/000517504>
- Rohr, S., Jung, F. U., Pabst, A., Grochtdreis, T., Dams, J., Nagl, M., Renner, A., Hoffmann, R., König, H. H., Kersting, A., & Riedel-Heller, S. G. (2021). A self-help app for Syrian refugees with posttraumatic stress (Sanadak): Randomized controlled trial. *JMIR MHealth and UHealth*, 9(1), 1–21. <https://doi.org/10.2196/24807>
- Safi Keykaleh, M., Jahangiri, K., & Tabatabaie, S. (2017). Review paper: Mental health challenges in immigrant and refugee children and adolescents: A systematic review. *Health in Emergencies and Disasters Quarterly*, 3(1), 3–10. <https://doi.org/10.29252/nrip.hdq.3.1.3>
- Statista. (2024). *Internet and social media users in the world from 2010 to 2024*. Statista. <https://www.statista.com/statistics/278414/number-of-worldwide-social-network-users/>
- Ünlü Ince, B., Cuijpers, P., van 't Hof, E., van Ballegooijen, W., Christensen, H., Riper, H. (2013). Internet-based, culturally sensitive, problem-solving therapy for Turkish migrants with depression: Randomized controlled trial. *Journal of Medical Internet Research*, 15(10), e227. <https://doi.org/10.2196/jmir.2853>
- Wang, S.-K., Feng, M., Fang, Y., Lv, L., Sun, G.-L., Yang, S.-L., Guo, P., Cheng, S.-F., Qian, M.-C., Chen, H.-X. (2023). Psychological trauma, posttraumatic stress disorder and trauma-related depression: A mini-review. *World Journal of Psychiatry*, 13, 331–339. <https://doi.org/10.5498/WJP.V13.I6.331>

- Wang, S., Higgins, M., Kinshuk, & Yano, Y. (2005). Limitations of mobile phone learning. In H. Ogata, & M. Sharples (Eds.), *IEEE international workshop on wireless and mobile technologies in education, WMTE 2005, tokushima, Japan* (pp. 179–181). IEEE Computer Society.
- Webb, C. A., Rosso, I. M., & Rauch, S. L. (2017). Internet-based cognitive-behavioral therapy for depression: Current progress and future directions. *Harvard Review of Psychiatry*, 25(3), 114–122. <https://doi.org/10.1097/HRP.0000000000000139>
- Ye, Y. Y., Zhang, Y. F., Chen, J., Liu, J., Li, X.-J., Liu, Y.-Z., Lang, Y., Lin, L., Yang, X.-J., Jiang, X. J. (2015). Internet-based cognitive behavioral therapy for insomnia (ICBT-i) improves comorbid anxiety and depression - A meta-analysis of randomized controlled trials. *PLoS One*, 10(11), e0142258. <https://doi.org/10.1371/journal.pone.0142258>
- Zoellner, L. A., Bedard-Gilligan, M. A., Jun, J. J., Marks, L. H., Garcia, N. M. (2013). The evolving construct of posttraumatic stress disorder (PTSD): DSM-5 criteria changes and legal implications. *Psychological Injury and Law*, 6(4), 277. <https://doi.org/10.1007/S12207-013-9175-6>