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Review

Early psychological interventions for posttraumatic stress, depression and anxiety after traumatic injury: A systematic review and meta-analysis

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HIGHLIGHTS

- Early intervention is recommended to prevent or reduce psychological conditions postinjury.
- Early interventions effectively reduced PTSD and depression symptom severity.
- CBT-based therapy, with prolonged exposure, is likely to have the greatest clinical impact.
- Interventions with stepped or collaborative care will have the greatest population impact.

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ABSTRACT

The psychological impacts of injury have significant long-term implications on injury recovery. This review examined the effectiveness of interventions delivered within three months of injury on reducing the severity of posttraumatic stress disorder (PTSD), anxiety and depression symptoms. A systematic search of seven databases (PsycINFO, Medline, Web of Science, CINAHL, Embase, Scopus and Cochrane Library) identified 15,224 records. 212 full-text articles were retrieved, 26 studies were included in narrative synthesis, and 12 studies with lower risk of bias were included in meta-analyses. Prolonged exposure, and cognitive and behavioural interventions elicited improvements in PTSD, anxiety and depression symptoms; multidisciplinary interventions improved PTSD and depression symptoms; and education-based interventions had little impact on any psychological symptoms. Studies comprising risk stratified or stepped care methods showed markedly greater population impact through better reach, implementation and adoption. Meta-analyses revealed small-medium reductions in PTSD symptoms over the first 12 months postinjury (SMD = 0.32 to 0.49) with clinically meaningful effects in 64% of studies; reduced depression symptoms at 0–3 (small effect; SMD = 0.34) and 6–12 months postinjury (medium effect; SMD = 0.60), with clinically meaningful effects in 40% of studies; but no pooled effects on anxiety symptoms at any time. Altogether, exposure- and CBT-based psychological interventions had the greatest impact on PTSD and depression symptoms postinjury when delivered within three months of injury, with risk-stratified, stepped care having the greatest population impact potential.

Abbreviations: BAI, Beck Anxiety Inventory; BDI, Beck Depression Inventory; BDI-II, Beck Depression Inventory-II; CAPS, Clinician-Administered PTSD Scale; CBT, cognitive behavioural therapy; CES-D, Center for Epidemiological Studies Depression Scale; CI, confidence interval; DASS-21, Depression Anxiety and Stress Score; EMD, eye movement desensitisation; FE, fixed effects; HADS-A, Hospital Anxiety and Depression Scale, Anxiety subscale; HADS-D, Hospital Anxiety and Depression Scale, Depression subscale; IES, Impact of Events Scale; IES-R, Impact of Events Scale-Revised; mTBI, mild traumatic brain injury; MVC, motor vehicle collision; NHMRC, National Health and Medical Research Council; NICE, National Institute for Health and Care Excellence; NR, not reported; NS, not stated; PCL-C, PTSD Checklist-Civilian Version; PC-PTSD, Primary Care Post-Traumatic Stress Disorder Screening; PDS, Posttraumatic Diagnostic Scale; PHQ-9, Patient Health Questionnaire-9 item Depression Screen; PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-analyses; PSS-I, The PTSD Symptom Scale Interview; PSS-SR, The PTSD Symptom Scale-Self Report Version; PTSD, posttraumatic stress disorder; PTSS-10, Posttraumatic Stress Syndrome questionnaire; RCT, randomized controlled trial; RE, random effects; RevMan, Review Manager; SD, standard deviation; SMD, standardised mean difference; STAI, the State-Trait Anxiety Inventory; SUDS, Subjective Units of Distress Score

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1. Introduction

Most people show remarkable resilience and recover well after injury; however, a significant minority develop psychological conditions including anxiety, depression and posttraumatic stress disorder (PTSD). For instance, within one year of traumatic injury, about a third of people meet the diagnostic criteria for PTSD and depression (Shih, Schell, Hambarsoomian, Belzberg, & Marshall, 2010; Sterling, Hendrikz, & Kenardy, 2011), and approximately one in five have a clinically poor trajectory for psychological outcomes (Bryant et al., 2010). A recent systematic review found that psychological distress is especially elevated after whiplash injury, spinal cord injury and acquired brain injury sustained in a motor vehicle collision (Craig et al., 2016). Several studies have shown that, once present, elevated psychological distress symptoms remain stable over the first two to three years post injury for a subset of injured people (Craig et al., 2016; Mayou & Bryant, 2002). Moreover, people who develop conditions like PTSD, depression or anxiety after injury typically have poorer long-term physical health, disability, and reduced participation in activities of daily living, including social and economic participation (Zatzick et al., 2008), highlighting the need to treat those at risk early.

Psychological conditions may arise partly due to predisposing risk factors as well as trauma-related characteristics including high levels of acute distress, and difficulty coping with the immediate consequences of the event (Bryant et al., 2010; Shih et al., 2010). In particular, the development of psychological distress symptoms within three months postinjury is one of the strongest determinants of disability 12 months postinjury (O'Donnell et al., 2013), more so than factors like injury severity, premorbid disability and acute pain severity. The frequent co-occurrence of anxiety, depression and PTSD symptoms after traumatic injury (Shalev, Freedman, Peri, & Brandes, 1998) is thought to indicate a generalized distress response to the trauma (Grant, Beck, Marques, Palyo, & Clapp, 2008; Thompson, Berk, O'Donnell, Stafford, & Nordfjaern, 2015). However, it is notable that early symptoms of several psychological conditions (especially PTSD; Fishbain, Pulikal, Lewis, & Gao, 2016) increase the likelihood of other disabling outcomes like chronic pain (Liedl et al., 2010; Mayou & Bryant, 2002; Wiech & Tracey, 2009) through shared vulnerability mechanisms. Identifying those at risk of poor outcomes and implementing early interventions to improve injury recovery is therefore a high priority (Forneris et al., 2013).

The key goal of early intervention is to prevent or attenuate the severity of psychological sequelae of injury in those at greatest risk by initiating treatment during the acute or sub-acute period. While implementing interventions early after injury is a high priority, it is not clear which early interventions are the most effective at reducing the severity and impact of psychological conditions, nor which intervention modalities offer the greatest potential for population impact. To date, most early interventions for psychological outcomes involve education, psychological therapy using cognitive behavioural therapy (CBT), prolonged exposure, and medical review and management (National Institute for Health and Care Excellence, 2005, 2011, 2016). International guidelines recommend physician or psychologist delivered trauma-focused CBT for those who present with PTSD symptoms within 3 months of a traumatic event (National Institute for Health and Care Excellence, 2005; Phoenix Australia - Centre for Posttraumatic Mental Health, 2013). Similarly, individual self-help interventions based on CBT, or group-based CBT, are recommended for people with mild to moderate depression who do not respond to first-line treatments (i.e. psychoeducation and active monitoring; National Institute for Health and Care Excellence, 2016). CBT-based self-help and guided psychoeducational groups are also the first-line recommended treatments for those whose anxiety symptoms persist despite education and encouragement of active monitoring strategies (National Institute for Health and Care Excellence, 2011). We note that these recommendations are specific to the early period post-injury, and that the theoretical

frameworks and treatment guidelines for chronic mental health conditions are likely to differ (e.g., initiating medications).

Only one previous systematic review examined the effectiveness of interventions implemented to *prevent* psychological distress following a motor vehicle crash (Guest, Tran, Gopinath, Cameron, & Craig, 2016). Three of the six CBT-based studies identified in that review brought about significant reductions in distress symptoms compared with waitlist control interventions. However, the studies identified in that review delivered interventions up to 18 months postinjury, and focused only on prevention of psychological symptoms in those who did not already have clinically elevated symptoms after transport injury. Therefore, the effects, and likely population-level impacts, of *early* interventions using psychological treatments (e.g., CBT or prolonged exposure) for those at risk of long-term psychological symptoms after traumatic injury, which may include those who have elevated acute distress symptoms, remains to be critically examined.

The present systematic review examined the efficacy of early interventions delivered to adults within three months of unintentional traumatic injury on the severity of psychological symptoms. Traumatic injury was defined as unintentional traumatic damage to the bodily tissues, and did not include trauma with a primary psychological injury, or that was intentional (e.g., assault). Where possible, we sought to identify the key features of successful interventions, and to examine the likely population impact of interventions based on the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework (Glasgow, Lichtenstein, & Marcus, 2003; Zatzick, 2012). Meta-analyses of studies considered to have lower risk of bias were conducted to determine the efficacy of early interventions (within and across intervention types) on PTSD, depression and anxiety symptoms.

2. Method

2.1. Search strategy

A systematic search of PsycINFO, Medline, Web of Science, CINAHL, Embase, Scopus and Cochrane Library electronic databases was conducted in September 2016, and was updated in September 2017. Procedures outlined in the Preferred Reporting Items for Systematic-Reviews and Meta-analyses (PRISMA) were followed (see Fig. 1; Moher, Liberati, Tetzlaff, & Altman, 2010). The search strategy included a combination of population, intervention and outcome keywords and Medical Subject Heading (MeSH) terms specific to early treatment to prevent chronic pain and secondary psychological outcomes following injury. Search terms included (but were not limited to): Motor vehicle accident/crash, work accident, injury, compensable injury (Population); Prevention, rehabilitation, cognitive behavioural therapy, cognitive training, psychological debriefing, CBT, psychological first aid, trauma-focused CBT, exposure therapy, cognitive therapy (Intervention); and Psychological distress, anxiety, depression, PTSD and posttraumatic stress. See Table A1 for all keywords and MeSH terms, and Table A2 for the Medline search strategy.

Trial authors and chief investigators of published protocols and registered trials on.

www.clinicaltrials.gov and www.anzctr.org.au were contacted to request any new published outcomes that may not have been indexed yet; however, none were available. A targeted search of Google Scholar was conducted for prominent study authors' research output, as well as a targeted search of the National Institute of Health and Care Excellence (NICE) grey literature database. Search outputs were managed using Endnote version × 8.

2.2. Inclusion and exclusion criteria

The search was restricted to peer-reviewed papers that described original empirical research, written in English, and published between 1990 and September 2017, to ensure that included papers were consistent with the most recent treatment guidelines.

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