Authors & year	Design	Intervention (I) and Comparison (C)	Population Mean age (SD)[1] Gender (%)	Delivered to	Dosage (total number of sessions)	Primary Outcome domain (Measure(s))	Secondary Outcome domain (Measure(s))	Total sample size	Participants	
									I	C
Cognitive behavioural therapy for insomnia										
Baddeley et al., 2013	Case study with 90 day follow-up	I: Cognitive behavioural therapy for insomnia	US Navy veteran with PTSD and insomnia Mean age: 70 Gender: Male	Individual	Six sessions	- Insomnia (Sleep diary: sleep efficiency; total sleep time; sleep quality; ISI)	- PTSD (PCL) - Depression, Anxiety & stress (DASS) - Sleep-related beliefs (DBAS-16)	N= 1	n= 1	N/A
The results of the case study showed that the participant's total sleep time increased from 4.5 hours per night to 5 hours per night, and sleep efficiency was increased from 56.3% to 83%, after CBTi. It was not reported whether these differences are clinically significant. Sleep quality increased from 2 to 3, where 1= very poor and 5= very good. The ISI score dropped a clinically significant degree, moving from the severe insomnia range to the minimal range at follow-up. It should be noted, however, that this was after the individual also received therapy for PTSD. It remains unclear how significantly insomnia severity was affected by the CBTi intervention due to the confounding effect of the PTSD therapy. There was also a reduction in PTSD, depression and stress scores post-intervention, but the unique effect of CBTi on this change is unknown.										
Edinger et al., 2009	RCT with six month follow up	I: Cognitive behavioural therapy for insomnia C: Sleep hygiene	US adults with mixed psychiatric disorders and insomnia (veteran status not described) Mean age: 54.2 (13.7) Gender: Male (86%)	Individual	Four bi-weekly sessions 30-60 minutes each	- Insomnia (ISQ; PSQI; Sleep diary: time in bed; total sleep time; sleep onset latency; wake after sleep onset; sleep efficiency; actigraphy[2])	- Sleep-related beliefs (DBAS-14)	N= 81	n= 41	n= 40
CBTi produced significantly greater sleep improvements compared to sleep hygiene at post-treatment for sleep onset latency and sleep efficiency, with moderate effect sizes. In actigraphy measures, the CBTi group also showed significant improvements in sleep after wake onset at six months follow-up. As a whole, there was a significant reduction in wake after sleep onset and increase in total sleep time for both groups at post-treatment, with an additional significant increase in total sleep time between post-treatment and six month follow-up. The CBTi group also showed greater short and long-term improvements to sleep-interfering beliefs and insomnia symptoms.										
Epstein et al.,	Single group	I: Brief insomnia	US OEF/OIF	Individual	Four sessions	- Insomnia (Sleep diary:	None	N= 41	n= 41	N/A

[1] Mean age and SD is given when provided, alternatively age range is provided

[2] Objective measure of sleep/wake cycles

2013	pre-post with three month follow-up	treatment with electronic components	veterans exposed to a potential TBI with insomnia Mean age: 30.3 (7.7) Gender: Male (95%)			total sleep time; sleep onset latency; wake after sleep onset; sleep efficiency; time in bed; PSQI; PSQI-A; ISI) - Sleep self-efficacy				
There were significant improvements to insomnia severity (ISI), sleep quality (PSQI) and sleep self-efficacy from pre-treatment to post-treatment and these improvements were maintained at three month follow-up. There was no significant change to disruptive nocturnal behaviours (PSQI-A). While there were no significant differences in sleep diary measures of sleep onset latency and wake after sleep onset between pre and post-treatment, there were significant increases in total sleep time, time in bed, and sleep efficiency between pre and post-treatment.										
Gellis & Gehrman, 2011	Single group pre-post	I: Cognitive behavioural therapy for insomnia	US veterans (88% Vietnam) with PTSD and insomnia Mean age: 58.6 (3.0) Gender: Male (100%)	Individual	Five sessions	- Insomnia (ISQ; actigraphy)	- PTSD (CAPS; PCL-M) - Other psychiatric disorders (MINI; STAXI; PHQ-9) - Daytime sleepiness (ESS) - Fatigue (FSS) - Nightmares (NFQ; NES)	N= 8	n= 8	N/A
In this small, single group pre-post study (n=9), it was found that post-treatment, there were significant improvements to all subjective measures of sleep diary (sleep onset latency; wake time after sleep onset; total sleep time; sleep efficiency) and severity of insomnia, with moderate to large effect sizes (*d*= 0.6-3.2). There were no differences in objective measures of sleep (actigraphy). Five of the eight participants continued to have sleep patterns consistent with clinically significant insomnia post-treatment. There were no significant differences in nightmares, PTSD severity or other psychiatric or sleep related outcomes post-treatment.										
Haynes et al., 2011	Retrospective single group pre-post	I: Brief group therapy based on cognitive behavioural therapy for insomnia	US veterans with severe mental illness and insomnia in psychiatric hospitals Mean age: 51.6 (12.2) Gender: Male (95%)	Group	One session, 60 minutes	- Insomnia (ISI)	None	N= 19	n= 19	N/A
There was a significant reduction in insomnia severity scores after treatment, with scores moving from the moderate severity range to the sub-threshold range. These reductions were almost clinically significant for seven participants, while six participants reported a slight worsening of their sleep.										
Karlin et al., 2013	Single group pre-post	I: Cognitive behavioural therapy	US veterans presenting for treatment at mental health and primary care settings with	Individual	Six sessions	- Insomnia (ISI)	- Depression (BDI-II) - Quality of life (WHOQOL-BREF)	N= 182	N= 182	N/A

			insomnia Mean age: 50 (15) Gender: Male (78%)							
On average, participants experienced a moderate clinical improvement to insomnia severity scores post-treatment. Sixty-one participants of the 115 who completed treatment (53%) no longer had clinically recognised insomnia. There were also statistically significant improvements to depression symptoms and quality of life post-treatment.										
Khawaja et al.,	Retrospective case-control	I: Cognitive behavioural therapy informed sleep skills education C: Non-attenders to the intervention	US veterans partially hospitalised in a psychiatric program Mean age: 48-48.5 (11.6-13.1) Gender: Male (91%)	Group	One to four sessions, 60 minutes each	- Insomnia (PSQI; sleep latency; sleep time)	None	N= 183	n= 106	n=77
Both groups improved significantly in terms of sleep quality as indicated by the PSQI, and there was no statistically significant difference in the level of improvement between the control and intervention group. There were significant reductions in sleep latency (18 minutes) and increases in sleep time, from 6.1 - 6.7 hours in the intervention group.										
Perlman et al., 2008	Single group pre-post	I: Cognitive behavioural therapy for insomnia	US veterans with insomnia and co-morbid psychiatric disorders Mean age: 52.4 (13.5) Gender: Male (75%)	Group	Eight to ten sessions, 75 minutes each	- Insomnia (Sleep diary: total sleep time; sleep onset latency; wake after sleep onset; sleep efficiency; PSQI; ISI) - Sleep-related beliefs (DBAS-16)	- Daytime impairment (MFI-20; QIDS-SR; STAI) - Hypnotic use	N= 20	N= 20	N/A
After treatment, wake after sleep onset time decreased on average by 99 minutes, total sleep time increased by 45 minutes, and sleep efficiency increased from 63% to 84%. In addition, sleep onset latency, frequency of awakenings and sleep diary subjective reports of sleep quality and restedness all improved significantly. All other subjective measures (PSQI; ISI; DBAS-16; MFI-20; QIDS-SR; STAI) of sleep quality, daytime impairment and depression and anxiety symptoms improved significantly post-treatment. However, the PSQI and ISI showed that on average, the group continued to have residual insomnia after treatment. Hypnotic use also improved, with 88% of participants taking hypnotics reducing use or stopping entirely.										
Pigeon et al., 2013	Case study with three month follow-up	I: Brief cognitive behavioural therapy for insomnia (two sessions delivered via telephone)	US veteran with insomnia and depression Mean age: Not reported Gender: Male	Individual	Four sessions, S1: 45 minutes, S2-4: 15-30 minutes	- Insomnia (Sleep diary: total sleep time; sleep onset latency; wake after sleep onset; sleep efficiency; number of awakenings; ISI)	- Depression (PHQ-9)	N= 1	n= 1	N/A
For the single participant in this case study, the ISI score decreased from 21 at pre-treatment to 8 at post-treatment and 6 at follow-up, meaning the person no longer had clinically meaningful insomnia. Depression scores also dropped from 11 to 2 by follow-up. Sleep latency was reduced from 52 minutes to 11 minutes at follow-up, wake after sleep onset reduced from 57 minutes to 8 minutes at follow-up and										

sleep efficiency improved from 76% to 95% at follow-up. However, as no significance testing was done, it is not known if these sleep diary indicated improvements are significant.										
Trockel et al., 2014	Single group pre-post	I: Cognitive behavioural therapy for insomnia delivered by therapists in training	US veterans with insomnia Mean age: 52 (14.0) Gender: Male (85%)	Individual	Six sessions	- Insomnia (ISI)	None	N= 696	N= 696	N/A
Of the 696 participants who started treatment in this single group,pre-post study, 62% completed all sessions (n= 432). For those that completed treatment, it was found that overall, ISI score decreased from 20.7 at pre-treatment to 10.9 at post-treatment (*d*= 2.3). At post-treatment, 35% had no clinically significant insomnia, 38% had sub threshold insomnia, 20% had moderate insomnia and 7% had severe insomnia.										
Cognitive behavioural therapy for insomnia with an adjunctive psychological intervention										
Germain et al., 2012	RCT with four month follow-up	I1: Behavioural sleep intervention incorporating cognitive behavioural therapy for insomnia and imagery rehearsal therapy I2: Pharmacotherapy C2: Placebo	US veterans with sleep complaints Mean age: 40.9 (13.2) Gender: Male (90%)	Individual	Five to eight sessions, 45 minutes each	- Insomnia (Sleep diary: total sleep time; sleep onset latency; wake after sleep onset; sleep efficiency; number of awakenings; ISI; PSQI; polysomnogram) - Nightmares (Sleep diary: frequency) - Improvement or worsening of symptoms (CGI)	- Mental health symptom severity (PCL; BDI; BAI)	N= 50	n:I1= 17 n:I2= 18	n:I1= 15
Insomnia severity was significantly lower in both intervention groups post-treatment, in comparison to the placebo group. All groups showed improvements to sleep quality using the PSQI across time. All groups showed improvements in sleep diary indicators. Overall, sleep improvements were found in 62% of those in the intervention groups and 25% of those in the placebo group. At follow-up, the behavioural intervention group had significantly greater insomnia improvements compared to the pharmacotherapy group. There were no other significant differences in sleep measures at follow-up between groups, and significantly greater improvements to insomnia severity were maintained for the psychological intervention group at follow-up. There were no significant differences in objective sleep measures (polysomnogram) or daytime mental health symptom measures.										
Harb et al., 2009	Single group pre-post	I: Cognitive behavioural therapy for insomnia combined with imagery rehearsal	US OIF veterans recently post deployment with PTSD and recurrent nightmares Mean age: 37.3 (9.2) Gender: Male (100%)	Individual	Six sessions (three CBT; three IRT)	- Insomnia (PSQI; sleep diary) - Nightmares (NFQ; sleep diary)	- PTSD (PCL-M)	N= 11	n= 11	N/A
Sleep quality improved significantly after treatment as indicated by the PSQI. Sleep diaries indicated an average nightly increase in sleep of 37 minutes and a decrease in sleep onset latency by 10 minutes. There										

were no changes in frequency of overall nightmares from the sleep diaries however, there was a trend for less intense dreams, and lower frequency of the primary nightmare (the target of the imagery rehearsal therapy). While four participants responded very well to treatment, three participants (from the group of 11) did not show improvement or worsened. There was a moderate change in PTSD symptom severity post-treatment.										
Margolies et al.,	RCT	I: Cognitive behavioural therapy for insomnia with adjunctive imagery rehearsal therapy (when participants reported problem nightmares) C: Waitlist	US OEF/OIF veterans with PTSD and insomnia Mean age: 37.7 (9.1) Gender: Male (90%)	Individual	Four sessions, 60 minutes each	- Insomnia (Sleep diary: total wake time; total sleep time; sleep onset latency; wake after sleep onset; sleep efficiency; actigraphy, PSQI; ISI) - Sleep-related beliefs (DBAS-16)	- PTSD (PSS-SR) - Mood (PHQ-9; POMS)	N= 40	n= 20	n= 20
After CBTi and IRT the intervention group showed significant improvements to sleep diary outcomes, in terms of sleep efficiency, sleep onset latency and wake after sleep onset (*d*= .13 - .40) and for sleep quality (PSQI), in comparison to the control group. There was no difference in changes in total sleep time between groups, although the intervention group trended towards increases in total sleep time. On the ISI, the intervention group decreased from moderately severe insomnia to sub threshold insomnia after treatment, whereas the controls remained as moderately severe. There were significant improvements in the treatment group on objective sleep measures (actigraphy) for sleep efficiency and wake after sleep onset but not for sleep latency and total sleep time. In terms of within-group effects, the treatment group had significant decreases in PTSD symptoms and improvements to mood post-treatment, whereas the controls showed significant increases in PTSD symptoms and no change in mood post-treatment.										
Swanson et al., 2009	Single group pre-post	I: Cognitive behavioural therapy with adjunctive exposure, relaxation and rescripting therapy	US veterans (90% Vietnam) with PTSD and insomnia Mean age: 59 (4.0) Gender: Male (100%)	Group	Ten sessions, 90 minutes each	- Insomnia (Sleep diary: total sleep time; sleep onset latency; wake after sleep onset; sleep efficiency; time in bed; PSQI; ISI) -Nightmares (Sleep diary: distress level; frequency)	- PTSD (PDS)	N= 10	n= 10	N/A
All sleep diary measures and PSQI and ISI scores improved significantly from pre to post-treatment (*d*= 0.46- 1.70). Post-treatment, 80% of participants reported an ISI score in the subthreshold range, whereas pre-treatment, the average ISI score for participants was in the moderate severity insomnia range. Weekly nightmares reduced by 50% and nightmare distress reduced by 46% from pre- to post-treatment.										
Ulmer et al., 2011	RCT	I: Cognitive behavioural therapy for insomnia and imagery rehearsal therapy C: Usual care	US veterans with insomnia and PTSD Mean age: 46 (11.1) Gender: Male (68%)	Individual	Six sessions, 60 minutes each	- Insomnia (Sleep diary: total sleep time; sleep onset latency; wake after sleep onset; sleep efficiency; PSQI; ISI) - Nightmares (Sleep diary: frequency)	- PTSD (PCL-M) - Depression (PHQ-9)	N= 22	n= 13	n= 9
The intervention produced significantly greater improvements in the sleep diary measures of total sleep time, sleep onset latency and nightmare frequency compared to the control condition. Post-intervention, all the intervention participants had achieved normal sleep onset latency compared to just 14% of controls. However, the two groups did not differ at post-intervention on the percentage of those who had achieved normal wake after sleep onset levels. For insomnia (ISI), sleep quality (PSQI) and PTSD symptoms (PCL-M), significantly greater improvements were found in the intervention group compared to the										

control group. The two groups did not differ in terms of depression from pre to post-treatment. Remission rates in the intervention group for insomnia were 11%, for sleep quality they were 33% and for PTSD they were 50%.										
Cognitive behavioural therapy for insomnia with pharmacotherapy										
Ruff et al., 2009	Prospective cohort with six month follow-up	I: Sleep hygiene and pharmacotherapy for nightmares	US OEF/OIF veterans with mTBI and headaches, the majority with PTSD Mean age: 29.4 (2.9) Gender: Male (93%)	Individual	Five sessions	- Insomnia (Subjective reports; ESS)	None	N= 74	n= 74	N/A
After taking the pharmacotherapy for nine weeks, both the veterans who completed the entire course of pharmacotherapy (n= 62) and those veterans who did not (n= 12) showed significant reductions in levels of daytime sleepiness. Of those who completed pharmacotherapy, 97% reported restful sleep and reduced or eliminated nightmare frequency. Of those who did not complete the pharmacotherapy course, 75% reported non-restful sleep at post-treatment. Comparisons were made between veterans who were taking pharmacotherapy at follow-up (n= 64) and those who weren't (n= 10). The non-pharmacotherapy group reported significantly higher levels of daytime sleepiness (ESS) at follow-up, and those who were taking pharmacotherapy had ESS scores in normal range.										
Alternative interventions										
Mind-body bridging										
Nakamura et al., 2011	RCT	I: Brief mind-body bridging program C: Sleep hygiene	US veterans with sleep disturbances Mean age: 49.9-53.8 (10.4) Gender: Male (95%)	Group	Two sessions, 90 minutes each	- Sleep (MOSS-SS)	- Quality of life (MOS-SF-36) - Depression (CES-D) - PTSD (PCL-m)	N= 63	n= 35	n= 28
There was a significant reduction in sleep problems in both groups however, the magnitude of improvement in sleep for the intervention group was significantly greater than that for the control group. Post intervention, 3% of participants in the intervention group reported no improvement or a deterioration in sleep compared to 25% of the controls. There were no significant differences in quality of life. There were significant reductions in severity of PTSD symptoms for those in the intervention group with moderate to severe PTSD symptoms in comparison to the control group. Depression scores decreased significantly in both groups post-treatment.										
Hypnotherapy										
Abramowitz et al., 2008	RCT with one month follow-up	I: Hypnotherapy and sleep hygiene C: Pharmacotherapy and sleep hygiene	Israeli veterans with PTSD Mean age: 31.7 (not reported) Gender: Male (100%)	Individual	Four sessions, 90 minutes each	- Insomnia (Sleep diary: total sleep time; quality of sleep; number of awakenings) - Daytime (ability to concentrate; morning	- PTSD (IES; PDS) - Depression (BDI)	N= 42	n= 17	n= 16

						sleepiness)				
Total sleep time improved significantly in both groups from pre to post-treatment. Sleep quality improved significantly in the hypnotherapy group compared to the pharmacotherapy group. While number of awakenings decreased in both groups from pre to post-treatment, they decreased more pronouncedly in the hypnotherapy group. Ability to concentrate and levels of morning sleepiness stayed relatively unchanged in the pharmacotherapy group from pre to post-treatment while the hypnotherapy group improved significantly. PTSD symptoms and depression reduced in both groups following intervention, with the greatest reductions observed in the intervention group.										