

Background

- Insomnia is considered the most prevalent sleep disorder, with up to 30% of the general population afflicted chronically.
- Continues to be under-recognized and untreated. Left untreated, it could increase the risk of mental health and physical disorders
- While numerous studies demonstrate the effectiveness of cognitive behavioral therapy for insomnia (CBTi), barriers to its use persist (lack of trained personnel, equitable access, and affordability)
- Alternative delivery methods including online CBTi have been evaluated to address these barriers.

Purpose

Evaluate and quantify the most current evidence for online CBTi as a treatment for chronic adult insomnia

Methods

- EBSCO MEDLINE®, CINAHL®, Ovid MEDLINE®, PsycINFO®, Ovid EMCARE, and PubMed®
- Inclusion criteria: randomized trials, adults with chronic insomnia, compared online CBTi to at least one control, Insomnia Severity Index or the Sleep Condition Indicator as measurement tool
- Exclusion criteria: insomnia not primary diagnosis, primary intervention not online/web-based form of CBTi, significant mental or physical health disorders, and specific populations (pregnant, shift workers, or unstable sleep apnea)
- Primary outcomes: insomnia severity (IS), sleep efficiency (SE)
- Secondary outcomes: wake after sleep onset (WASO), sleep onset latency (SOL), total sleep time (TST), nocturnal awakenings (NWAK)
- PRISMA checklist and Cochrane Risk of Bias for quality/bias assessment per study
- Review Manager (RevMan) 5.3, Number Cruncher Statistical System (NCSS), *Meta-Essential* excel add-in
- Between group and pooled effects calculated under a random-effects model using standardized mean differences for effect sizes (ES). Hedges' *g* applied to correct small sample bias
- ES values of 0.2, 0.5, and 0.8 were used to represent small, medium, and large effects, respectively
- Heterogeneity measured with I^2 percentages of 25%, 50%, and 75% considered low, moderate, and high heterogeneity, respectively.
- Publication bias assessed with funnel plots, Duval and Tweedie's trim and fill method, Egger's Regression model, Begg and Mazumdar's test

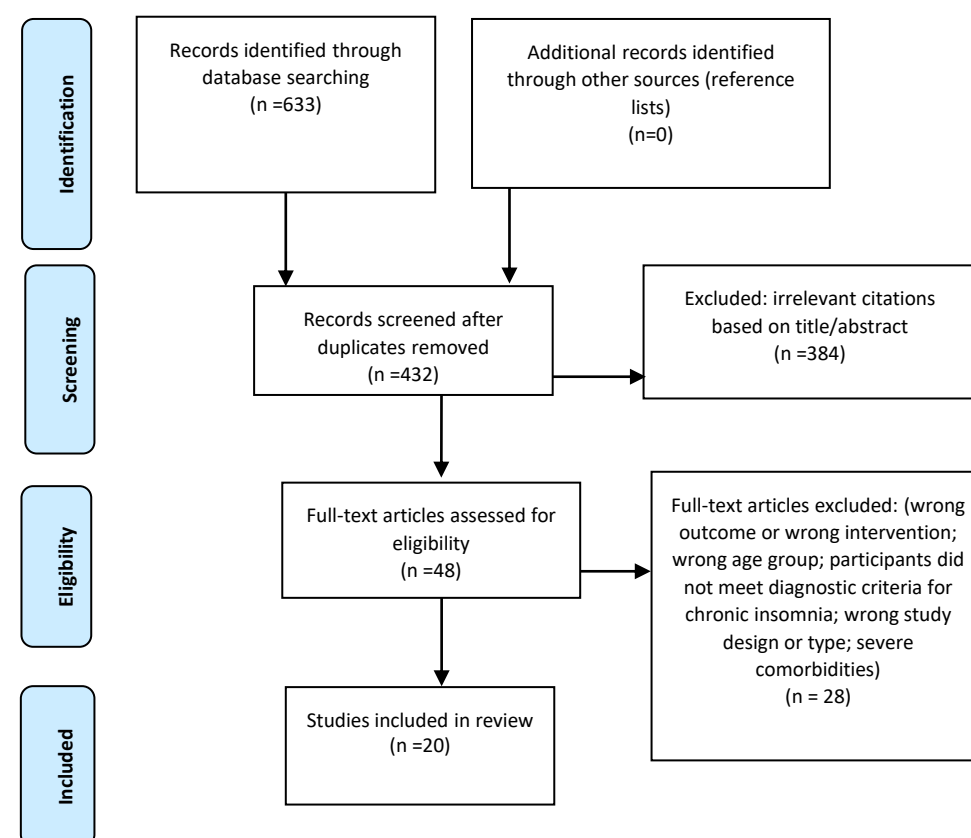


Figure 1. PRISMA Flow Diagram

Analysis

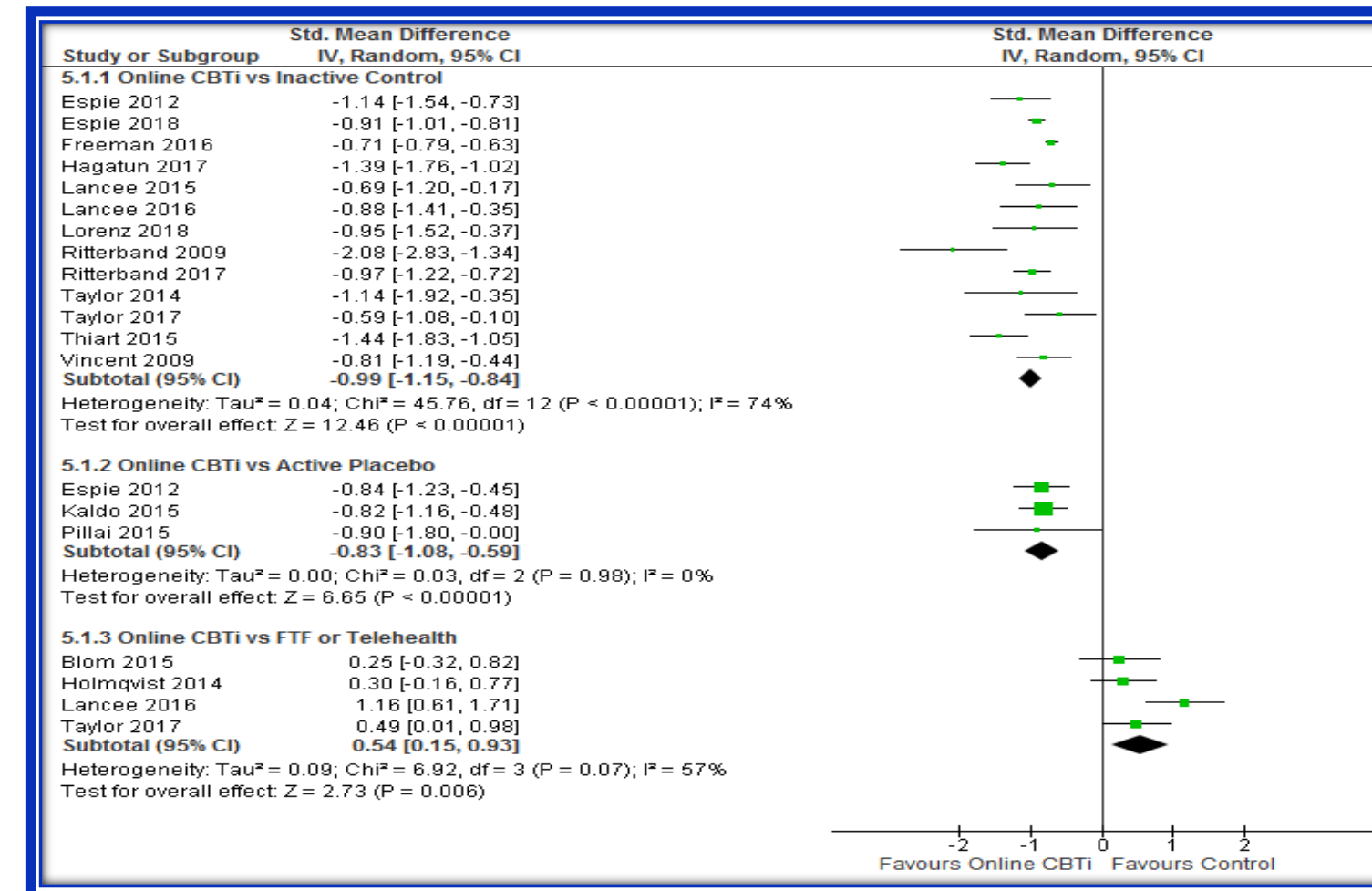


Figure 2. Between-Group Effects, Insomnia Severity

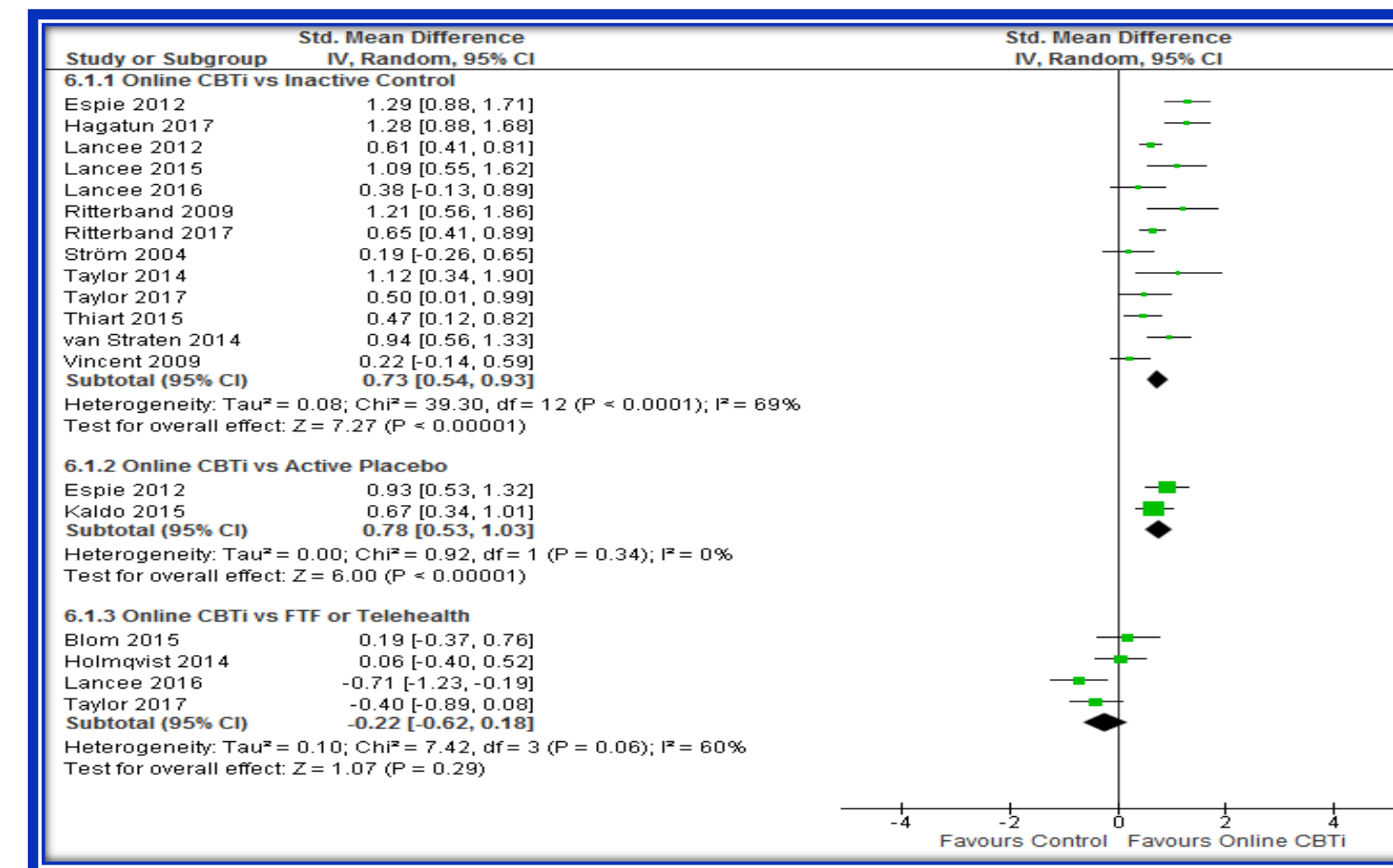


Figure 3. Between-Group Effects, Sleep Efficiency

Table 1. Pooled Effects, Primary and Secondary Outcomes

Outcome	N _c	Effect Size (95% CI), P	I^2 (P)
Insomnia severity (IS)	5726	-0.75 (-0.96, -0.55), $P < 0.00001$	88% ($P < 0.00001$)
Sleep efficiency (SE)	1880	0.66 (0.48, 0.84), $P < 0.00001$	69% ($P < 0.00001$)
Sleep onset latency (SOL)	1774	-0.41 (-0.59, -0.24), $P < 0.00001$	65% ($P = 0.0002$)
Total sleep time (TST)	1774	0.21 (0.07, 0.35), $P = 0.004$	49% ($P = 0.01$)
Wake after sleep onset (WASO)	1440	-0.34 (-0.58, -0.10), $P = 0.006$	78% ($P < 0.00001$)
Nocturnal awakenings (NWAK)	1329	-0.28 (-0.44, -0.12), $P = 0.0008$	46% ($P = 0.05$)

Results

- Twenty randomized trials involving 7690 participants (72% female, mean age 41.4) met inclusion criteria
- Online CBTi comparison to inactive controls (IC), active controls/placebo (AC/PL), and face-to-face/telehealth (FTF/TH)
- Primary outcomes: between-group effects favored online CBTi over IC and AC/PL. Pooled effects favored online CBTi over all control groups while indicating larger, significant intervention effects in favor of online CBTi for IS and SE. Secondary outcomes: small to moderate significant effects were found for SOL, TST, WASO, and NWAK in favor of online CBTi
- Moderate-high heterogeneity, possible multiple-study and citation bias

Table 2. Study Characteristics

Author	Mean Age	N (% F)	Randomized (% dropout)	Duration (weeks)	Post-assess. ^a (wk)/ follow-up ^b (month)	Control
Blom et al	54.4	23 (48%)	48 (2%)	8	8/6	FTF ^c
Espie et al	49.0	120 (73.2%)	164 (14%)	6	8/2	WL ^d , PL ^e
Espie et al	48.0	1329 (77.7%)	1711 (41%)	8	8/2	SHE ^f
Freeman et al	24.7	2676 (71.3%)	3755 (50%)	6	10/5.5	TAU ^g
Hagatun et al	44.9	122 (67%)	181 (21.6%)	6-9	11/6	SHE
Holmqvist et al	nr	55 (75%)	73 (26%)	6	6/2	TH ^h
Kaldo et al	48.0	116 (78%)	148 (10.14%)	8	8/6, 12, 36	AC ⁱ
Lancee et al	52.1	283 (68.4%)	414 (15.78%)	6	10/6, 12	WL
Lancee et al	48.7	50 (79%)	63 (13%)	6	12/3,6	WL
Lancee et al	41.6	73 (81.11%)	90 (15%)	6	12	WL, FTF
Lorenz et al	42.9	39 (69.64%)	56 (<1%)	6	6/12	WL
Pillai et al	48.6	14 (62.5%)	32 (18.8%)	6	7/nr	AC
Ritterband et al	45.0	34 (76%)	45 (4%)	9	11/6	WL
Ritterband et al	43.3	218 (71.9%)	303 (9.2%)	9	9/6, 12	SHE, FTF
Strom et al	45.0	82 (75.2%)	109 (24%)	5	7/nr	WL
Taylor et al	19.7	14 (58.8%)	34 (14.7%)	6	6/3	WL
Taylor et al	32.7	17 (17%)	100 (14%)	6	6/6	WL
Thiart et al	48.0	95 (74%)	128 (7.8%)	6	8/4	WL
van Straten et al	49.5	83 (70.3%)	118 (17%)	6	6/2	WL
Vincent et al	nr	79 (67%)	118 (33%)	5	5/1	WL

^aPost-assessment time: number of weeks post randomization; ^bfollow-up: number of months from post assessment; ^cface-to-face (FTF); ^dwaitlist (WL); ^eplacebo (PL); ^fsleep hygiene (SHE); ^gtreatment as usual (TAU); ^htelehealth (TH); ⁱactive control (AC); female: F; not reported: nr.

Clinical Prevalence

- Face-to-face treatment may not be as critical for improving sleep outcomes as previously suggested in literature
- Online CBTi appears to be an acceptable alternative, cost-effective treatment for chronic adult insomnia or adjunctive therapy to compliment face-to-face treatment
- Decrease barriers to care
- Increased opportunities for Physician Assistants

Future Research

- Larger studies directly comparing online CBTi with FTF treatments
- Long-term effects of online interventions
- Access-to-care, quality, cost effectiveness, and patient outcomes from online-guided CBTi provided by Physician Assistants

References

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