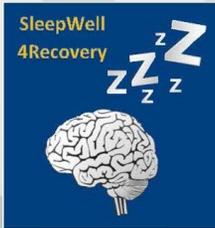




NATIONAL INSTITUTE FOR
STROKE AND APPLIED NEUROSCIENCES
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Use of online treatments to improve sleep after traumatic brain injury (TBI)



Associate Professor Alice Theadom
on behalf of the SleepWell4Recovery Research Group



@atheadom



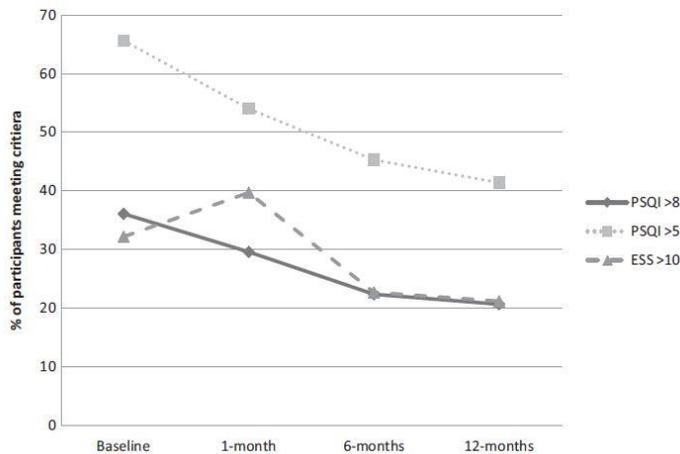
With thanks



Why look at sleep after brain injury?

- Sleep is vital for well-being and functioning^{1,2}
- >50% of people experience difficulties sleeping after a brain injury³
- Poor sleep can exacerbate symptoms and hinder recovery⁴
- Clear link between TBI and onset of sleep difficulties⁵
 - Areas of brain responsible for sleep are vulnerable to injury
 - Evidence of reduced melatonin production following TBI
- Secondary consequence of other symptoms/lifestyle changes
- Prior sleep can still have an impact on recovery

Sleep difficulties can become persistent following mild TBI... Theadom et al, (2015) Sleep medicine



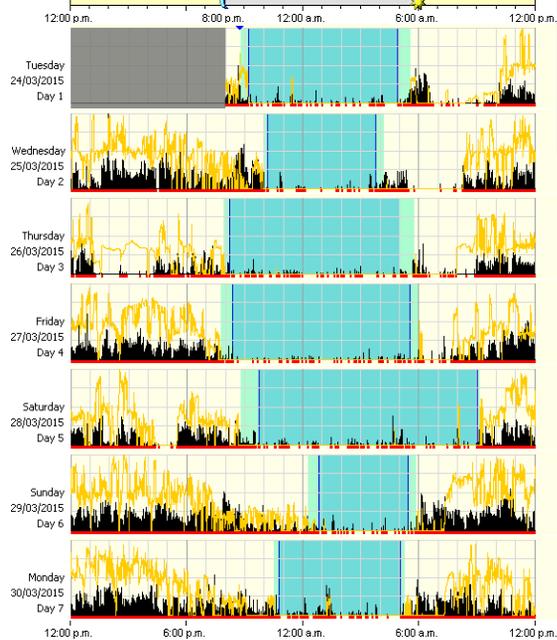
SleepWell4Recovery Study

- Adults (18-60 years of age) who experienced a TBI 3 months to 3 years ago
- Recruited through brain injury service providers, patient support organisations and self-referrals in Auckland and Hamilton
- Pre and post intervention measures included:
 - Pittsburgh Sleep Quality Index (PSQI)
 - CNS-Vital Signs computerised neuropsychological test
 - Quality of life after brain injury (QOLIBRI)
 - Rivermead post-concussion symptoms (RPQ)
 - Actigraphy measures over a 2 week period

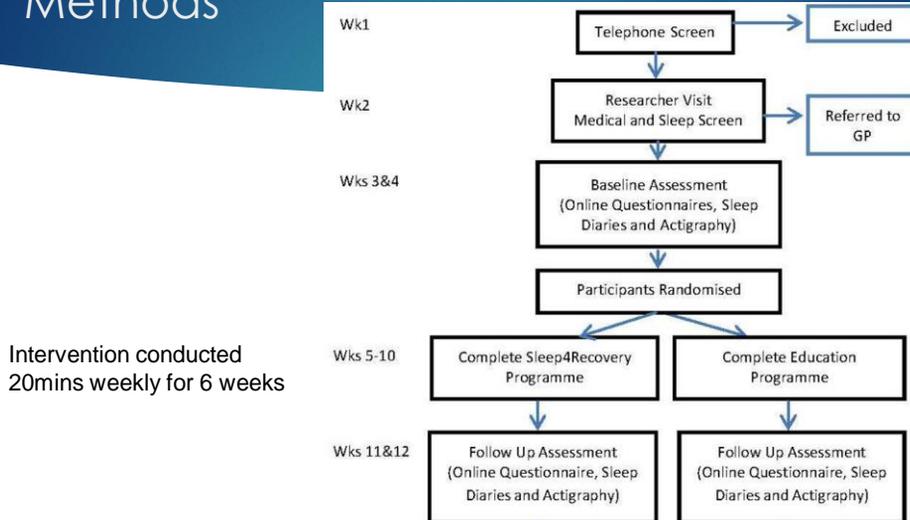
Actigraphy



Actogram:



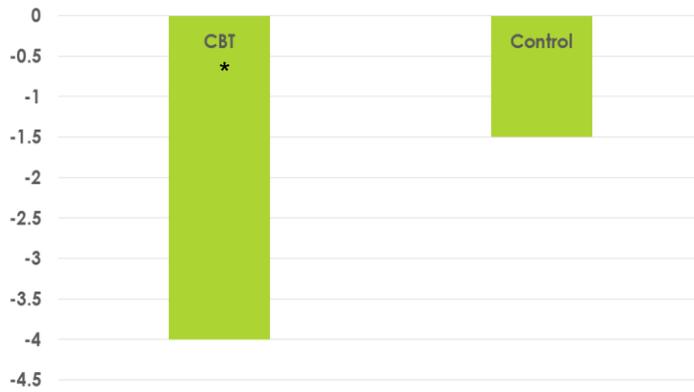
Methods



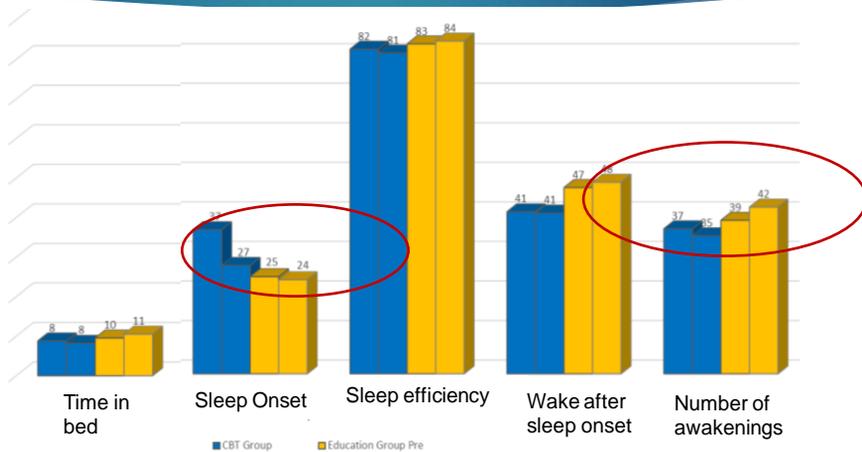
Participant Characteristics

	CBT N= 12	Control N = 12	Test of Difference
Age at time of injury Mean (SD)	39.92 (11.81)	31.83 (2.67)	t= 1.75, p = 0.09
Months Since Injury Mean (SD)	10.42 (7.32)	15.09 (10.67)	t= -1.24, p=0.24
Gender N (%)			
Male	5 (41.6)	4 (33.3)	X ² = 0.18, p = 0.67
Ethnicity N (%)			
European	6 (50.0)	7 (58.3)	X = 0.28, P = 0.87
Maori	3 (25.0)	3 (25.0)	
Other	3 (25.0)	2 (16.6)	
Relationship status N (%)			
Married/living with partner	7 (58.3)	5 (41.6)	X = 0.17, P = 0.68
Single/divorced/widowed	5 (41.6)	7 (58.3)	
Mechanism of injury N (%)			
Motor vehicle accident	6 (50.0)	6 (50.0)	X = 0.34, P = 0.84
Hit by object	3 (25.0)	2 (33.3)	
Other	3 (25.0)	4 (16.7)	
Prior TBI N (%)			
Yes	4 (33.3)	6 (50.0)	X = 0.17, P = 0.68
No	8 (66.7)	6 (50.0)	

Change in self-reported sleep quality between baseline & post-intervention



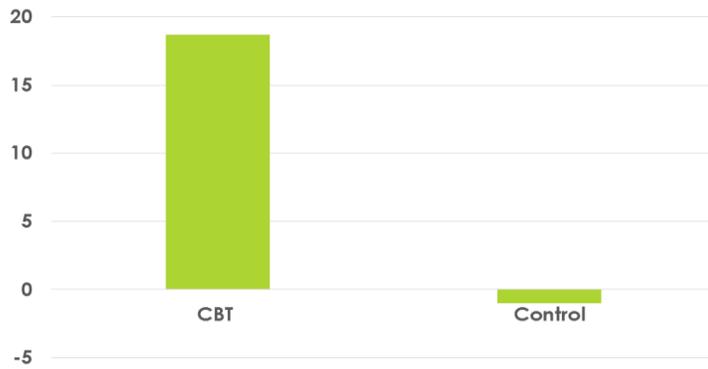
Actigraphy Data – Baseline and post-intervention mean scores



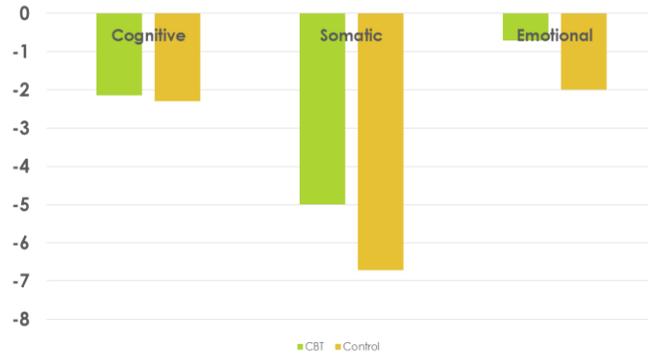
Change in neuropsychological functioning baseline to post-intervention



Change in quality of life between baseline to post-intervention



Change in post-concussion symptoms baseline to post-intervention



Feasibility issues ...

- ▶ Lots of enquires from people outside timeframe post-injury
- ▶ No alert when participants finish programme so hard to know when to follow up
- ▶ Multiple assessment modes problematic
 - ▶ Consider alternative neuropsych measures
- ▶ Access to computers manageable – use of library/family
- ▶ Consider adapting programme for tablet devices
- ▶ Those with visual disturbance experienced challenges in using the programme
- ▶ No adverse events reported for those with balance difficulties, fatigue or headaches

Where to from here?

- ▶ Participant Feedback positive – But, need to link sleep to TBI
- ▶ Given improvement in symptoms observed from education intervention
 - ▶ Need to combine the two interventions compare to usual care

Evidence of initial trends in effectiveness

- ▶ Based on these data @ 85% power, 128 people (64 per group) would be needed in full trial

Theadom A, et al. A pilot randomized controlled trial of on-line interventions to improve sleep quality in adults after mild or moderate traumatic brain injury. [Clin Rehabil](#). 2018 May;32(5):619-629. doi: 10.1177/0269215517736671.

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- ▶ 3 Mathias JL, Alvaro PK. Prevalence of sleep disturbances, disorders, and problems following traumatic brain injury: a meta-analysis. *Sleep Med* 2012;13:898-905.
- ▶ 4 Theadom A, Cropley M, Parmar P, Barker-Collo S, Starkey N, Jones K, Feigin VL, on behalf of the BIONIC Research Group. Sleep difficulties one year following mild traumatic brain injury in a population-based study. *Sleep Medicine* 2015 Aug;16(8):926-32.
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- ▶ 6 Morin CM, Belanger L, Bastien C, Vallieres A. Long-term outcome after discontinuation of benzodiazepines for insomnia: a survival analysis of relapse. *Behaviour research and therapy* 2005;43:1-14.
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- ▶ 9 Vincent N, Lewycky S. Logging on for better sleep: RCT of the effectiveness of online treatment for insomnia. *Sleep* 2009;32:807-815.
- ▶ 10 Stepanski EJ, Wyatt JK. Use of sleep hygiene in the treatment of insomnia. *Sleep Med Rev* 2003;7:215-225.