A Brief School-Entry Sleep Intervention Improves Child Sleep But Not Other Outcomes: A Randomized Controlled Trial

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Background

- A successful transition to school depends on a child's physical health and wellbeing, social competence, emotional maturity, language and cognitive skills, and approach to learning
- Daily expression of each can be affected by immediate factors such as sleep
- Behavioral sleep problems affect up to 40% of school entrants and are associated with social, emotional, behavioural, and learning problems
- Systematically identifying and managing sleep problems at school entry could improve child psychosocial functioning, sleep and a range of other outcomes

Efficacy Trial (2008-2010)

- RCT of a behavioral sleep intervention
- N=108 new school entrants in 22 schools in Melbourne, Australia
- Sleep intervention:
  - 2 fortnightly face-to-face consultations + 1 telephone call two weeks later if required
  - suite of interventions, tailored to family needs
  - delivered at child's school, by trained research assistants
- At 6 months, intervention vs control children had better psychosocial health-related QoL, sleep, and parent mental health.

Quach et al, *Pediatrics*, 2011

Aims

To determine whether the same intervention, delivered by school nurses, can improve outcomes in school entrants with behavioral sleep problems.

Primary

- PedsQLv.4 (psychosocial health-related quality of life (QoL))

Secondary

- Sleep problems and patterns
- Behavior
- Academic achievement (blinded child assessment)
- Overall child QoL
- Parent mental health and QoL

Methods

Design

- School entry survey to systematically identify children with parent reported moderate or severe sleep problems
- RCT of a behavioral sleep intervention versus 'usual care'

Intervention

- School nurse-delivered (24 nurses, 2 x 3 hour training sessions)
- 1 x 45 min face-to-face consultation at the child's school
- Follow up telephone call two weeks later to check progress

Open Access Protocol

BMJ Open

Sleep well—be well study: improving school transition by improving child sleep: a translational randomised trial

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Sampling

Inclusion

- Child in first year of formal schooling
- Moderate or severe sleep problem by parent report on classroom survey
- Attending government (public) or Catholic schools, representative proportion of each school type

Exclusion

- Major illness or disability (eg IQ <70)
- Likely obstructive sleep apnoea (3 item questionnaire screen + clinician call to family)
- Non-English speaking

Intervention strategies

Good sleep hygiene PLUS

Standard clinical care:

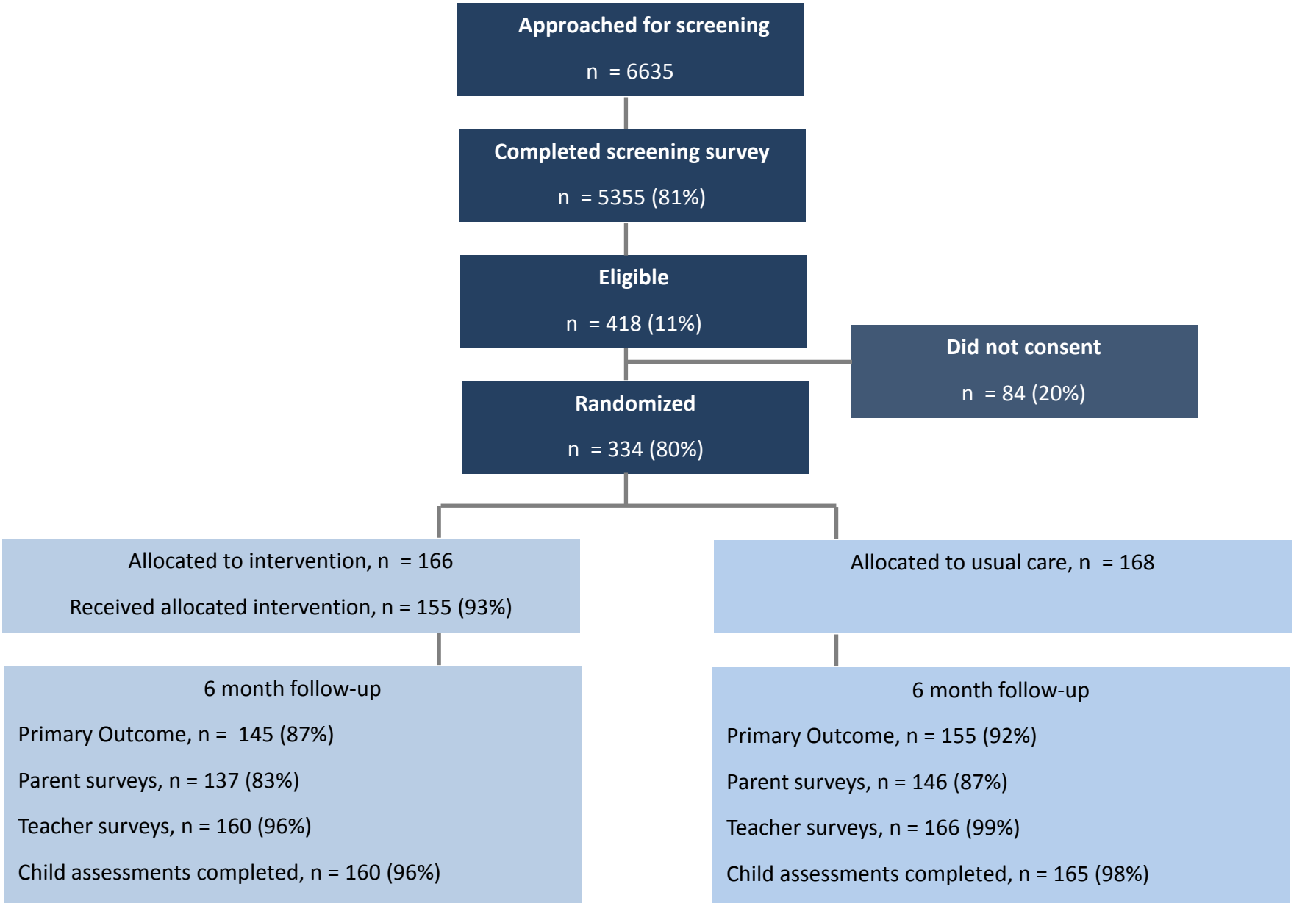
- Limit setting disorder: helping parents to consistently manage behaviour, positive reinforcement, checking method
- Sleep onset association disorder: adult fading (ie, camping out), checking method, rewards
- Insomnia: visual imagery & relaxation, simple cognitive restructuring, restricting time in bed
- Delayed sleep phase: bedtime fading, wake at same time every morning, early light exposure
- Night-time anxiety: coping skills (e.g., 'brave behaviour', relaxation, 'worry book', rewards, checking method

Measures

Construct	Measures		Time point	
			Baseline	6 months
Child				
Psychosocial QoL	Pediatric Quality of Life Inventory (PedsQL 4.0)	Parent	•	•
		Child		•
Sleep problems	Moderate/severe sleep problems Child Sleep Habits Questionnaire Sleep timing – bed, sleep and wake times	Parent	•	•
Behaviour	Strengths & Difficulties Questionnaire	Parent	•	•
		Teacher		•
Quality of Life	Child Health Utilities Index (CHU-9D)	Child		•
		Parent	Limited	
Academic achievement	Wechsler Individual Achievement Test (WIAT-2 abbreviated)	Child		•
	Academic Rating Scale	Teacher		•
Working Memory	Automated Working Memory Assessment	Child		•
Parent				
Mental Health	Depression Anxiety Stress Scale (DASS-21)	Parent	Limited	•
Quality of life	EuroQol	Parent	•	•

Statistical analysis

- Intention-to-treat
- Compared scores between intervention & control groups
  - linear regression - mean difference (95% CI) for continuous data
  - logistic regression - odds ratio (95% CI) for categorical data
- Adjusted for baseline score of outcome (where available), child gender, primary caregiver education
- Effect sizes - ≤ 0.2 = small, 0.3-0.5 = moderate, ≥ 0.6 = large
- Additional analyses adjusted for potential clustering at the nurse and school level (mixed effects models with a random intercept for school and nurse (within the intervention group only))
- Economic evaluation


Approached for screening
n = 6635
Completed screening survey
n = 5355 (81%)
Eligible
n = 418 (11%)
Did not consent
n = 84 (20%)
Randomized
n = 334 (80%)
Allocated to intervention, n = 166
Received allocated intervention, n = 155 (93%)
Allocated to usual care, n = 168
6 month follow-up
Primary Outcome, n = 145 (87%)
Parent surveys, n = 137 (83%)
Teacher surveys, n = 160 (96%)
Child assessments completed, n = 160 (96%)
6 month follow-up
Primary Outcome, n = 155 (92%)
Parent surveys, n = 146 (87%)
Teacher surveys, n = 166 (99%)
Child assessments completed, n = 165 (98%)

Baseline characteristics (%)	Intervention (n=166)	Usual care (n=168)
Child		
Male	48.8	45.2
Age in years (mean (SD))	5.8 (0.37)	5.7 (0.39)
Public school	81.3	81.0
Psychosocial QoL (mean (SD))	69.3 (13.5)	68.4 (13.3)
Child Sleep Habits Q total (mean (SD))	53.8 (7.8)	53.7 (8.2)
Strengths & Difficulties Q total (mean (SD))	12.1 (6.0)	12.6 (6.1)
Primary caregiver		
Mother	93.9	92.9
Age in years (mean (SD))	38.8 (6.1)	38.3 (5.1)
Completed high school	84.1	82.7

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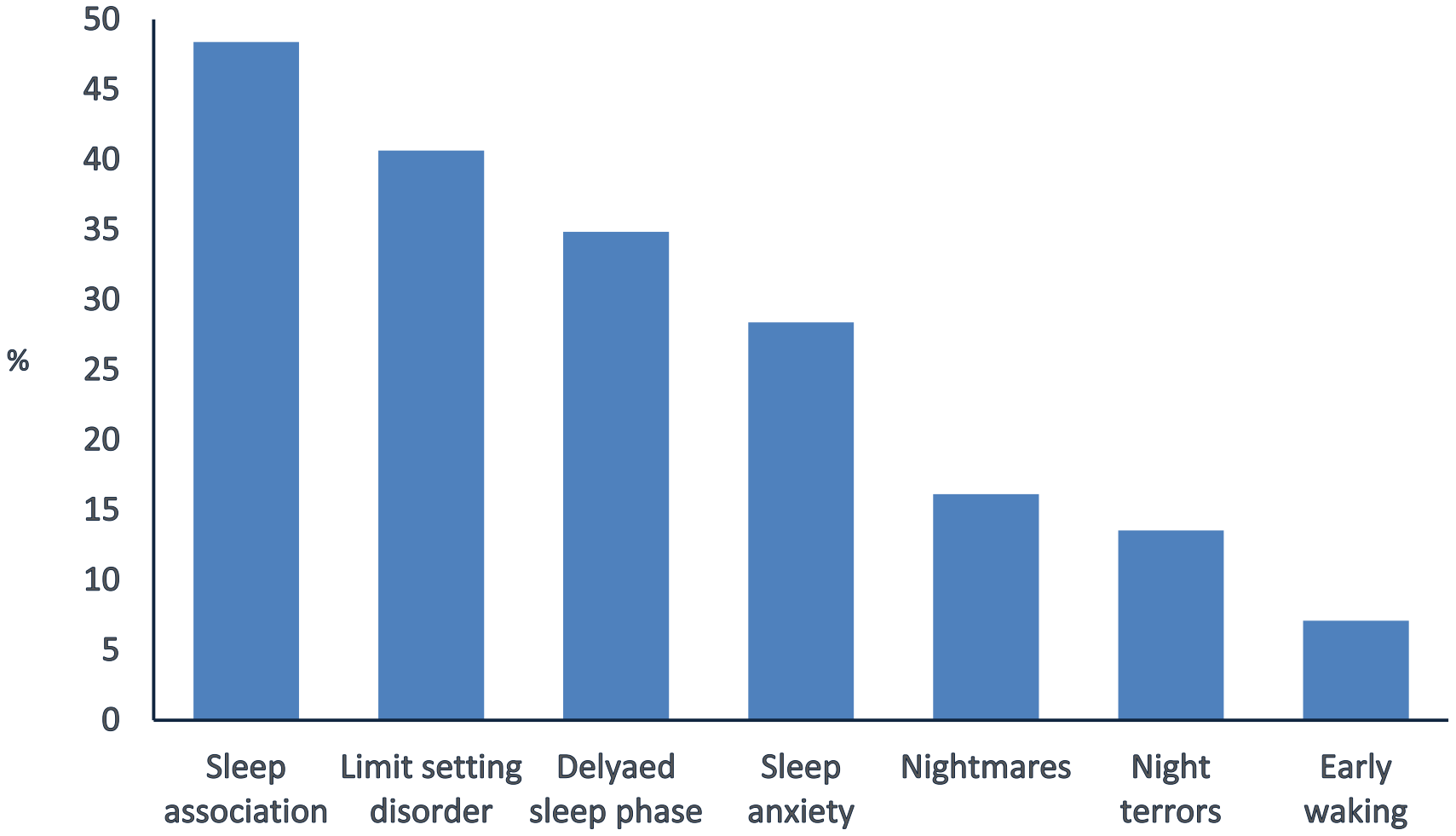
Sleep problem type



Adjusted 6 month outcomes	(Intervention – control) Mean diff in scores (95% CI)	Effect Size	p
Parent-report			
Psychosocial QoL	1.1(-1.1 to 3.3)	.1	.30
CSHQ total	-1.6 (-2.8 to -0. 3)	-.2	.01
Bedtime resistance	-.6 (-1.1 to -0.05)	-.2	.03
Night waking	-0.2 (-.5 to 0.1)	-.1	.21
Sleep onset delay (mins/night)	-12 (-6 to -18)	-	.002
Sleep duration (mins/night)	12 (2 to 18)	-	.01
SDQ (total)	-0.4 (-1.2 to 0.4)	-0.1	.36
	ORs (95% CI)		
Parent mental health			
Depression	0.7 (0.6 to 0.9)	-	0.03
Anxiety	0.8 (0.7 to 1.1)	-	0.19
Stress	0.8 (0.6 to 1.1)	-	0.16

Further Outcomes

- At 6 months intervention parents reported:
  - fewer moderate or severe sleep problems than control parents, ie 35% vs 53%, OR 0.5 (95% CI 0.3 to 0.8), p=0.002
  - no evidence for a difference in:
    - child academic achievement or working memory (blinded direct assessment)
    - child or parent QoL
- Intervention cost/child =$AUS 182 (training, resources, nurse time, travel)

Strengths

- First translational RCT to test the effectiveness of a behavioral sleep intervention, delivered by an existing workforce, in school entry students
- Families from a range of schools
- Validated outcome measures
- High follow up rates

Limitations

- Parent report unblinded so may bias outcomes
  - teacher reports and direct child included
- Nurses delivered only 1 face-to-face consultation (in contrast to 2 consultations in the efficacy trial)
- Well educated primary caregivers
- Non-English speaking families excluded
  - results may not generalise to these families

Conclusions

- Translating an efficacious sleep intervention into an existing (school nurse) workforce does not result in the same child health improvements, despite similar populations

- Sleep improves in both intervention and control group children, with a more marked improvement in intervention children

- Training school nurses to deliver a face-to-face intervention soon after school entry appears feasible and acceptable to parents and nurses alike

Co-investigators

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