

Longitudinal Associations Between Subjective Sleep Quality And Functional Disability In Older Adults At Risk Of Dementia



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Introduction & Objectives

- Disability reduces independence, quality of life, and increases healthcare burden in older adults.¹
- Sleep disturbance is highly prevalent across the cognitive continuum and is associated with cognitive decline and functional impairment.²**
 - However, it remains unclear whether sleep predicts disability trajectories in older adults with cognitive concerns.
 - Whether sleep predicts disability independently of depressive symptoms and objective sleep measures remains unclear.

KEY KNOWLEDGE GAP: It remains unclear whether poor sleep quality predicts worsening disability over time in older adults at risk of dementia, independent of depressive symptoms and objective sleep measures.



AIMS

- To determine whether baseline sleep quality predicts longitudinal disability trajectories.
- To examine the contribution of depressive symptoms to the sleep-disability relationship.
- To compare subjective and objective sleep measures as predictors of disability.

Methods

Study Design & Sample:

Longitudinal observational of older adults (age ≥ 50 years) with new-onset cognitive complaints recruited from the Healthy Brain Ageing Cohort, University of Sydney (Fig 1).

Exclusion: Existing dementia diagnosis or MMSE < 20 ; stroke, head injury, or neurological disorder; neurodevelopmental disorder; non-affective psychiatric disorder; current substance dependence or abuse

Outcome Measures:

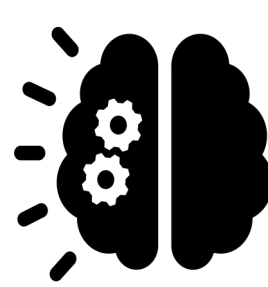
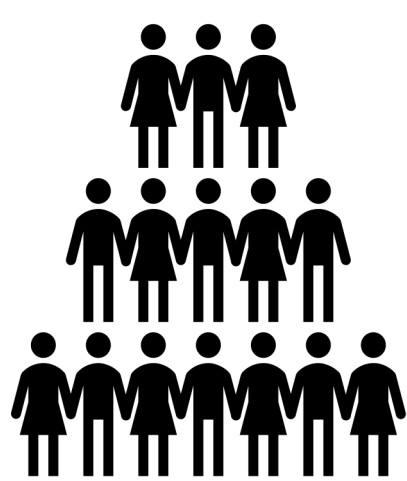
- Disability:** WHODAS 2.0 - 36 item
- Subjective sleep:** PSQI
- Objective sleep:** Actigraphy (subsample $n=212$)
- Covariates:** age, sex, depressive symptoms (GDS-15 item), medical comorbidity burden (CIRS-G)

Statistical Analysis

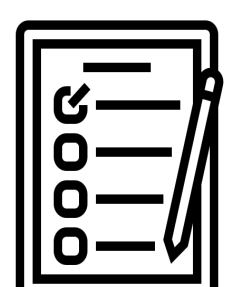
- Random-intercept linear mixed-effects models assessed whether sleep predicted longitudinal disability, using log-transformed WHODAS 2.0 scores.
- Models adjusted for age, sex, depressive symptoms, and comorbidity burden.
- Sleep $\times$ time* and *sleep $\times$ depression* interactions were tested, with sensitivity analyses by cognitive group (MCI vs SCD) and age group (50-64 vs 65+).

N = 481 analytic sample

Mild Cognitive Impairment (MCI), $n = 280$
Subjective Cognitive Decline (SCD), $n = 140$
Healthy Controls, $n = 41$
Alzheimer's Disease, $n = 23$



Cognitive
assessment



Self-report
measures



Actigraphy

Follow-up period of analytic sample:
Mean of 3.63 years
(median = 2.55 years)

Fig 1. Study flowchart.

Results

Cross-sectional associations

- Sleep quality ($\rho = 0.344$, $p < .001$), depression ($\rho = 0.578$, $p < .001$), and medical comorbidity ($\rho = 0.188$, $p < .001$) were each positively associated with disability at baseline.
- Age, sex, and cognitive group were not significantly associated (all $p > .07$)

Longitudinal associations

- Poorer baseline sleep quality independently predicted greater disability across follow-up ($\beta = 0.034$, 95% CI [0.015, 0.053], $p < .001$; Fig 2).
- Depression was the strongest overall predictor of disability ($\beta = 0.104$).
- The sleep-disability association was consistent across diagnostic groups: MCI ($\beta = 0.036$, $p = .005$) and SCD ($\beta = 0.041$, $p = .015$).
- Associations were stronger in younger adults: 50-64 years: $\beta = 0.049$ vs 65+ years: $\beta = 0.027$.
- Significant *sleep $\times$ time* interaction ($p = .008$):
 - Poor sleepers had higher disability at baseline, but the association attenuated over follow-up.
- Significant *sleep $\times$ depression* interaction ($p = .026$):
 - Sleep predicted disability more strongly when depressive symptoms were lower (Fig 3).

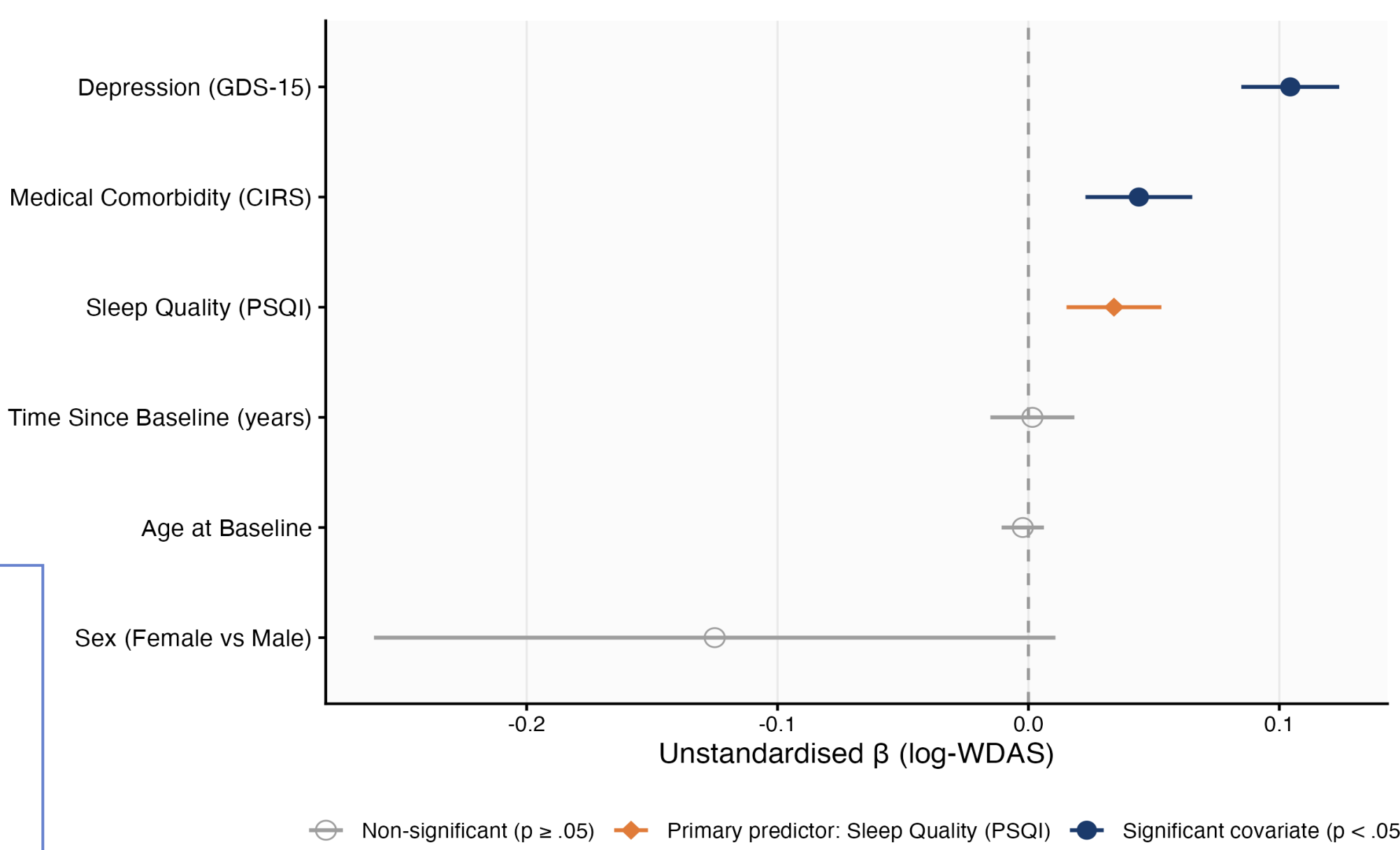


Fig 2. Predictors of longitudinal disability. Standardised β estimates from mixed-effects models predicting log-WHODAS 2.0.

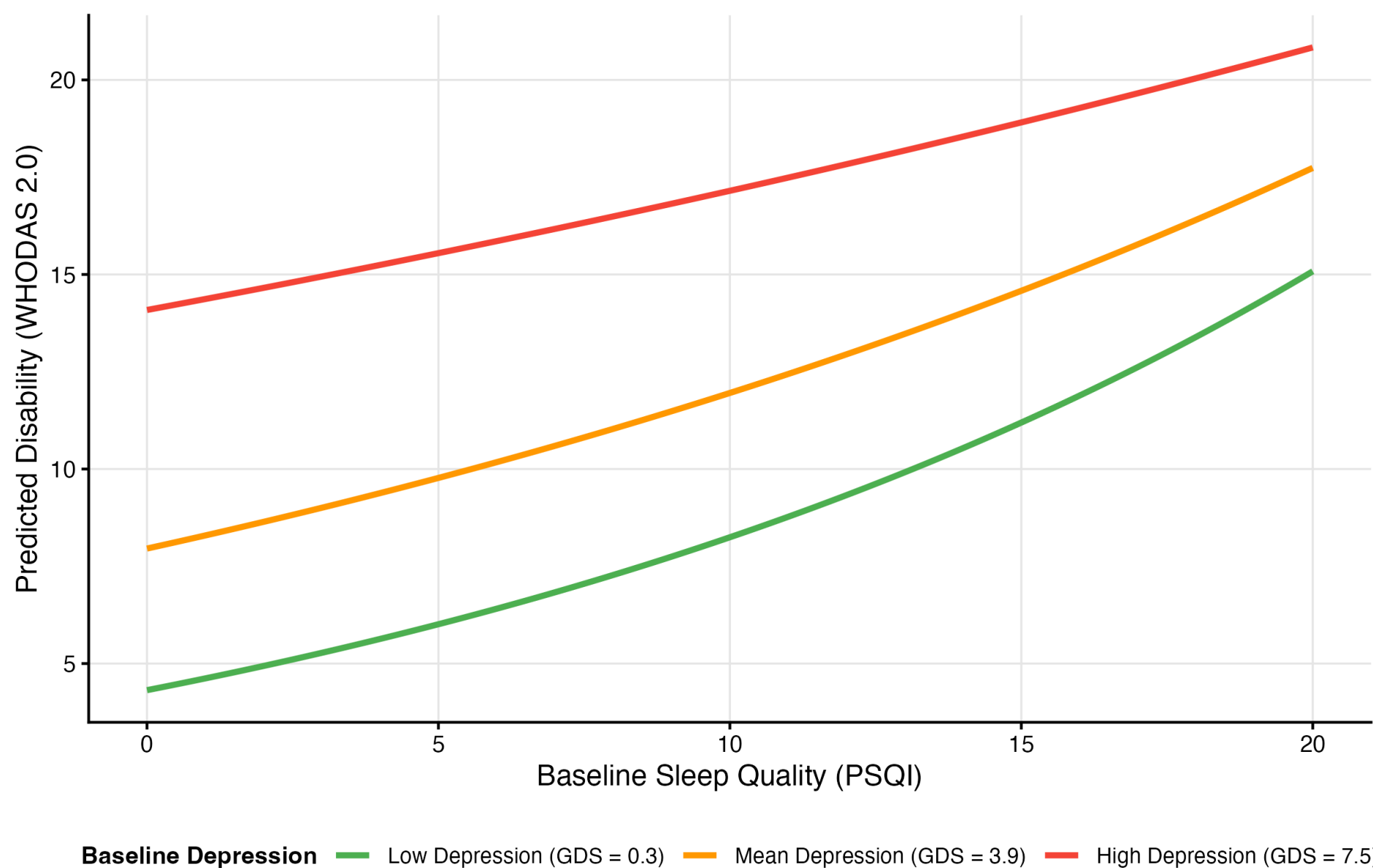


Fig 3. Sleep $\times$ depression interaction. Predicted WHODAS 2.0 by baseline sleep quality and depressive symptoms.

Subjective vs objective sleep

PSQI remained associated with disability in the actigraphy subsample ($n = 212$; $\beta = 0.050$, $p < .001$), whereas objective actigraphy measures were not associated with disability.

Conclusions

- Poorer subjective sleep quality independently predicted greater disability over follow-up in older adults at risk of dementia.
- The sleep-disability association was stronger in younger adults aged 50-64 years.
- Depressive symptoms were the strongest predictor of disability, highlighting the importance of addressing both sleep and mood.
- Subjective sleep, but not actigraphy, predicted disability, supporting routine patient-reported sleep assessment in dementia-risk settings.