OSA and Neurobehavioural Function in Men

A Large, Population-Based Cohort Study

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Research problem

- Obstructive sleep apnea (OSA) is associated with: ***executive dysfunction, attentional problems, vigilance failure, and memory impairments***[1,2]
- **HOWEVER,** this evidence predominantly comes from ***small experimental laboratory studies and large cohort studies in clinical populations, or older samples with cognitive decline/impairment*** [3]

Knowledge gap

- The ***scope and magnitude*** of OSA-related neurobehavioural dysfunction in the general population with no prior clinical OSA diagnosis remains unclear

Research methodology

- 837 community-dwelling men from the MAILES study underwent ***successful 8-channel in-home unattended polysomnography***
- MAILES study consists of participants from ***two existing prospective cohort studies*** (Florey Adelaide Male Ageing Study [FAMAS] and North West Adelaide Health Study [NWAHS])
- FAMAS participants completed the inspection time (IT) task. trail-making test (TMT) part A (TMT-A) and part B (TMT-B), Fuld object memory evaluation (FOME) test, and mini-mental state examination (MMSE)

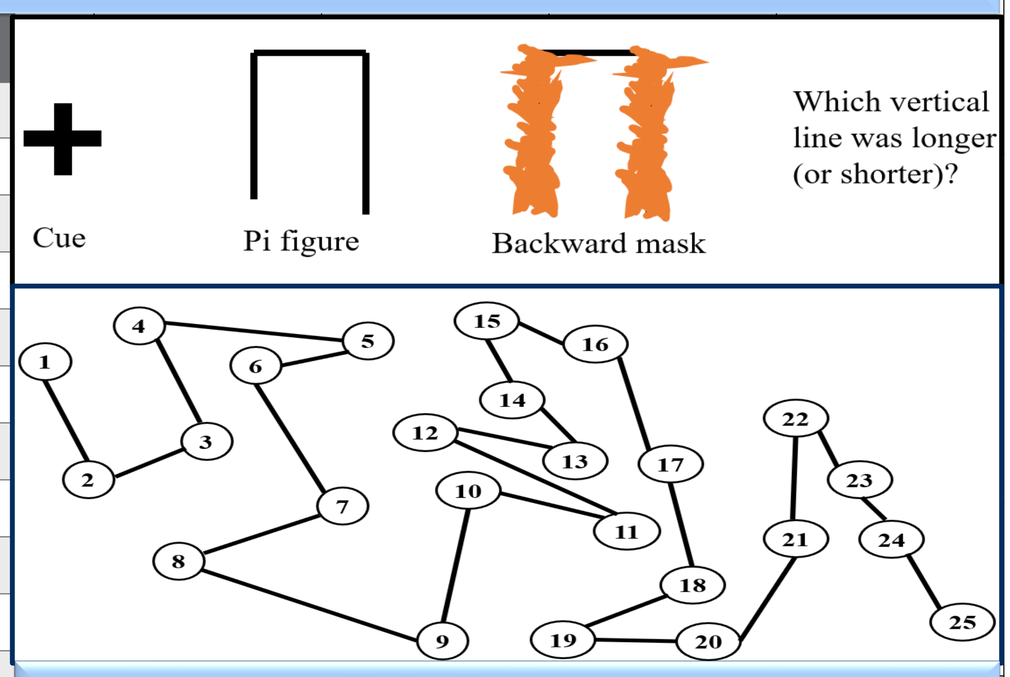
RESULTS: Clinical OSA metrics and sleep architecture were not associated with any neurobehavioural function domains

	Model 1		Model 2	
	Beta	*P*	Beta	*P*
IT				
AHI	4.3	0.80	-0.8	0.96
TST90	0.4	0.97	2.7	0.87
TST	13.3	0.05	12.0	0.08
TMT-A				
AHI	8.0	0.67	14.4	0.45
TST90	15.4	0.37	10.7	0.55
TST	-13.6	0.06	-9.0	0.23
TMT-B				
AHI	8.5	0.66	9.6	0.63
TST90	12.4	0.48	19.5	0.29
TST	7.0	0.36	11.4	0.14
FOME				
AHI	0.1	0.49	0.0	0.95
TST90	0.3	0.17	0.2	0.39
TST	0.0	0.98	-0.0	0.64

	Model 1		Model 2	
	Beta	*P*	Beta	*P*
IT				
REM	11.8	0.52	12.2	0.51
NREM	13.6	0.08	11.9	0.13
TMT-A				
REM	-8.7	0.66	-10.3	0.60
NREM	-14.7	0.09	-8.6	0.32
TMT-B				
REM	4.5	0.83	6.7	0.75
NREM	7.5	0.40	12.6	0.16
FOME				
REM	0.3	0.22	0.3	0.23
NREM	-0.0	0.53	-0.1	0.25

	Model 1		Model 2	
	OR	*P*	OR	*P*
MMSE				
AHI	0.5	0.10	0.5	0.14
TST90	0.7	0.26	0.6	0.28
TST	1.1	0.63	1.2	0.25

	Model 1		Model 2	
	OR	*P*	OR	*P*
MMSE				
REM	1.2	0.72	1.6	0.27
NREM	1.1	0.73	1.2	0.45



Statistical analysis models

- ***Model 1:*** adjusted for age
- ***Model 2:*** adjusted for age + marital status, SEIFA, income, smoking status, alcohol use, physical activity, pulse pressure, insomnia, CVD, diabetes, BMI
- ***OR:*** odds ratio (binary logistic regressions)
- ***Beta:*** multivariable linear regressions

Discussion of Results

- Non-significant associations could be explained by:
  - *Less symptomatic OSA in the general public*[3]
  - *Some participants being resilient to neurobehavioural dysfunction*[4,5]

Future research directions

- Future large prospective non-clinical cohort studies are needed to determine if clinical OSA metrics and sleep architecture are associated with ***future onset of neurobehavioural dysfunction*** in middle-aged and older populations

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References

1. Bucks RS, Olaithe M, Eastwood P. Neurocognitive function in obstructive sleep apnoea: a meta-review. Respirology. 2013;18(1):61-70.
2. Wallace A, Bucks RS. Memory and obstructive sleep apnea: a meta-analysis. Sleep. 2013;36(2):203-20.
3. Quan SF, Chan CS, Dement WC, Gevins A, Goodwin JL, Gottlieb DJ, et al. The association between obstructive sleep apnea and neurocognitive performance--the Apnea Positive Pressure Long-term Efficacy Study (APPLES). Sleep. 2011;34(3):303-14B.
4. Neurocognitive effects of obstructive sleep apnea syndrome. Curr Neurol Neurosci Rep. 2007;7:161-6.
5. Alchanatis M, Zias, N., Deligiorgis, N., Amfilochiou, A., Giorgos, D., Dora Orphanidou, D. Sleep apnea-related cognitive deficits and intelligence: an implication of cognitive reserve theory. J Sleep Res. 2005;14:69-75.

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MAILES
Men Androgen Inflammation Lifestyle Environment & Stress Study

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