



Concept Paper Form

Provisional Paper Title: Obstructive Sleep Apnoea and adverse outcomes.
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Objective of the study:

To identify the proportion of adverse outcomes among individuals having a high risk of Obstructive sleep apnoea (OSA) in the Dunedin cohort study participants. Specifically identifying risk of accidents, loss of employment, divorce and depression.

Data analysis methods:

The Berlin questionnaire is a validated questionnaire used to identify adults at risk for Obstructive sleep apnoea (OSA). It allows identification of a group at high risk of having OSA (defined as a respiratory disturbance index (RDI) greater than five) with high sensitivity (0.86) and specificity (0.77)^[1].

The analysis requires calculation of the Berlin questionnaire at phases 32 to identify participants at high risk of OSA. The cohort can be monitored for the development health related and societal outcomes of adverse events with accidents, loss of employment, divorce and low mood. The high risk OSA group can be compared against low risk OSA group.

We will need to adjust for known risk factors such as alcohol consumption, body mass index (BMI), neck circumference, age, smoking status, and sex. We also can compare the risk of OSA over time from phases 32 to 45 and observe the change of risk of OSA over increasing age.

Variables needed at which ages:

Age 32, 38, 45

- Age, Sex, weight, height, hypertension (for Berlin Questionnaire)
- Socioeconomic status, smoking status, alcohol/cannabis consumption,
- Sleep questionnaire data
- Neck measurements (risk of OSA)
- Vehicle accidents
- Employment, divorces,
- Depression

Significance of the Study (for theory, research methods or clinical practice):

The prevalence of OSA syndrome has been estimated at 2% for women and 4% for men^[3]. In early 2000s the NZ prevalence of OSA syndrome was estimated to be 4.4% for Māori men, 4.1% for non- Māori men, 2.0% for Māori women, and 0.7% for non- Māori women^[2].

There are a number of concerning demographic drivers including increasing age, smoking rates, obesity and ethnic diversity would expect to increase OSA prevalence but there have been no recent prevalence data in New Zealand.

The Sleep health foundation report estimated the total cost of treating excessive daytime somnolence – sleep disorder was estimated to be \$232 million in Australia in 2016-2017^[5].

The economic burden of undiagnosed and untreated OSA is substantial ^[4] with clear evidence supporting the cost effectiveness of OSA syndrome diagnosis and treatment. The estimated incremental net cost of treating OSA syndrome was \$389 per case treated (range \$338–\$427). The estimated incremental net direct medical cost per quality of life year (QALY) gained was \$94 (range \$56–\$310). The medical cost per QALY gained by OSA syndrome treatment is well below the average QALY cost (\$6865) for drugs selected by PHARMAC to receive government subsidy for use in the healthcare system. The impact of OSA syndrome has health related and societal effects.

Evidence suggests that 15-20% of New Zealand car crashes may be attributable to driver sleepiness ^[6]. OSA is a common reason for sleep related accidents including and motor vehicle accidents. OSA also impacts on patients quality of life and high associated health related cost.

This study would provide data from a longitudinal cohort of adults to help to

estimate the impact of OSA with increasing age. This information will be of direct benefit to health providers/funders when determining the impact and societal costs of OSA. It might also be used to support a more comprehensive sleep apnoea prevalence assessment of the Dunedin study cohort in future phases.

References:

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- [3] Young T et al. The occurrence of sleep-disordered breathing among middle-aged adults. *N Engl J Med* 1993;328:1230-5.
- [4] Philippa H Gander, Guy Scott, Kara Mihaere, Helen Scott *NZMJ* 2010, 123 1321 Societal costs of obstructive sleep apnoea syndrome
- [5] Asleep on the job: Cost of inadequate sleep in Australia. Sleep Health Foundation August 2017. <https://www.sleephealthfoundation.org.au/news/latest-news/new-report-asleep-on-the-job.html>
- [6] Connor et al. The role of driver sleepiness in car crashes: a review of the epidemiological evidence. *Drugs, Driving and Traffic Safety*. 2009. https://doi.org/10.1007/978-3-7643-9923-8_12