

Madeline Gibson

Night shift work, early death & disease

it's how we sleep not how much sleep that matters

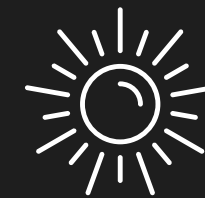
CAIRNMILLAR INSTITUTE | AUGUST 2021

Night Shift Work

Shift work operating outside the standard hours of 7:00am and 6:00pm and rotational shift work involves alternating between shift times including morning, afternoon and night shifts.



Circadian rhythm disruption
(our natural sleep-wake cycle)



Exposure to artificial light and
light during sleep hours



Sleepiness and work performance

Shift Work & Disease

Epidemiological studies have demonstrated an association between working night shifts to earlier mortality and an assortment of diseases.

In 8,059 nurses, there was a **higher dementia incidence** for those who worked night shifts for 6 years or more, than those who worked day shifts for 6 years or more and for those who worked night shifts for less than a year.

Associations with cancer, particularly breast, ovarian and colon cancer, Alzheimer's disease and dementia, cardiovascular disease and diabetes.

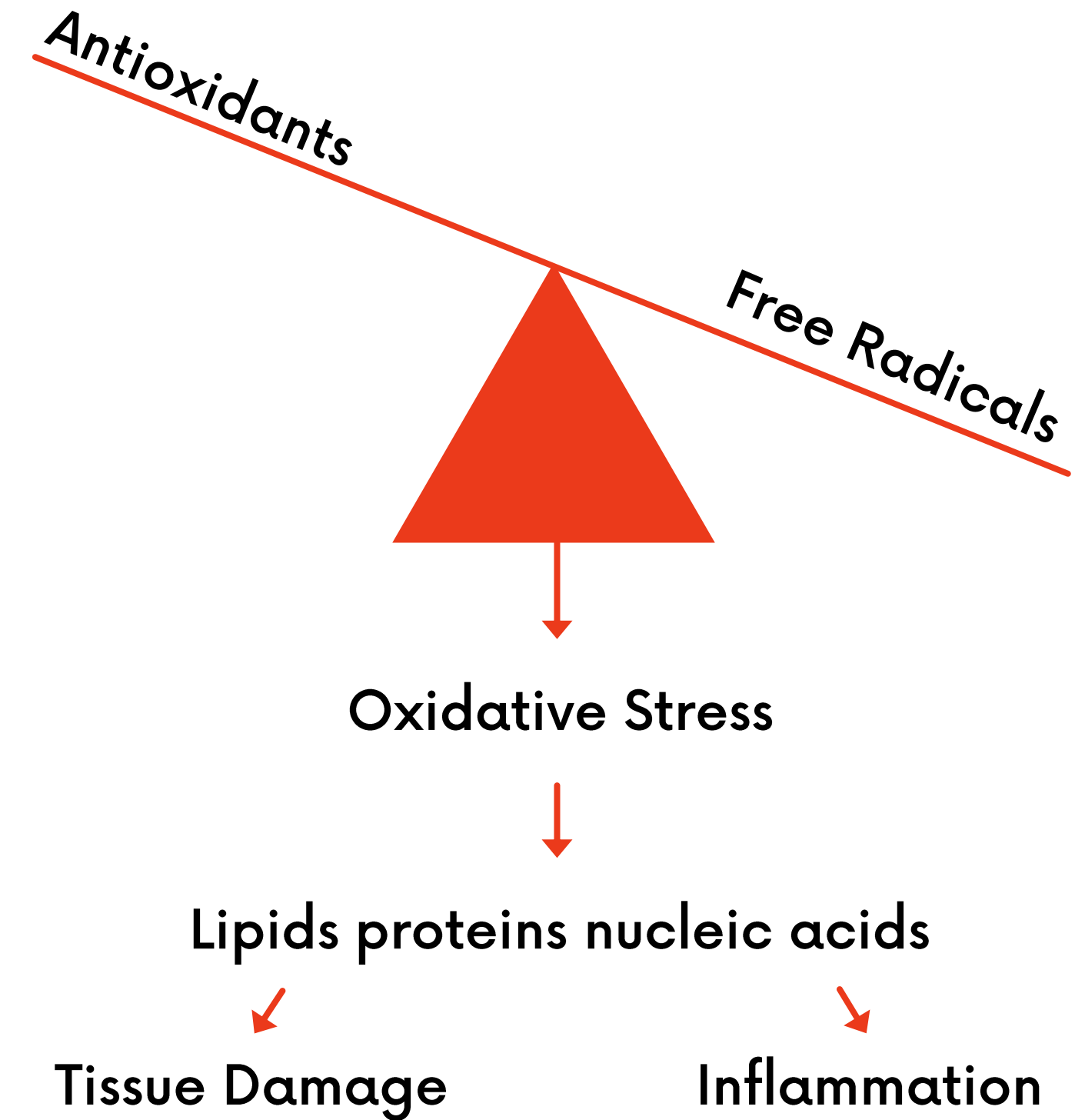


Sleep & Disease

Generally, patients with neurodegenerative disease and dementia often present with sleep disturbance, research suggests that sleep disturbance may be an early sign of dementia and may accelerate brain aging.

Oxidative Stress

WHAT IS OXIDATIVE STRESS?



The Role of Melatonin



DISEASE

Are night shift workers at
greater risk of oxidative stress?

Oxidative
Stress

SLEEP

Literature Review

HYPOTHESIS:

Working a single night shift would be associated with an increase in oxidative stress indicators and that those who only work night shifts will have higher oxidative stress indicators than day only workers.





132

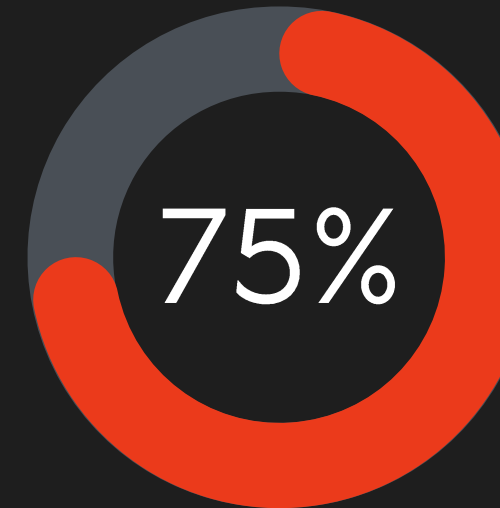


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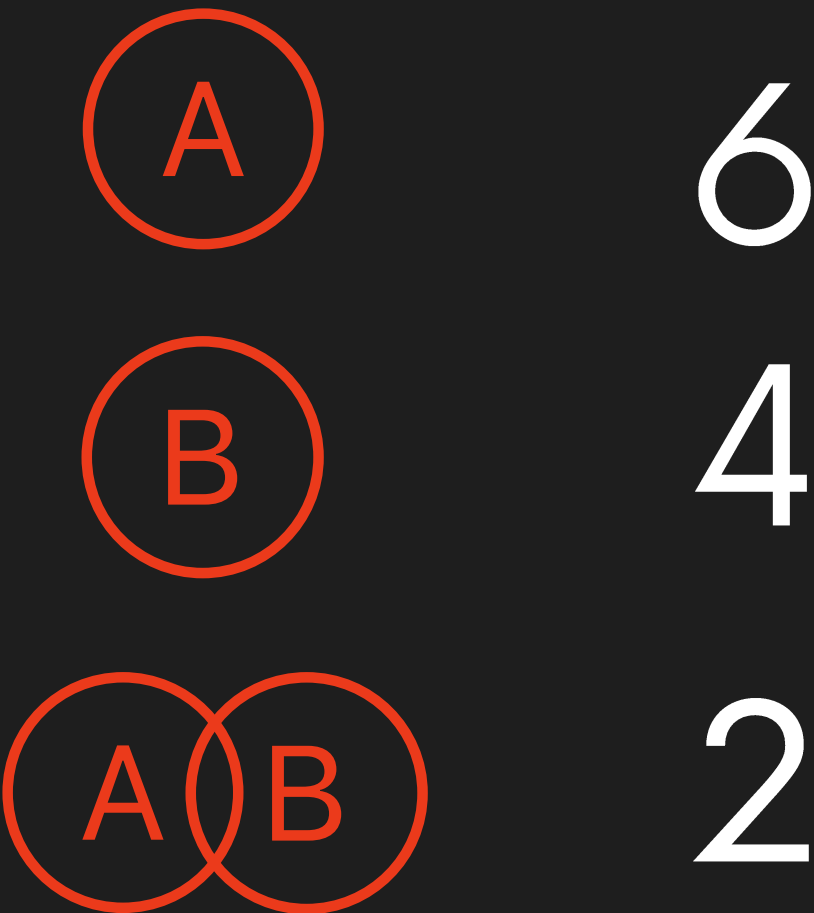
The search returned 132 articles, of which 12, met inclusion criteria.



1,077
night shift workers



Healthcare
workers



Articles were categorised into either group 'A' or 'B'.



MEASURING OXIDATIVE STRESS



URINE



BLOOD

DNA/RNA damage

- 8-OhdG
- 8-OxoGua
- DNA strand breaks

Lipid Peroxidation

- MDA
- 8-isoprostane
- Lipid hydroperoxide

Reactive Oxygen Species

- Hydrogen peroxide
- Superoxide

Antioxidants

- Total antioxidant capacity
- Thiol
- Catalase
- Glutathione peroxidase



50% measured multiple markers



7 studies measured antioxidants



5 studies measured reactive oxygen species OR DNA damage



4 studies measured lipid peroxidation

DNA/RNA damage

- 8-OhdG
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Lipid Peroxidation

- MDA
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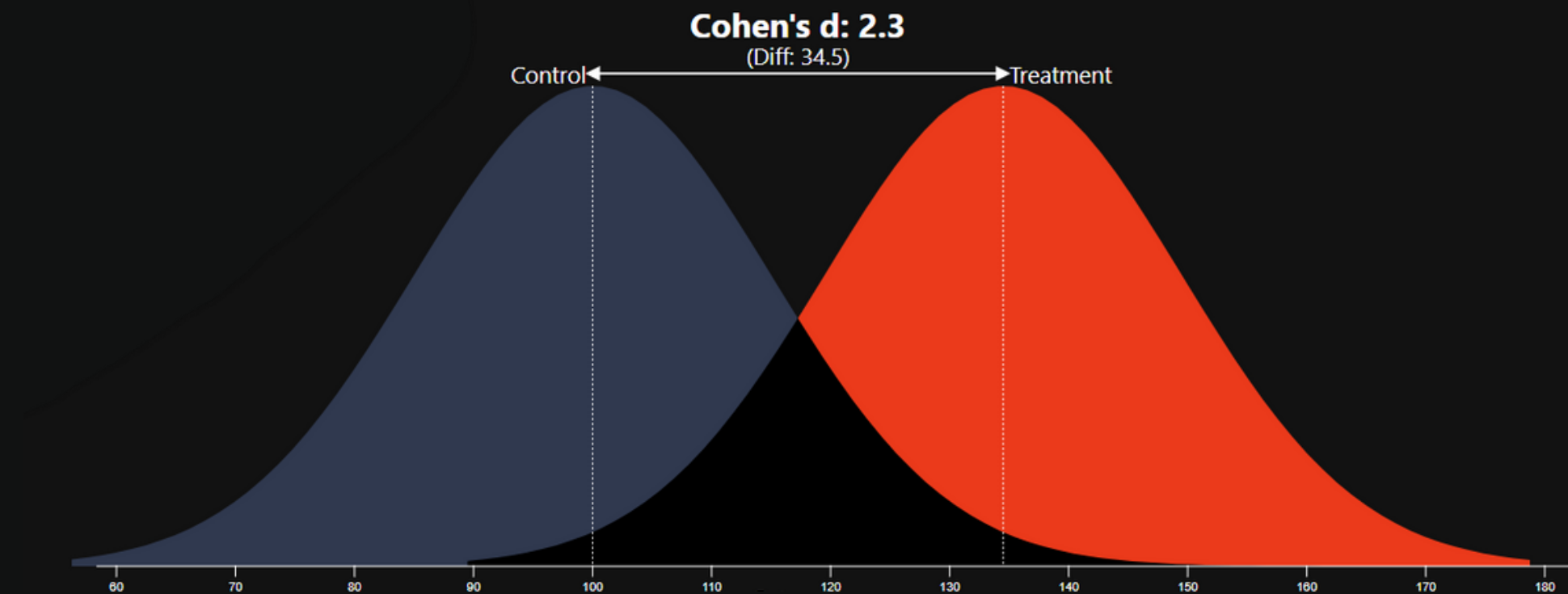
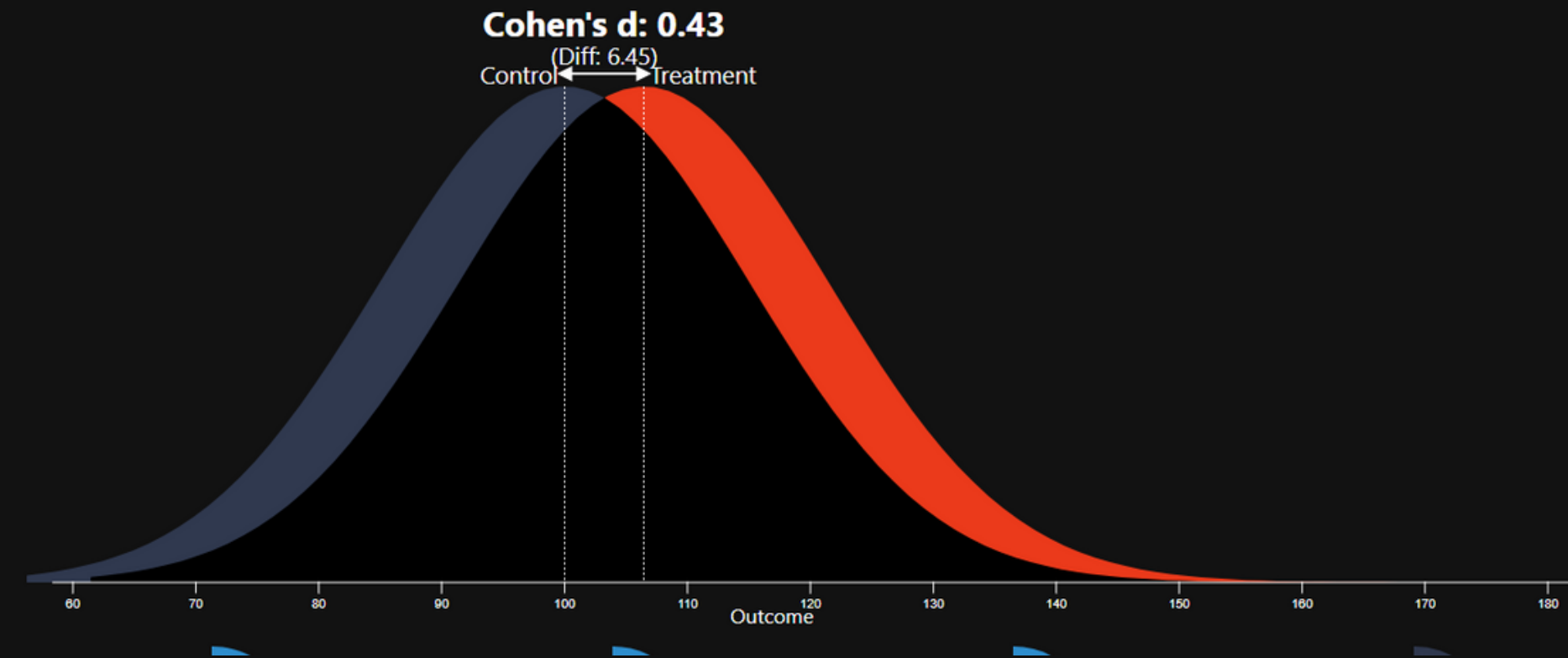
Reactive Oxygen Species

- Hydrogen peroxide
- Superoxide

Antioxidants

- Total antioxidant capacity
- Thiol
- Catalase
- Glutathione peroxidase

Four articles Cohen's d effect sizes between groups ranged from 0.43 to 2.3



Risk of bias

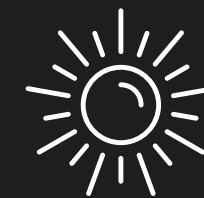
Hypothesis & Findings

Natural fluctuation or due to shift work?

Cheung and colleagues



Before a night shift



After a night shift

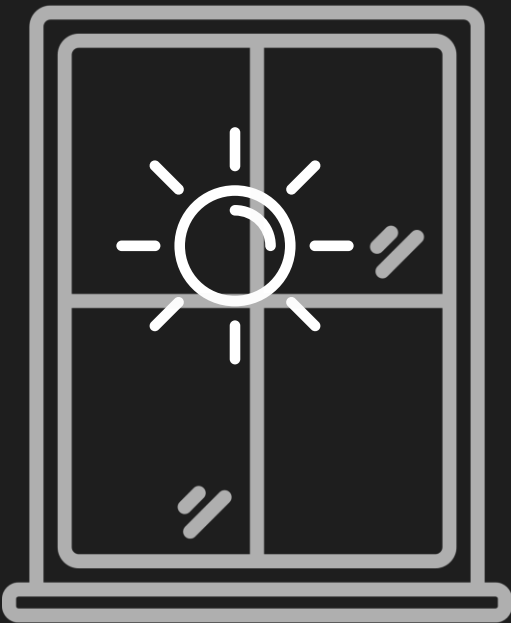


Morning after 3 days of self-reported undisturbed sleep.

Protective Factors



HOW SHIFTS ARE SCHEDULES



3 WEEKS OF
5 DAY SHIFTS



3 WEEKS OF
3 NIGHT SHIFTS



CLOCKWISE ROTATION

MON	TUES	WEDS
Morning 0700-1530	Evening 1300-2130	Night 2100-0730
WEEK 1 -2	WEEK 3-4	WEEK 5-6

FUTURE DIRECTIONS

ANY QUESTIONS?

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