Association between Psychological Distress, Sleepiness and Physical Health in FIFO Mine Workers

An Analysis of Health Demographic Screening Data of FIFO Mining Workers between 2011 and 2017

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OUTLINE

- Background
- Methods
- Results
- Discussion
- Conclusion
BACKGROUND

- Numbers of FIFO workers on the increase over last decade
- OHS, media, political and societal focus on health impacts
- The specific objectives of this study were to:
  - Determine the prevalence of psychological distress and sleepiness amongst FIFO workers
  - Determine the magnitude of associations between psychological distress, sleepiness, and physical health indicators of obesity and hypertension
  - Compare the prevalence of psychological distress and sleepiness in FIFO workers and the general population
BACKGROUND

- Physical and psychological health impact on work safety, productivity, claims performance and retention of workers

- FIFO associated with increased psychological stress and other health problems
  - Fatigue
  - Excessive daytime sleepiness
  - Overweight/obesity
  - Elevated systolic blood pressures
  - Suicide
  - Psychological and Cognitive issues (memory and concentration, anxiety, tension and irritability)
BACKGROUND

- Contribution of poor physical and psychological health on
  - Work safety and injury indicators
  - Productivity
  - Worker retention and workforce planning
- Media and Regulatory Focus on Mental Health Impacts
- Strong association between organic sleep disorders (OSA, PLM, Narcolepsy etc) and psychiatric disturbance
METHODS

- Descriptive retrospective quantitative study
- Participants were single site FIFO mining workers; 925 medical assessments over period 2011-2017
- Ethics and commercial approval
- Inclusion criteria
  - FIFO employee of the mining company completing a medical between 2011 and 2017
  - Employment for a minimum of 3 years
- Exclusion criteria
  - Incomplete medical assessment data
METHODS

- Main outcome variables
  - Psychological distress (K10 Score)
  - Excessive daytime sleepiness (ESS Score)

- Secondary variables: Body mass index (BMI) & Systolic blood pressure (SBP)

- Data analysed using SPSS version 20.0
  - Frequencies (and percentages); or means (and standard deviations) for description of variables
  - Associations between psychological distress and sleepiness (Chi-square test)
  - Mean differences between test scores (t-tests; ANOVA)
RESULTS

Prevalence of psychological distress and excessive daytime sleepiness

**Psychological distress**
- Present: 5.0%
- Absent: 95.0%

**Excessive daytime sleepiness**
- Present: 5.5%
- Absent: 94.5%
RESULTS

Prevalence of elevated blood pressure and overweight/obesity

High blood pressure

- Present: 6.4%
- Absent: 93.6%

BMI

- Normal: 18.7%
- Overweight: 45.0%
- Obese: 36.3%
RESULTS

Association between psychological distress and sleepiness

χ²=39.330; p < 0.001
RESULTS - GENDER

Influence of gender on both psychological distress and excessive sleepiness

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep ESS Score (Mean±SD)</td>
<td>4.3±3.1</td>
<td>3.8±2.9</td>
<td>1.559</td>
<td>0.119</td>
</tr>
<tr>
<td>K10 Score (Mean±SD)</td>
<td>12.5±3.1</td>
<td>13.0±3.9</td>
<td>-1.737</td>
<td>0.083</td>
</tr>
</tbody>
</table>
RESULTS – YEARLY TRENDS

Yearly trends of mean ESS scores (A) and K10 scores (B) in the study population

A

B
RESULTS – AGE TRENDS

Trends in the average ESS scores (A) and average K10 scores (B) across age groups
## RESULTS – PREDICTORS

### Predictors of psychological distress

<table>
<thead>
<tr>
<th>Model</th>
<th>Standardized Beta Coefficients</th>
<th>Exp(B)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.128</td>
<td>-4.102</td>
<td>0.000</td>
</tr>
<tr>
<td>Gender</td>
<td>0.079</td>
<td>2.487</td>
<td>0.013</td>
</tr>
<tr>
<td>Sleep ESS Score</td>
<td>0.363</td>
<td>11.872</td>
<td>0.000</td>
</tr>
<tr>
<td>BMI</td>
<td>-0.026</td>
<td>-0.844</td>
<td>0.399</td>
</tr>
<tr>
<td>BP (systolic)</td>
<td>0.010</td>
<td>0.238</td>
<td>0.812</td>
</tr>
</tbody>
</table>

### Predictors of excessive daytime sleepiness

<table>
<thead>
<tr>
<th>Model</th>
<th>Standardized Beta Coefficients</th>
<th>Exp(B)</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.088</td>
<td>2.777</td>
<td>0.006</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.087</td>
<td>-2.741</td>
<td>0.006</td>
</tr>
<tr>
<td>K10 Score</td>
<td>0.366</td>
<td>11.872</td>
<td>0.000</td>
</tr>
<tr>
<td>BMI</td>
<td>-0.027</td>
<td>-0.881</td>
<td>0.378</td>
</tr>
<tr>
<td>BP (systolic)</td>
<td>-0.064</td>
<td>-1.541</td>
<td>0.124</td>
</tr>
</tbody>
</table>
RESULTS - COMPARISON

Prevalence of psychological distress and excessive daytime sleepiness in FIFO workers compared with the general Australian population

<table>
<thead>
<tr>
<th></th>
<th>Psychological distress</th>
<th>Excessive daytime sleepiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIFO Workers</td>
<td>5.00%</td>
<td>5.50%</td>
</tr>
<tr>
<td>General population</td>
<td>11.70%</td>
<td>19.10%</td>
</tr>
<tr>
<td>P &lt; 0.0001 (95% CI: 5.03 – 8.02)</td>
<td>P &lt; 0.0001 (95% CI: 10.76 – 16.45)</td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION

- FIFO workers with psychological distress are more likely to suffer from excessive daytime sleepiness.
- Compared with the general population, FIFO workers did not have higher rates of reported of psychological distress and excessive daytime sleepiness (as expected).
- Age is a significant predictor of both psychological distress and excessive daytime sleepiness on assessment.
- BMI and systolic blood pressure do not influence the occurrence of psychological distress or excessive daytime sleepiness.
DISCUSSION

- **Strength**
  - Large number of participants (n= 925)
  - Data collection over a number of years

- **Limitations**
  - Retrospective study design
  - Use of self-administered screening tools
  - Single site study
  - Low female inclusion

- **Bias**
  - Context (deliberate symptom minimization)
  - Suitability for comparison with general population data
CONCLUSION

- A significant proportion of FIFO workers suffer from both psychological distress and excessive daytime sleepiness.
- How these interact in terms of overall impairment is uncertain.
- It is important to review safety and occupational health policies surrounding operator psychological health and attentiveness.
- Further research is required to determine influence of FIFO on psychological and physical health; and the best way to measure impairment sensitive health impacts utilizing evidence based screening tools.
ACKNOWLEDGEMENTS

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The Faculty and educational supervisors for continued support through training
KEY REFERENCES

1. Clifford S. The effects of fly-in/fly-out commute arrangements and extended working hours on the stress, lifestyle, relationship and health characteristics of Western Australian mining employees and their partners: report of research findings [bachelor’s thesis]. School of Anatomy and Human Biology, The University of Western Australia; 2009.


Thank You For Listening!
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