

Workplace stress in South African mineworkers

INRS Occupational Health Research Conference 2012:
Health risks associated with mixed exposures

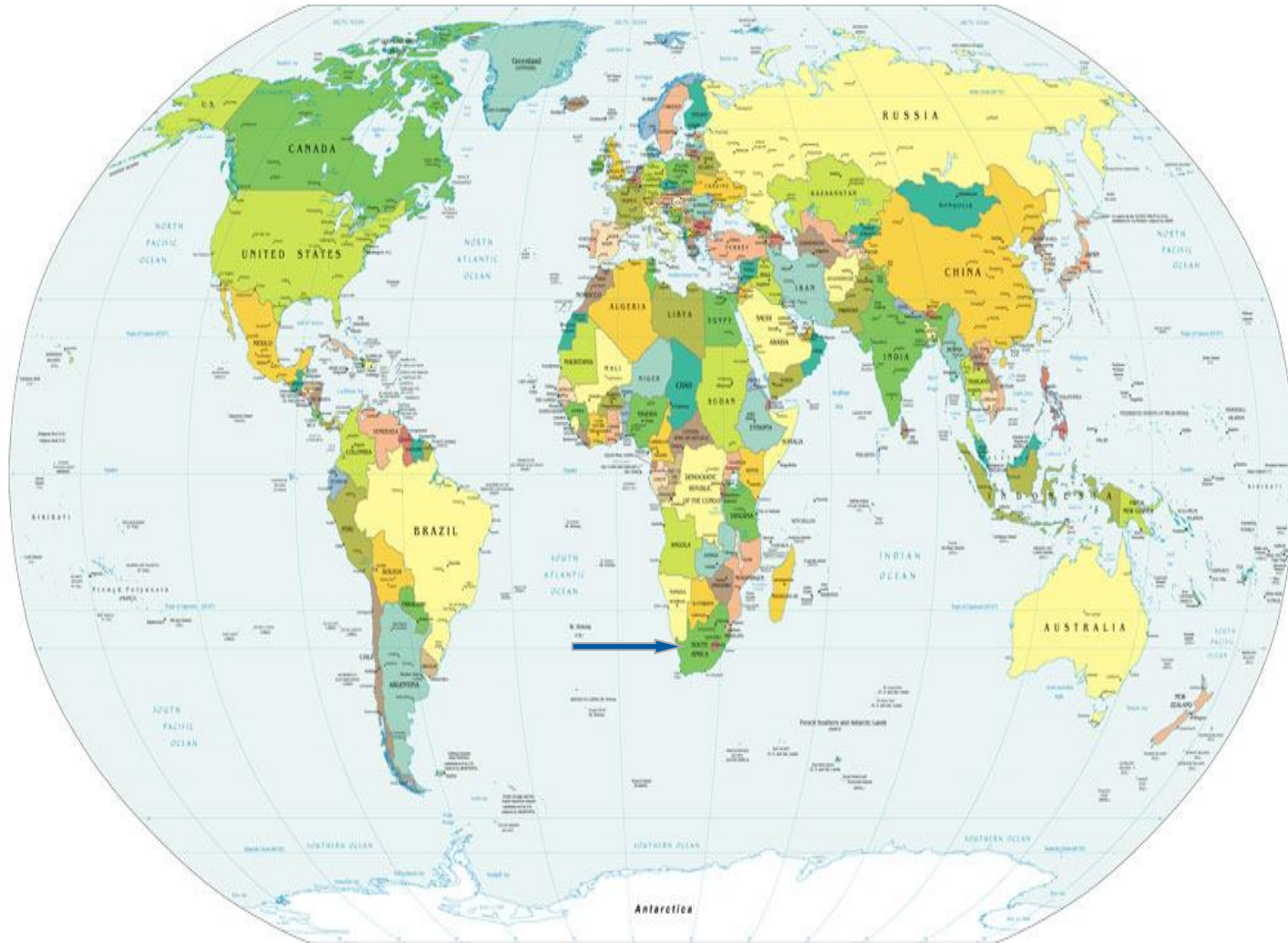
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South Africa
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Outline of presentation

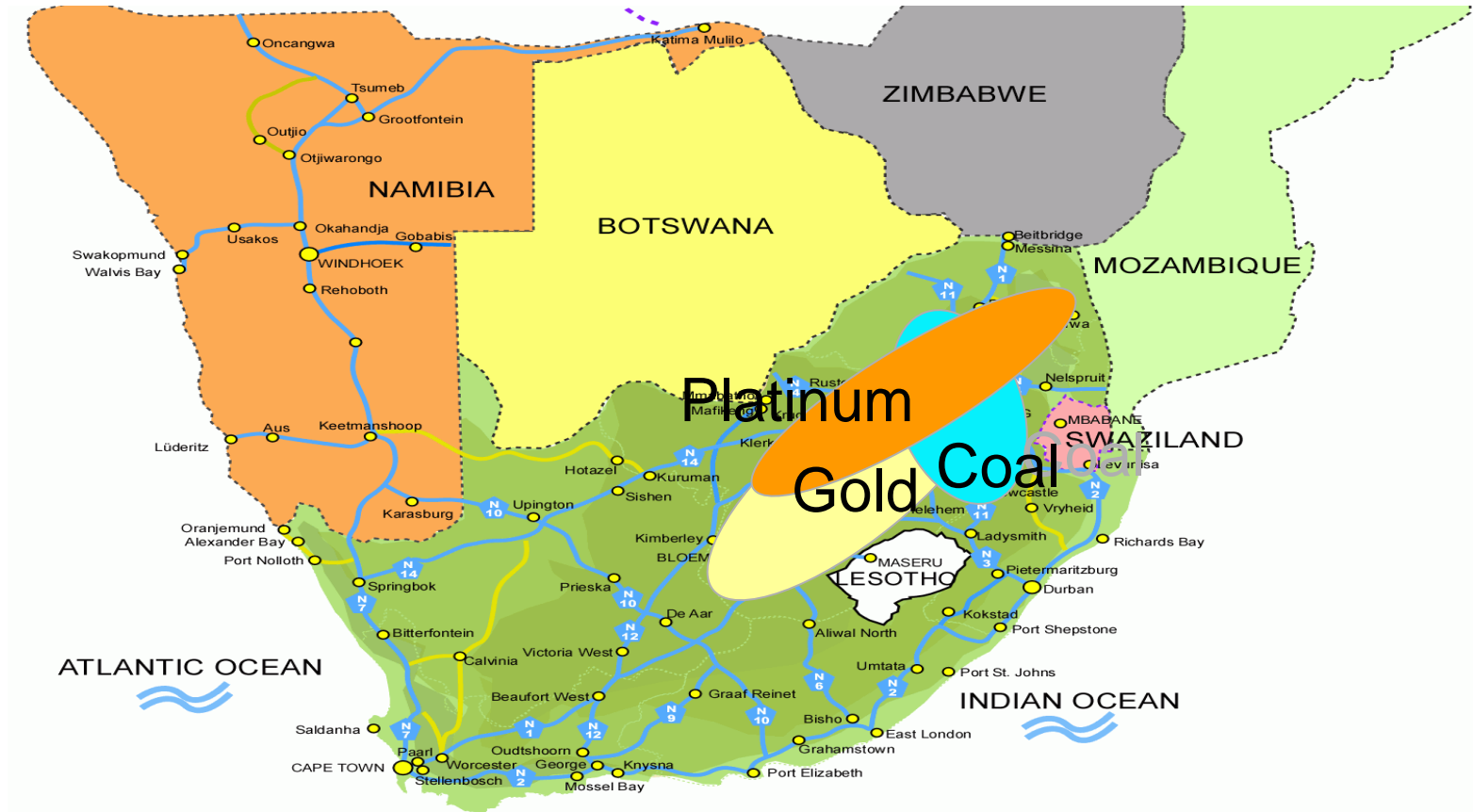
- Background to study
- Aim of the study
- Methodology
- Results
- Conclusions

Background



Background

South Africa is a mineral rich country



Mining accounts for 34% of export
6.5% of formal employment

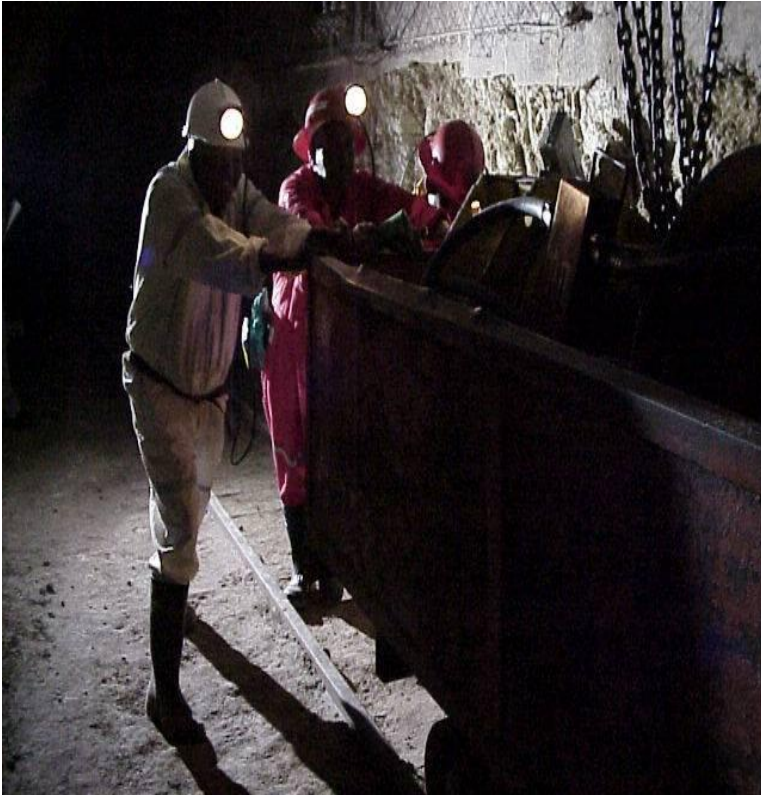
Background

Very harsh working conditions



Background

Long working shifts



Background

The workforce in the mining industry is changing

- *More females*
- *Older workers*
- *Chronic medical conditions – TB, HIV/AIDS, hypertension, diabetes*

Need scientific information about impact of work

To inform decisions about

- *Safer workplaces*
- *Healthier workers*

Workplace Stress

Definition: When the workplace or performing work causes emotional stress

Rationale: Extended periods of stress are known to cause health problems

Measure by means of self report questionnaires

- *Job content*
- *General health and mental well-being*
- *Fatigue*

Measure by means of biological indicators

- *Salivary cortisol sample*

Aims of the study

- To evaluate the prevalence of workplace stress among mineworkers in South Africa
- To identify mineworkers that are at risk of workplace stress
- To evaluate the use of translated self-report questionnaires and salivary cortisol methods in the real world mining environment

Methodology

173 volunteer mine workers

- underground and surface
- males and females
- day shift and night shift
- expected higher stress and lower stress

Salivary cortisol levels

- used commercially available collection kit
- levels above the expected normal levels using the time from getting out of bed in the morning to include diurnal fluctuations of cortisol

Methodology

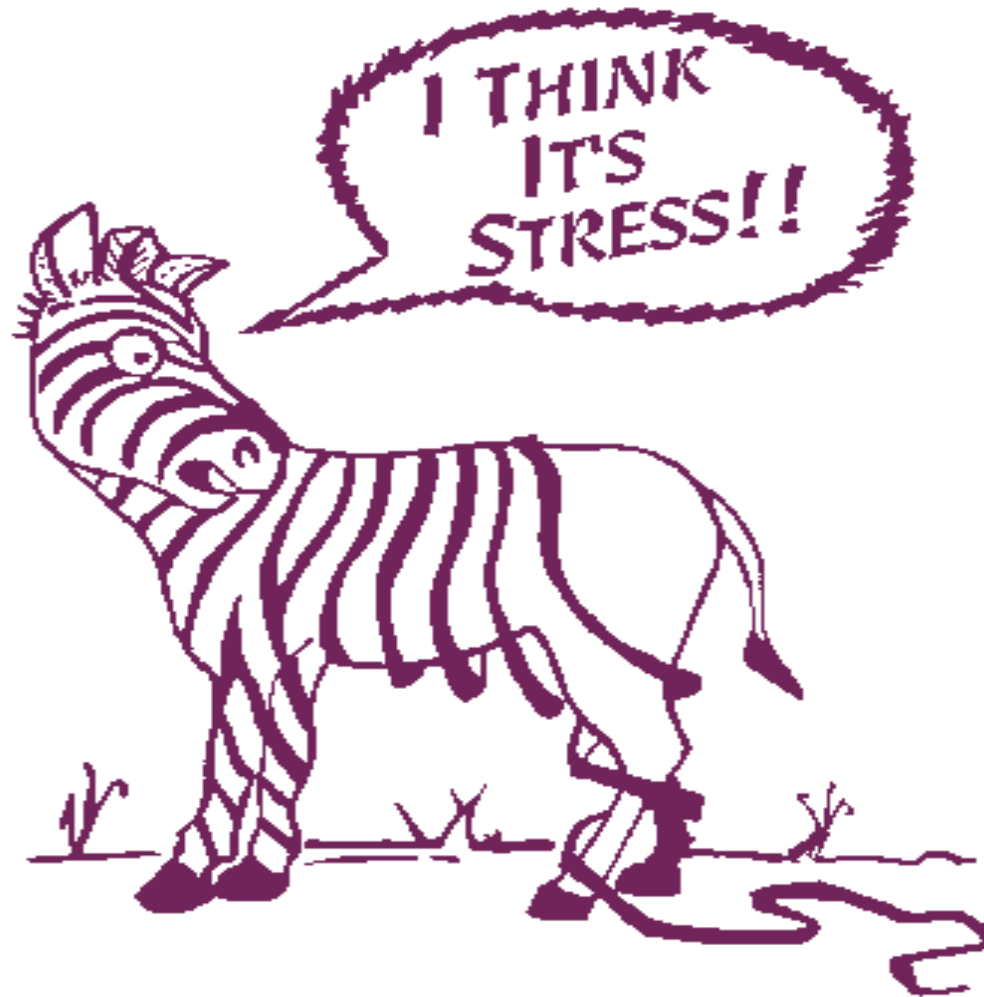
Workplace stress

- 18-item Job Content Questionnaire - psychological demand and decision latitude in the workplace
- General Health Questionnaire - health and mental wellbeing
- Subjective Fatigue Checklist - drowsiness, loss of concentration and physical fatigue

Data Analysis

- comparing male and female mineworkers
- underground occupations and surface occupations
- night shift and day shift
- demographic factors

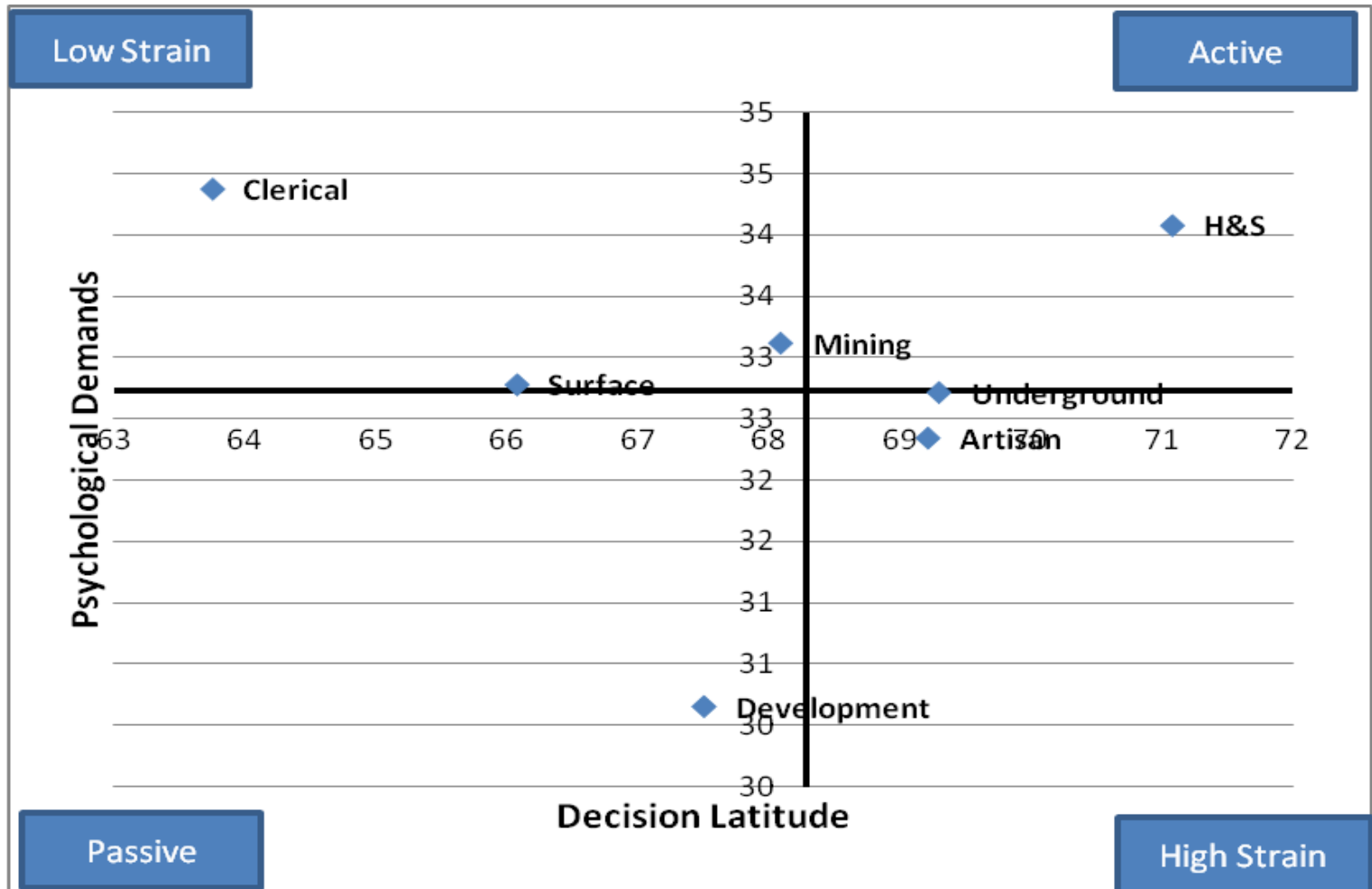
Results



Prevalence Job Content

Job Content Questionnaire	Range	Mean	Standard Deviation
Skill Discretion	12 – 48	33.69	4.8
Decision Authority	12 – 48	33.74	5.72
Decision Latitude (control)	48 – 96	67.44	8.13
Psychological Demands	12 – 48	30.92	5.22
Physical Demands	1 – 4	3.05	0.89
Social Support	2 – 8	5.03	1.48
Noise	1 – 4	3.08	0.87

Job Strain



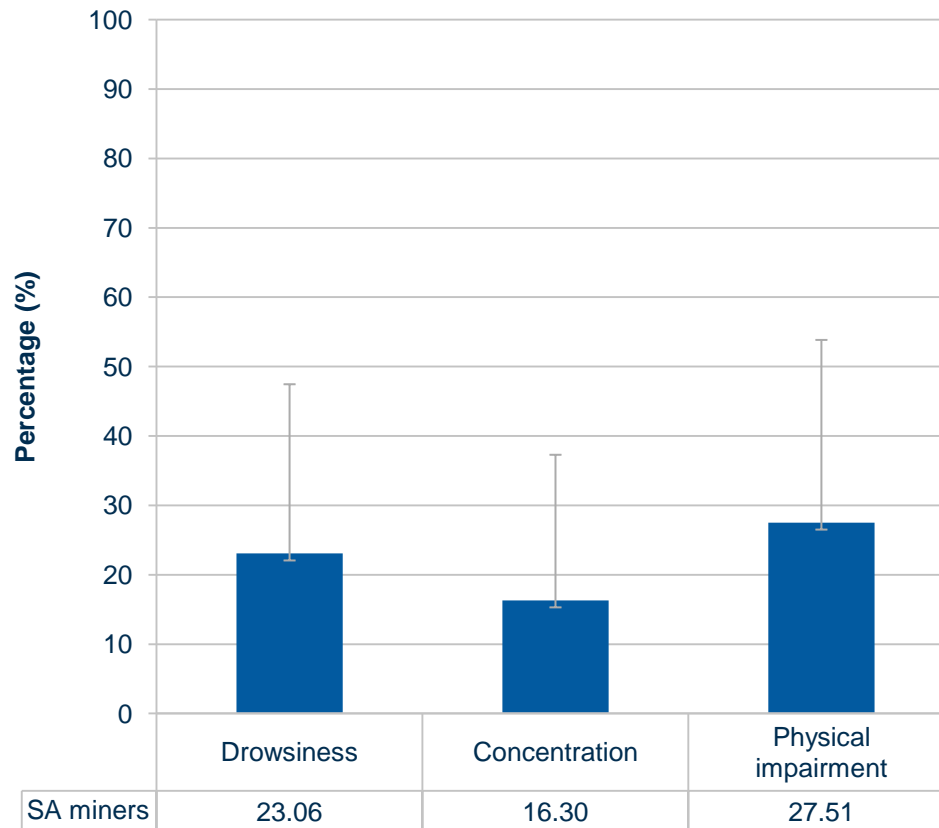
Mental Health

	Somatic Symptoms	Anxiety/ Insomnia	Social Dysfunction	Severe Depression	Total score
Mean	5.41	5.81	5.37	3.03	19.48
Standard Deviation	4.17	4.37	3.49	4.22	11.75
Possible Range	0 - 21	0 – 21	0 – 21	0 -21	4 – 84

Low levels of negative health symptoms and mental well-being amongst the mine workers.

Fatigue

Subjective Fatigue Checklist

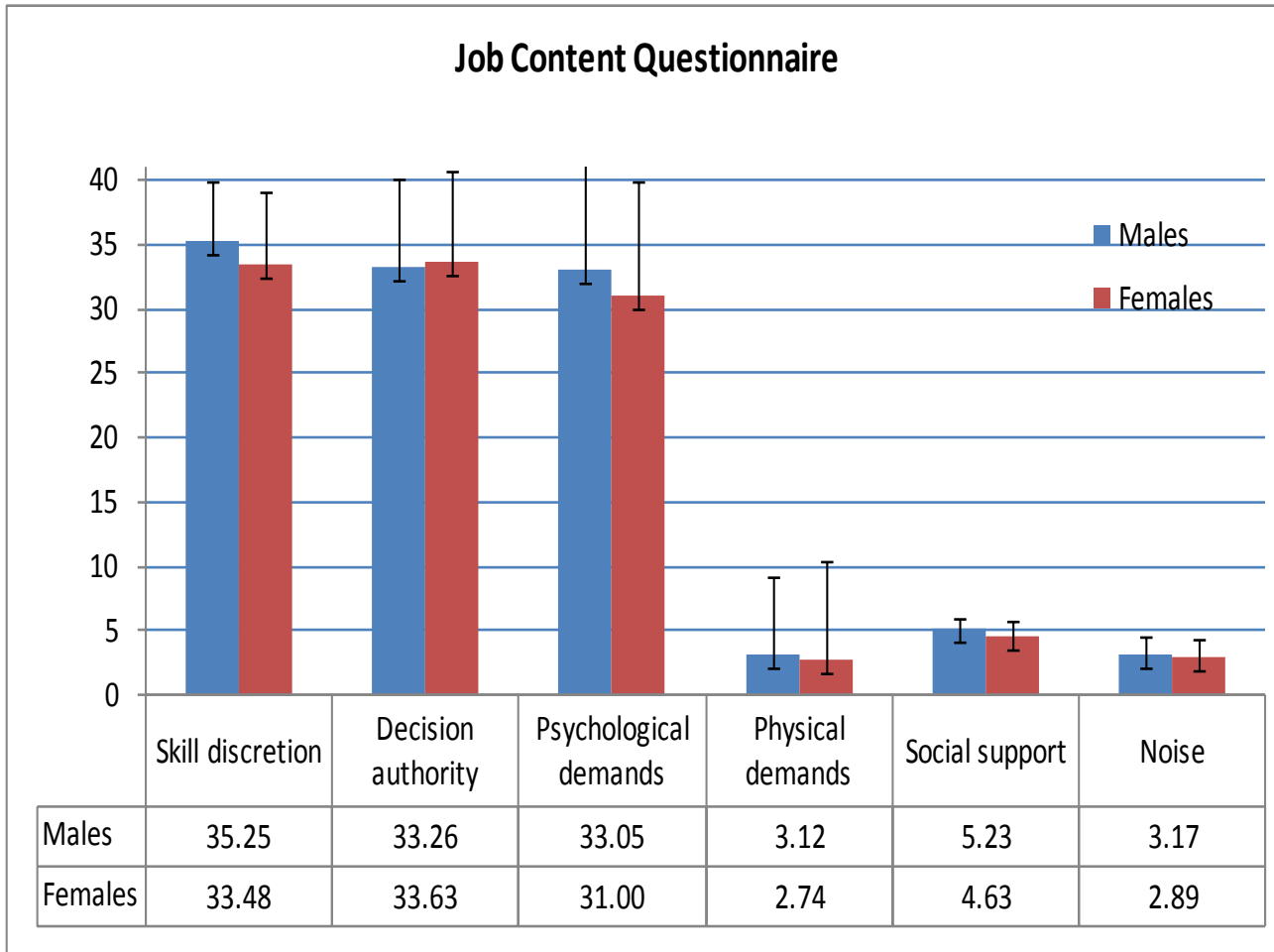


Salivary Cortisol Concentrations

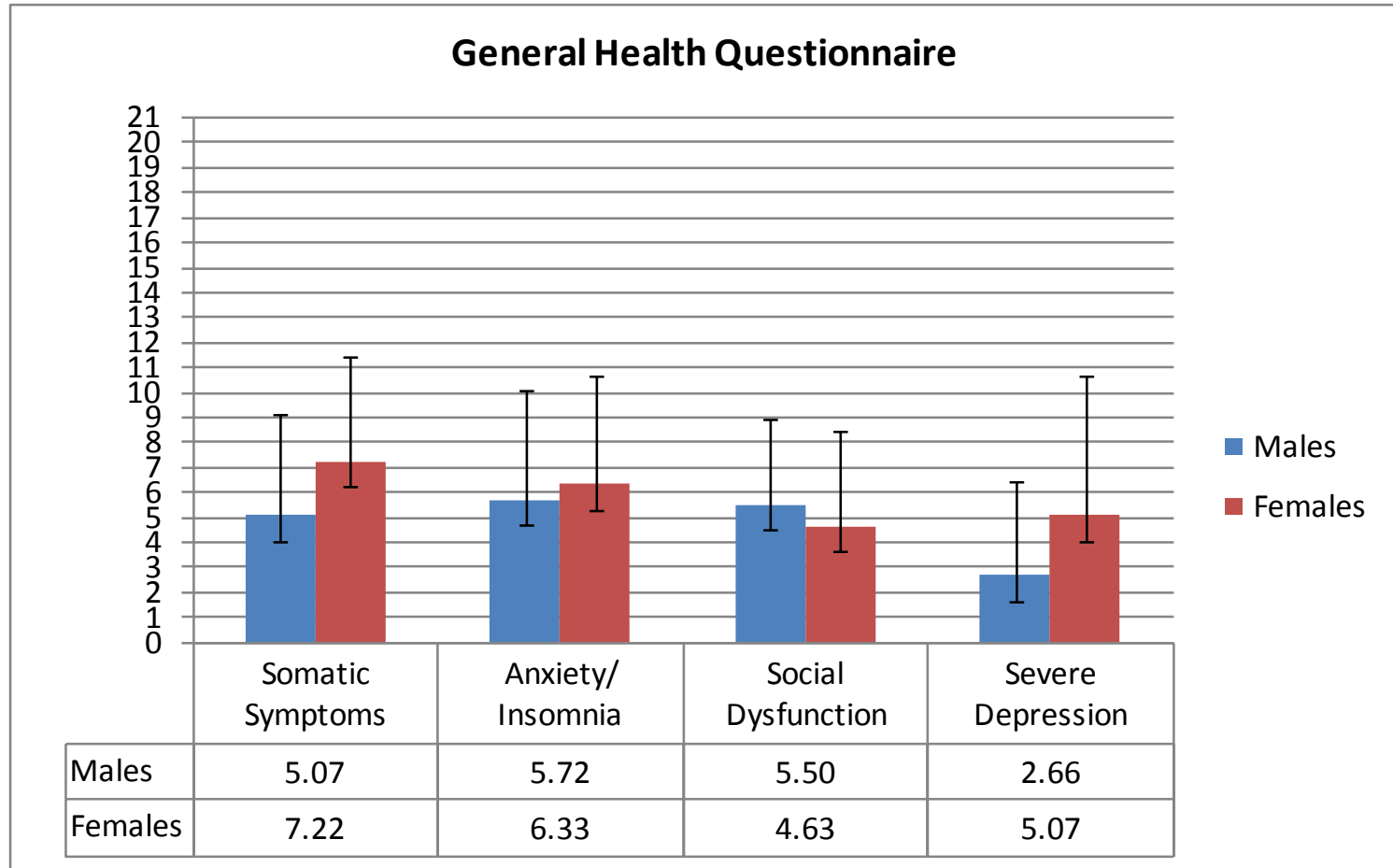
Percentage of results	Lower than range	In range	Higher than range
Pre-shift (n=153)	8.50%	90.20%	1.31%
Post shift (n=149)	6.04%	75.17%	18.79%

Risk

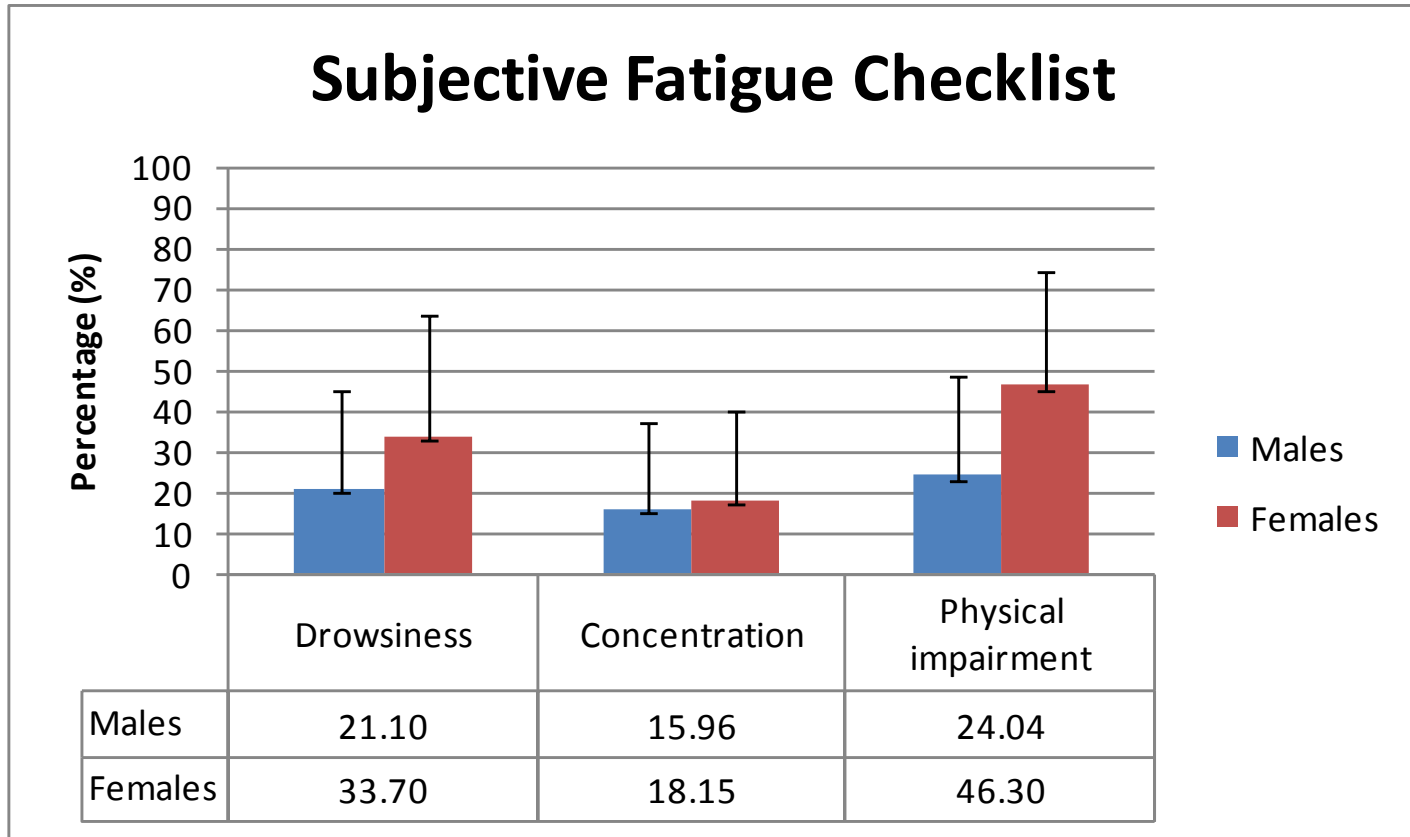
Males vs Females



Males vs Females



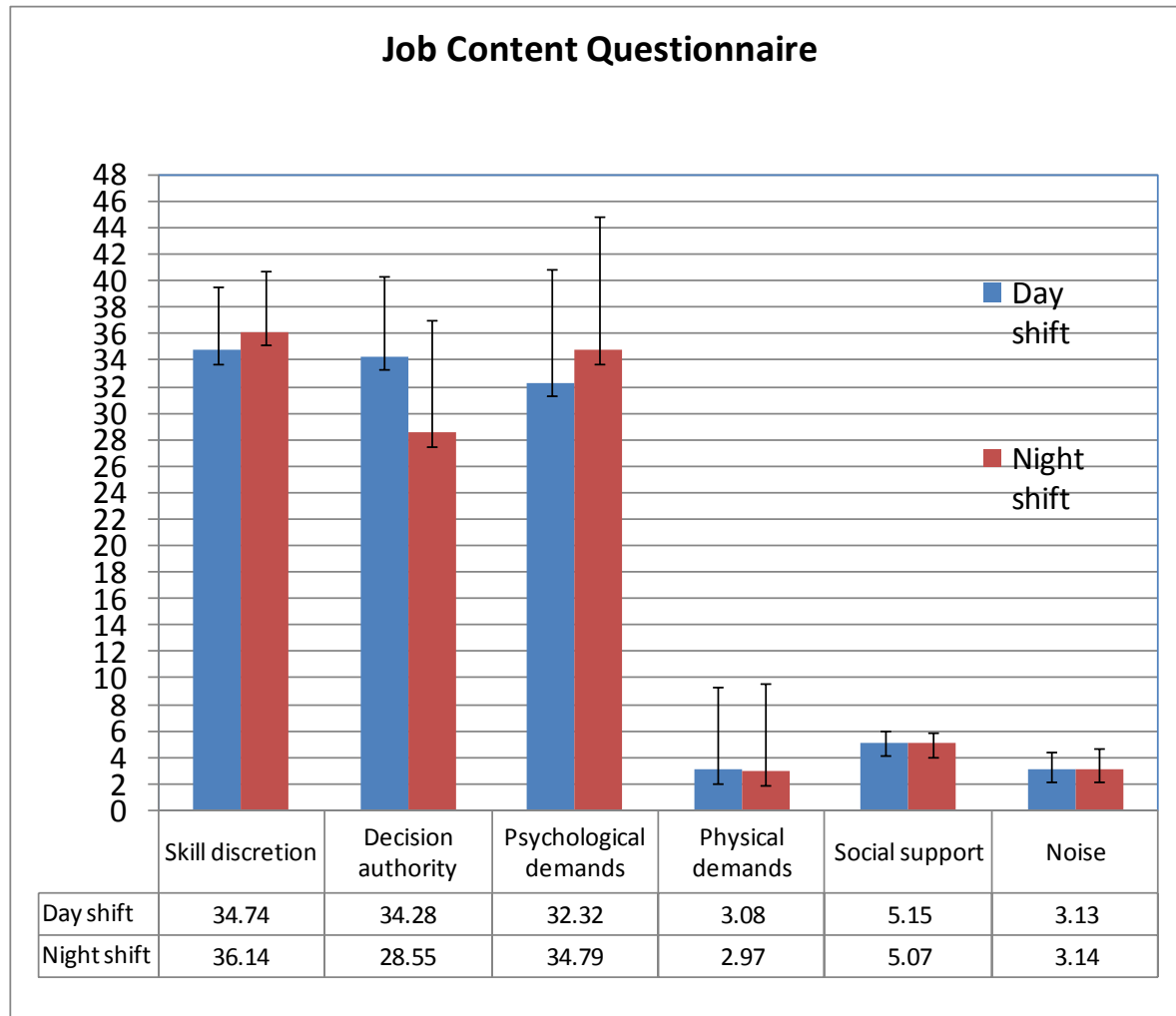
Males vs Females



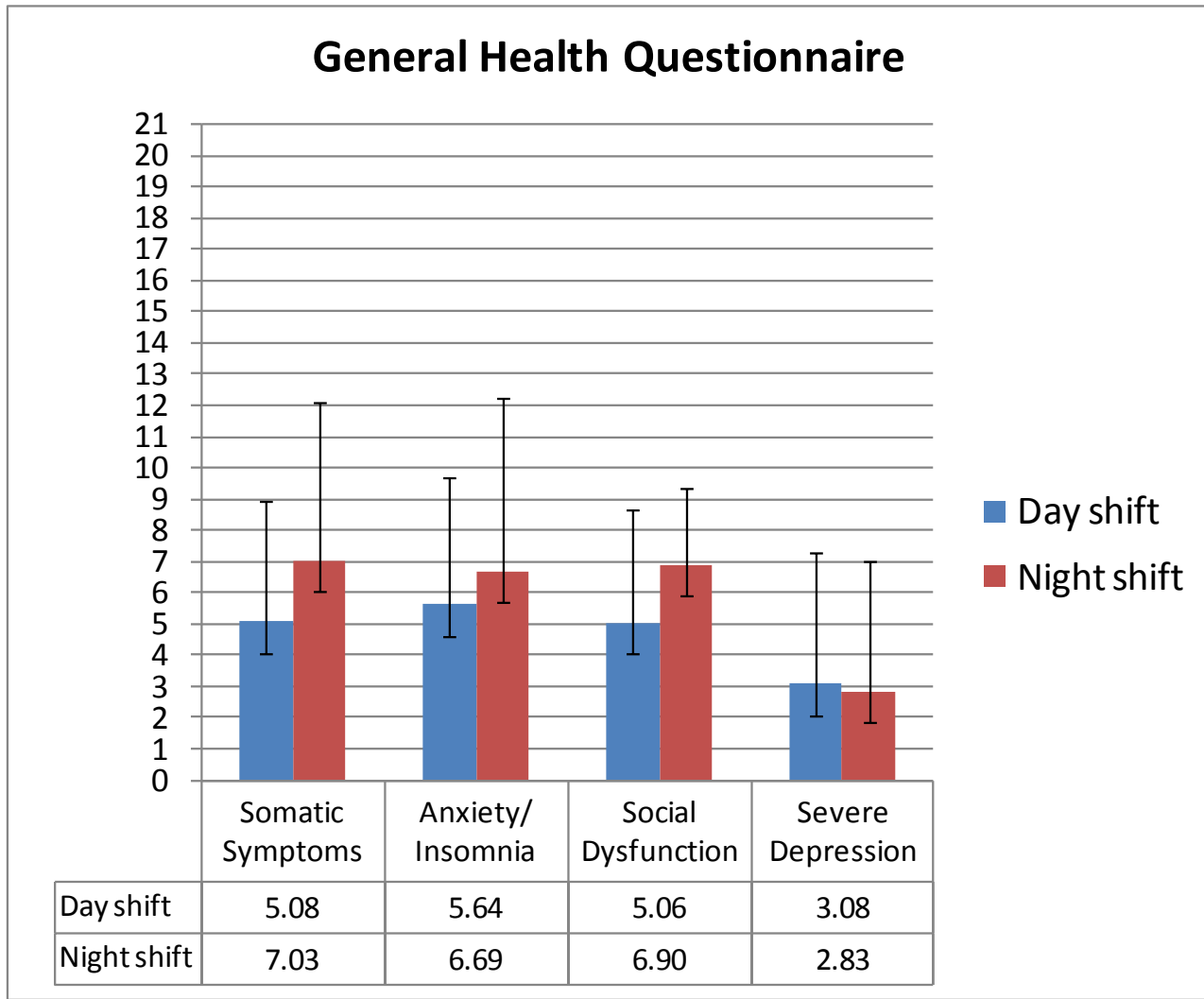
Males vs Females

Gender	Pre-shift cortisol level	Post-shift cortisol level
	Higher than expected range	Higher than expected range
Females	0	0
Males	2	28
Total	2	28

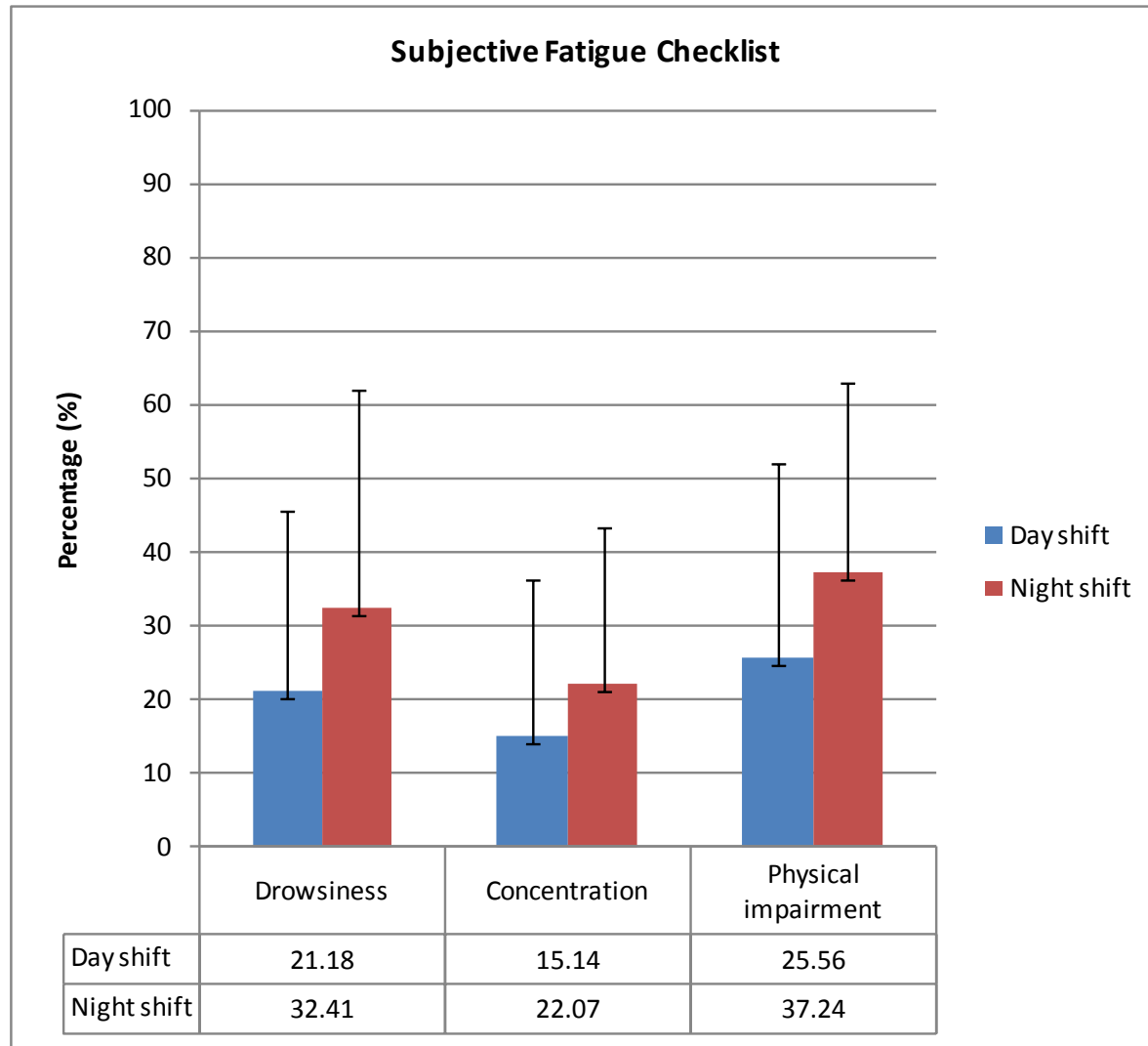
Day shift vs Night shift



Day shift vs night shift



Day shift vs Night shift



Day shift vs Night shift

- Day shift and Night shift cortisol levels could not be compared – due to the difficulty in identifying when they woke up
- Require norms and improved data collection methods

Underground vs Surface occupations

Occupation Category	Post shift cortisol levels
	Higher than range
Surface (n=40)	0
Underground (n=109)	28

Occupation	Post shift cortisol levels
	Higher than range
Artisan (n=36)	7
Clerical (n=6)	0
Development (n=17)	2
Health & Safety reps (n=13)	8
Mining (n=77)	11

Conclusion

23 % of miners feel their work is a high strain job

20% had health and mental health symptoms

23 % of the miners reported drowsiness and dullness

16% reported difficulty concentrating

28% reported physical fatigue symptoms

17% of miners had salivary cortisol levels above the norm after working

Conclusion

Females miners and night shift miners have a higher risk for

- health symptoms
- anxiety
- insomnia
- social dysfunction
- depression

More males miners have higher than expected cortisol levels after work than female miners

Conclusion

More white miners have higher than expected cortisol levels after work than other races

Underground miners had more symptoms of workplace stress than surface miners

Artisan and Miner are high strain occupations

Higher socio-economic miners have higher post shift cortisol levels

Conclusions

Prevention strategies for workplace stress in mining need to manage

- psychological demands
- physical fatigue
- concentration difficulties

Risk matrix for occupations

Questions?

