Sleep and Fatigue Offshore: Investigating subjective and objective parameters on sleep, fatigue, health, safety and performance.

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Primary Objective: To objectively and subjectively investigate sleep and fatigue among Dutch and British offshore workers and their influence on health safety and performance.Secondary Objective(s): • To examine the course of cortisol, cotison and...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Observational non invasive

Summary

ID

NL-OMON41114

Source
ToetsingOnline

Brief title
Sleep and Fatigue Offshore

Condition

- Other condition
- Environmental issues

Synonym
Circadian rhythm, sleep/wakefulness

Health condition

Sleep, fatigue, health, safety and performance

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Groningen
Source(s) of monetary or material Support: Shell/NAM

Intervention

Keyword: Fatigue, Health, Offshore, Sleep

Outcome measures

Primary outcome

• Sleep:

o Cortisol (in saliva)

o Cortison (in saliva)

o Melatonin (in saliva)

o Sleep/Wake cycle (actigraph and sleep diary)

• Fatigue

o Reaction time (Psychomotor vigilance task; proxy for fatigue)

o Items from the sleep diary

Secondary outcome

Secondary study parameters/endpoints

• General health status (questionnaire)

• Safety aspects (Companies safety data base/reporting tool)

• Subjective performance (sleep diary)

Other study parameters

• Socio-demographics (e.g.: Age; gender; education; years worked offshore)

• Physical environment (e.g.: Noise, temperature and humidity)

• Social environment (e.g.: Relationships with colleagues; family situation)

• Work conditions (e.g.: Work ability; work load)

Study description

Background summary

Fatigue has been described to be a multi-dimensional, complex construct with effects on cognitive and task performance which influence safety outcomes.2 Fatigue includes behavioral, physiological, emotional and cognitive components.3 Experiences of fatigue have been noted to be very common on worksites with an estimated prevalence of 22% in Dutch populations.4 Resnick (2006) found that self-reported fatigue is associated with higher body mass index5 and fatigue in general has been linked to ill-health6,7 and safety outcomes such as accidents, injuries8 and reduced performance.3,9 The extensive effect of fatigue on health and safety outcomes can be partly explained by the influence fatigue has on decreasing cognitive processing speed. Decreased cognitive processing speed has been shown to be associated with increased reaction times, tunnel vision, inattentiveness and lower vigilance and concentration10 which in turn increase the chances of accidents (at work). Further, the link between increased fatigue and accident involvement has been explained by the depletion of required cognitive resources due to physical exertion or sleep deprivation.11 Dawson and Reid (1997) found that the cognitive processing deficits of individuals with moderate sleep deprivation were analogous to those experienced by individuals with blood alcohol levels above the legal driving limit.12

In the offshore oil and gas industry, safety is taken very seriously because of the potential hazards stemming from the oil and gas production. A pilot study among Dutch offshore workers found that 73% of workers reported severe fatigue levels and sleeping difficulties. Further, the study found that 41% of workers experienced a physical and mental dip at some point during their fortnight shift, which could be detrimental to health and safety aspects offshore. The majority of workers (60%) reported this dip to occur on the 10th or 11th day, whilst being offshore. In the UK, Ross (2009) found that one of the major health concerns among offshore workers were sleeping problems.1 Understanding and improving sleep, fatigue and dip experiences is crucial to prevent accidents like the Macondo disaster close to the Gulf of Mexico in 2010 or the Piper Alpha disaster which took place close to the coast of Aberdeen in 1988.

It has been suggested that there is a gained benefit of using subjective and

objective measures together to investigate several health behaviors.13 Especially for fatigue, it has been noted that subjective measures alone are not sufficient for the thorough investigation of fatigue. Subjective estimates are prone to bias and are often inaccurate.14 However, perceived sleep is important and individual differences in sensitivity to the effects of sleep loss constitute key considerations in the prediction of fatigue. Therefore, programs should investigate both objective and subjective measures.

To our knowledge, no studies exist on offshore workers working in the Dutch North
Sea sector and only a handful UK offshore studies exist investigating the health of offshore workers. Overall, only a few offshore studies conducted in other countries exist, that looked at the effects of physical and (psycho) social work environments on workers* health status. A recent systematic review on the effect of offshore shift work on health found that shift workers reported more sleep problems than day workers.15 Although sleeping problems offshore have been reported by the authors no explanations were given with regard to etiology and consequences. For example, the previously investigated Dutch offshore population did not have a permanent shift work schedule and yet they still reported severe fatigue and sleeping difficulties. The outcomes of the proposed study will help to clarify which factors constitute the sleep and fatigue problems offshore and will shed light on how sleep and fatigue problems affect health and safety parameters offshore. Moreover the data will help us identify which factors constitute the dip that workers reported in the pilot study.

Study objective

Primary Objective:
To objectively and subjectively investigate sleep and fatigue among Dutch and British offshore workers and their influence on health safety and performance.

Secondary Objective(s):
• To examine the course of cortisol, cotison and melatonin levels during a fortnight offshore shift
• To examine links between the dip indication and objective (cortisol and melatonin) and subjective (sleep diary) measures
• To examine the sleep/wake cycle of offshore workers as indicated by actigraph data
• To examine the course of reaction times of PVT outcomes during a fortnight offshore shift as indicated by number of lapses and mean reaction time
• To relate fatigue and sleep parameters with health, safety and performance outcomes
• To compare Dutch and British offshore workers on the parameters mentioned above
• To compare subjective and objective sleep and fatigue indications

Study design

This study is a repeated measures design conducted over the course of four weeks in two different countries (the Netherlands and the UK).

Study burden and risks

The majority of measurements will be conducted during working hours offshore. The measurements cover a period of four weeks and the accumulated time investment needs to be taken into account: Baseline questionnaire 20 min.; sleep diary 28 x 10 min.; saliva samples on 3 days x (5 x 5 min).; PVT 28 x 10 min.; Closing questionnaire 10 min.. On average on a day with biomarker testing an individual will spend 55 min on the research. On a day without biomarker testing: 30 min. To our knowledge, there are no known risks of the involved measurements.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age

Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

Working for the company Shell/NAM

Exclusion criteria

None

Study design

Design

Study type: Observational non invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Basic science

Recruitment

NL

Recruitment status:	Recruitment stopped
Start date (anticipated):	01-11-2014
Enrollment:	60
Type:	Actual

Ethics review

Approved WMO

Date:	02-02-2015
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL48659.042.14