*Occupational Medicine* 2008;**58:**302–304
Published online 15 March 2008 doi:10.1093/occmed/kqn019

SHORT REPORT

# Shift work and sickness absence

**Finn Tüchsen, Karl Bang Christensen and Thomas Lund**

| | |
|---|---|
| **Background** | Sickness absence is increasing in public work places in Denmark where shift work is common. |
| **Aims** | The aim of this prospective study was to predict the hazard ratio (HR) of short- and long-term sickness absence due to shift work in Danish shift workers. |
| **Methods** | A total of 1008 shift workers and 4009 day workers were followed up for short- and long-time sickness absence. |
| **Results** | Among shift workers, the HR of sickness absence lasting ≥2 weeks was 0.92 (95% CI: 0.71–1.18) for men and 0.90 for women (95% CI: 0.71–1.14). For sickness absence lasting ≥8 weeks, the HR was 1.33 (95% CI: 0.91–1.94) for men and 1.13 (95% CI: 0.81–1.59) for women. |
| **Conclusion** | This study was inconclusive in proving any link between shift work and absenteeism after controlling for age, education, body mass index, smoking status, alcohol consumption, leisure time physical activity, psychosocial and physical work environment factors. |
| **Key words** | Absenteeism; DREAM register; shift system. |

## Introduction

Sickness absence is mainly due to disease or sickness, but there are other risk factors such as uncomfortable working positions and handling of heavy loads and psychosocial factors [1]. There is conflicting evidence or inconclusive results regarding the relationship between absenteeism and shift work [2,3]. Shift work is suspected to cause both short-term sickness and contributes to chronic diseases such as cardiovascular diseases, cancer, metabolic disturbances as well as contributing to accidents [4].

Some studies have found that day workers have higher sickness absence rates than shift workers [5], whereas others have found higher sickness absence rates or longer absence spells among shift workers [6]. Short- and long-term sickness absence may have different determinants but from the literature reviewed, it was difficult to draw firm conclusions as different studies have reported their results in different ways [7,8].

The present study aimed to estimate the relative risks of sickness absence when comparing shift workers to non-shift workers.

National Research Center for the Working Environment, Lersø Parkallé 105, DK-2100 Copenhagen, Denmark..

Correspondence to: Finn Tüchsen, National Research Center for the Working Environment, Lersø Parkallé 105, DK-2100 Copenhagen, Denmark.
Tel: +45 3916 5284; fax: +45 3916 5201; e-mail: ftu@nrcwe.dk

## Methods

The Danish Work Environment Cohort Study (DWECS) is carried out every fifth year in order to describe the work environment in Denmark and to follow workers health over time. The 2000 wave of DWECS featured a simple random sample of 11 437 adults, of which 8583 (75%) participated in telephone interviews. For the purposes of our study, we included workers who were aged between 18 and 64 and had worked as employees for at least 2 months before the baseline interview ($n$ = 5357).

Shift workers were defined as employees working irregular working hours, two-shift systems, fixed evening shifts, three-shift systems or fixed nights. Shift workers were compared with permanent day workers. We used the personal civil registration number for each employee to create a link to weekly information on sickness absence compensation. Employers in Denmark are entitled to compensation if employees are sick for >14 days. Details of compensation received by employers are filed in the national 'DREAM' (a Danish acronym for The Register Based Evaluation of Labour Market Marginalisation) register [9]. Therefore, each employee could be followed up and their sickness absence monitored through DREAM.

The cohort was followed up for 78 weeks. People were excluded from further analysis if they died, emigrated or retired. Maternity leave was not included in the follow-up. Employees with incomplete data on the DREAM register were also excluded. After a sickness spell had occurred, that employee was removed from the study.

© The Author 2008. Published by Oxford University Press on behalf of the Society of Occupational Medicine.
All rights reserved. For Permissions, please email: journals.permissions@oxfordjournals.org

Downloaded from http://occmed.oxfordjournals.org/ at socialforskningsinstituttet on June 18, 2015

The Cox proportional hazards model was used to calculate hazard ratios (HR) and 95% confidence intervals. Confounding was corrected for by adjusting for age, education, health behaviour, psychosocial and physical work environment factors.

Health behaviour included body mass index (BMI), smoking status, alcohol consumption and leisure time physical activity [10]. Psychosocial work environment factors included decision authority, skill discretion, quantitative demands, emotional demands, demands of hiding emotions, job insecurity, social support from colleagues and supervisor, management quality, role conflicts, reward in work, meaning of work, predictability in work and conflicts at work [9]. Physical work environment factors included extreme bending or twisting of the neck or back, work with arms lifted or hands twisted, working mainly standing or squatting, lifting or carrying loads and pushing or pulling loads [1].

## Results

Altogether 5017 employees were followed up for the duration of the study. The demographics of the study group are shown in Table 1.

Shift workers comprised 495 men (19%) and 513 women (21%). During the 78-week-long follow-up time, 446 men (17%) and 428 (18%) women had a sickness absence spell lasting at least 2 weeks. Of these, 163 men (6%) and 206 women (8%) had a sickness absence spell lasting at least 8 weeks (Table 2).

Analyses without gender stratification were also considered. For absences lasting ≥2 weeks, the HR after adjustment for age and gender was 1.06 (95% CI: 0.90–1.25). The HR was reduced when adjusted for education, health behaviour, psychosocial and physical work environment to 0.88 (95% CI: 0.74–1.04). The corresponding figures for absence lasting ≥8 weeks were HR = 1.38 (95% CI: 1.09–1.75) and 1.13 (95% CI: 0.88–1.45) (Table 2).

## Discussion

We found no effect of shift work on sickness absence in general, but a moderately increased risk for both men and

**Table 1.** General demographics of the studied groups

| | Shift workers | Day workers |
|---|---|---|
| Age, mean (SD) | 39.0 (11.6) | 40.5 (11.0) |
| Women | 51% | 48% |
| Married/cohabitee | 28% | 88% |
| No children living at home | 54% | 50% |
| One child living at home | 18% | 19% |
| Two or more children living at home | 28% | 31% |

**Table 2.** Number of men and women at baseline, person years of risk (PYRS), HR due to sickness absence for ≥2 weeks and ≥8 weeks for shift working men and women compared to day workers

| Gender (*n*) | Shift/day work (*n*) | % | ≥2 weeks | | | | | ≥8 weeks | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | PYRS | Cases | Age adjusted | | Fully adjusted[a] | PYRS | Cases | Age adjusted | | Fully adjusted[a] |
| | | | | | HR | 95% CI | HR 95% CI | | | HR | 95% CI | HR 95% CI |
| Men (2573) | Shift (495) | 19 | 653.13 | 83 | 0.94 | 0.74–1.19 | 0.92 0.71–1.18 | 699.98 | 41 | 1.43 | 1.01–2.04 | 1.33 0.91–1.94 |
| | Day (2078) | 81 | 2698.73 | 363 | 1.00 | – | 1.00 – | 2955.02 | 122 | 1.00 | – | 1.00 – |
| Women (2444) | Shift (513) | 21 | 654.50 | 102 | 1.20 | 0.96–1.50 | 0.90 0.71–1.14 | 703.19 | 52 | 1.35 | 0.98–1.84 | 1.13 0.81–1.59 |
| | Day (1931) | 79 | 2547.13 | 326 | 1.00 | – | 1.00 – | 2721.00 | 154 | 1.00 | – | 1.00 – |
| Total | 5017 | | 6553.49 | 874 | | | | 7079.19 | 369 | | | |

[a]Adjusted for age, education, health behaviour, psychosocial and physical work environment.

Downloaded from http://occmed.oxfordjournals.org/ at socialforskningsinstituttet on June 18, 2015

women, when restricting attention to longer sickness absence spells. However, the results were not statistically significant.

Weaknesses of this study were that the number of employees' working shifts was relatively small and the fact that shift exposure history was lacking. Strengths of this study included the access to compensated sickness absence data (as these files are independent of the memory of the study participants) and the high follow-up rate. Another strength is that we tried to correct for age, education, BMI, smoking status, alcohol consumption, leisure time physical activity, psychosocial and physical work environment factors. These factors have shown associations with shift work and/or sickness absence in previous studies. A possible bias is the fact that over-adjustment may have occurred if any of the psychological or physical factors were related to shift work.

The results do not exclude the possibility that shift work carries an excess risk of sickness absence, but it is unlikely that there is a strong effect.

## Key points

- The association between shift work and sickness absence was studied, but no conclusion can be drawn.
- More powerful studies are needed to ascertain whether shift work causes sickness absence and whether there are differences between various shift systems.

## Conflicts of interest

None declared.

## References


1. Lund T, Labriola M, Christensen KB, Bültmann U, Villadsen E. Physical work environment risk factors for long term sickness absence: prospective findings among a cohort of 5357 employees in Denmark. *Br Med J* 2006;**332:**449–452.
2. Eriksen W, Bruusgaard D, Knardahl S. Work factors as predictors of sickness absence: a three month prospective study of nurses' aides. *Occup Environ Med* 2003;**60:**271–278.
3. Kleiven M, Bøggild H, Jeppesen HJ. Shift work and sick leave. *Scand J Work Environ Health* 1998;**24(Suppl. 3):** 128–133.
4. Knutsson A. Health disorders of shift workers. *Occup Med (Lond)* 2003;**53:**103–108.
5. Hermansson U, Knutsson A, Brandt L, Huss A, Rönnberg S, Helander A. Screening for high-risk and elevated alcohol consumption in day and shift workers by use of the AUDIT and CDT. *Occup Med (Lond)* 2003;**53:**518–526.
6. Lai CS. Sickness absence in a Singapore refinery, 1981–1992. *Ann Acad Med Singap* 1994;**23:**660–664.
7. Ala-Mursula L, Vahtera J, Kivimäki M, Kevin MV, Pentti J. Employee control over working times: associations with subjective health and sickness absences. *J Epidemiol Community Health* 2002;**56:**272–278.
8. Kivimäki M, Head J, Ferrie JE, Shipley MJ, Vahtera J, Marmot MG. Sickness absence as a global measure of health: evidence from mortality in the Whitehall II prospective cohort study. *Br Med J* 2003;**327:**364.
9. Lund T, Labriola M, Christensen KB, Bültmann U, Villadsen E, Burr H. Psychosocial work environment exposures as risk factors for long-term sickness absence among Danish employees: results from DWECS/DREAM. *J Occup Environ Med* 2005;**47:**1141–1147.
10. Christensen KB, Lund T, Labriola M, Bültmann U, Villadsen E. The impact of health behaviour on long term sickness absence: results from DWECS/DREAM. *Ind Health* 2007;**45:**348–351.


Downloaded from http://occmed.oxfordjournals.org/ at socialforskningsinstituttet on June 18, 2015