

Summary:

Health, safety and bus drivers

TOI Report 1279/2013
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Oslo 2013, 51 pages English language

Work-related health problems are more common for bus drivers than for many other occupations, and the stressors responsible may be on the increase. Although health decrements could well be linked to poorer safety performance in bus driving, little has been done to characterize the relationship between work-related health and safety behaviour. A model is therefore presented as an evidence-based framework, describing that work stressors are linked to safety behaviour via a dynamically interacting triad of “duty fitness” factors: psychophysiological stress response, sleep quantity/quality and health status. Analysis of survey responses in a sample of bus drivers with typical health outcomes, gives some support to this so-called Duty Fitness Model. Future research is recommended to perform a more robust test of the model, and act as a basis for potential longitudinal studies.

This report describes a literature review and survey analysis, carried out to explore links between work stressors, health outcomes and safety behaviours in bus drivers.

Poor work-related health outcomes for bus drivers

The literature review shows that work-related health complaints and health-related organizational outcomes are more prevalent for bus drivers than most other occupations. Work-related health problems for bus drivers are typically stress-related psychological disorders and associated physical symptoms (especially elevated blood pressure), musculoskeletal problems, cardiovascular disease, stomach and related gastrointestinal problems, and chronic fatigue or burnout. The main causes are psychosocial stressors. In particular, low control is inherent to the bus driver task, where goal achievement (e.g. arriving on time) is threatened by both competing demands and unpredictable events in the road environment. Physical stressors, sleep pressure and work-home conflict also play a major part in health outcomes for the bus driver. Psychosocial, physical and sleep stressors are often present simultaneously, having confounding affects on health outcomes.

Analysis of a new survey, with responses from 1183 bus driver members of a large transport union in Norway, supports these findings, showing that one in three drivers report a work-related health problem. Complaints reported by the sample are also largely in line with those found in the literature. Notably, 81 per cent of health problems reported were musculoskeletal in nature, with or without associated stress problems.

Work stressors, health complaints and driving hours transgressions more common for shift workers

The bus drivers in our survey sample also resemble literature reports in that work-related health problems were more abundant among those working shifts (36 per cent reported health problems compared with only 26 per cent of those not working shifts).

Work stressors were also more abundant among those drivers working shifts. Specifically:

- Between 52 and 61 per cent of shift workers reported experiencing various time pressures at work, compared with 31 to 39 per cent of those not working shifts.
- 54 per cent reported conflict between work and home compared with 39 per cent of those not working shifts.

The literature review gave reason to believe that negative health outcomes are detrimental to safety performance, not least due to associated health behaviours (e.g. use of medication) or the cognitive decrements associated with many health problems.

Given the greater shares of shift workers in our sample reporting work stressors and poor health outcomes, we wanted to test whether negative safety behaviours were also more abundant among these respondents. We found that of those who experienced pressure from timetables, 23 per cent of shift workers reported breaking driving time regulations, a share which was significantly greater than the corresponding share of those not working shifts (12 per cent). However, there were no corresponding differences for speeding behaviour.

Split shifts are particularly challenging

Split shifts have been reported to be a particularly challenging type of shift for bus drivers. Accordingly, greater shares of drivers working split shifts in our sample reported undesirable levels of work stressors, sleep pressure and poor health outcomes. The specific differences were as follows:

- 55 per cent of split shift drivers reported having insufficient time to carry out tasks, versus 47 per cent of drivers working other types of shift
- 75 per cent reported pressure from route timetables, versus 65 per cent of drivers working other shifts
- 59 per cent reported problems balancing work and home life, versus 46 per cent of drivers on other shifts.
- 46 per cent reported shift-related sleep problems, versus 38 per cent of drivers on other shifts
- 41 per cent reported work-related health problems versus 28 per cent of drivers on other types of shift

However, there were no significant differences in the shares of those working split versus other shifts reporting undesirable safety behaviours.

The Duty Fitness Model

To structure further investigations into any common causes of the poor health outcomes and undesirable safety behaviours seen for bus drivers working shifts, we developed a framework based on the literature review.

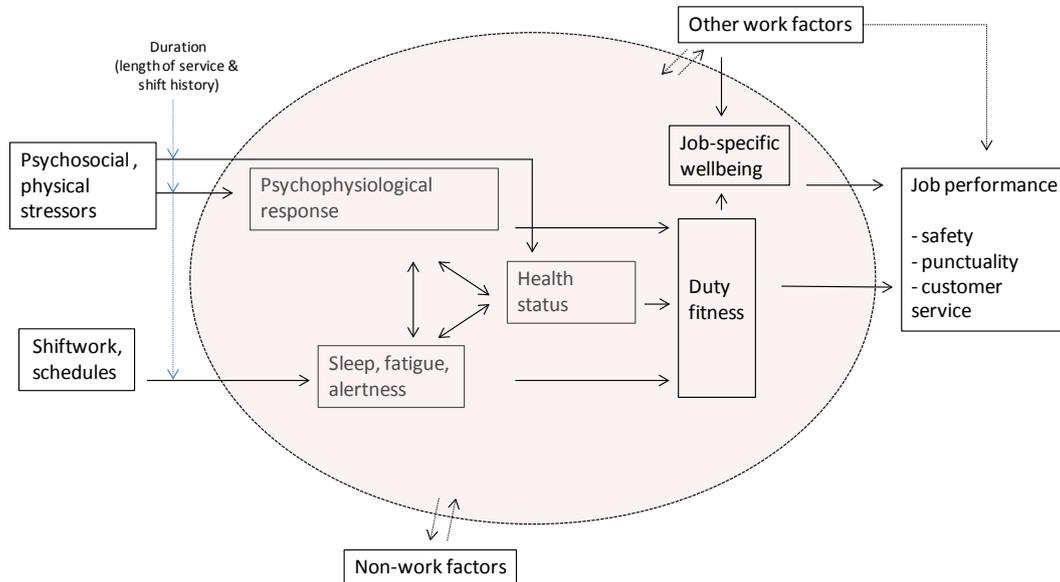


Figure 1. The Duty Fitness Model. A model of the effect of work stressors on health and safety performance for the bus driver. The pink circle represents the individual. For a detailed description of the model, see main body of report.

The so-called Duty Fitness Model describes how work stressors (psychosocial stressors, physical stressors, schedules and shift work) together influence a triad of dynamically interacting duty fitness factors – psychophysiological response, health status and sleep – which in turn influence the safety performance of bus drivers.

In support of the model, we found that the share of urban drivers frequently working nights (i.e. high level of both work stressors and sleep pressure from schedules) who reported work-related health problems was almost twice as high as the share reported by rural drivers who rarely or never work nights (low stressors, low sleep pressure).

Analyses of responses from split shift drivers resulted in the following additional evidence in support of the model:

1. Work-related time pressure and work-home balance (work stressors) were each responsible for a significant and substantial variation in the amount of a) shift-related sleep problems and b) work-related health problems.
2. Work-related health problems were linked to shift-related sleep problems.
3. The effects of time pressure at work and work-home balance on work-related health were partially mediated by shift-related sleep problems.
4. For those reporting time pressure due to route timetables, the level of work-home conflict was responsible for a significant variation in reports of the following safety behaviours:
 - a. speeding due to time pressure, and
 - b. breaking driving time regulations due to time pressure.

5. Addition of work-related health problems as a predictor in the regression model in 4b. resulted in a further small but significant change in the total variance of driving hours transgressions explained.

However, work-related health problems did not result in a significant change in total variance in speeding behaviour explained by work-home conflict.

The limitations of the study include those inherent to *post hoc* analyses, and also that the language of certain of the survey items could be interpreted as leading. Moreover demographics were not assessed in the union survey, and could therefore not be controlled for in the analysis.

Need for further testing of the Duty Fitness Model

On balance we conclude that the results presented here support further investigation of the need to account for health as a potential factor in safety performance, as a precursor to longitudinal studies into the effects of work stressors on health, sleep, and safety behaviour.

Fatigue, stress and health have mostly been considered as separate factors in relation to both driver health and driver safety, despite the fact that these factors are strongly and dynamically interactive. Likewise, while psychosocial pressures are often cited in relation to health outcomes, sleep undoubtedly plays a role in the effects of these stressors. Our hope is therefore that this is the first of several studies that will contribute towards a more integrated approach to studying health and safety links among bus drivers.