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Working conditions and occupational risk exposure in employees driving for work☆

Emmanuel Fort[a,*], Sheba Ndagire[a], Blandine Gadegbeku[b], Martine Hours[b], Barbara Charbotel[a]

[a] Univ Lyon, University Lyon 1, Transport Work and Environmental Epidemiology Research and Surveillance Unit – UMRESTTE (UMR T9405), F-69373 Lyon, France

[b] Univ Lyon, IFSTTAR, Transport Work and Environmental Epidemiology Research and Surveillance Unit – UMRESTTE (UMR T9405), F-69500 Lyon, France

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ABSTRACT

Introduction: An analysis of the occupational constraints and exposures to which employees facing road risk at work are subject was performed, with comparison versus non-exposed employees. Objective was to improve knowledge of the characteristics of workers exposed to road risk in France and of the concomitant occupational constraints. The descriptive study was based on data from the 2010 SUMER survey (Medical Monitoring of Occupational Risk Exposure: *Surveillance Médicale des Expositions aux Risques professionnels*), which included data not only on road risk exposure at work but also on a range of socio-occupational factors and working conditions.

Materials and methods: The main variable of interest was "driving (car, truck, bus, coach, etc.) on public thoroughfares" for work (during the last week of work). This was a dichotomous "Yes/No" variable, distinguishing employees who drove for work; it also comprised 4-step weekly exposure duration: <2 h, 2–10 h, 10–20 h and ≥20 h.

Results: 75% of the employees with driving exposure were male. Certain socio-occupational categories were found significantly more frequently: professional drivers (INSEE occupations and socio-occupational categories (PCS) 64), skilled workers (PCS 61), intermediate professions and teaching, health, civil service (functionaries) and assimilated (PCS 46) and company executives (PCS 36). Employees with driving exposure more often worked in small businesses or establishments.

Constraints in terms of schedule and work-time were more frequent in employees with driving exposure. Constraints in terms of work rhythm were more frequent in non-exposed employees, with the exception of external demands requiring immediate response. On the Karasek's Job Demand-Control Model, employees with driving exposure less often had low decision latitude. Prevalence of job-strain was also lower, as was prevalence of "iso-strain" (combination of job-strain and social isolation). Employees with driving exposure were less often concerned by hostile behavior and, when they did report such psychological violence (inspired on the Leymann questionnaire), it was significantly more frequently due to clients, users or patients.

Discussion: Employees with driving exposure at work showed several specificities. The present study, based on a representative nationwide survey of employees, confirmed the existence of differences in working conditions between employees with and without driving exposure at work. In employees with driving exposure, constraints in terms of work-time and rhythm increased with weekly exposure duration, as did tension at work and exposure to hostile behavior.

1. Introduction

In France, road accidents while at work accounted for 22% of fatal work accidents in 2006 and 20% in 2010 (CNAMTS, 2007, 2009, 2011).

According to a study based on police data (road injury analysis reports), the number of driving injuries while at work fell from more than 10,000 per year between 1997 and 2001 to 6500 in

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* Corresponding author.
E-mail address: emmanuel.fort@univ-lyon1.fr (E. Fort).

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2006 (Charbotel et al., 2010). The incidence of road injury while working fell by more than 35% between 1997–2000 (45.2/100,000) and 2003–06 (26.6/100,000). The same downward trend was found for fatal work-related road accidents over the period 1990–2009 (DREES, 2011).

Employees' road risk exposure, on the other hand, seems to be increasing: the French National Institute of Statistics and Economic Studies (*Institut National de la Statistique et des Etudes Economiques*: INSEE) had already reported increased employee mobility for the period 1981–93 (Cragué, 2003). The rate of driving for work increased more quickly for women than men: from 9% in 1994 to 13% in 2003, compared to from 32% to 35% (Coutrot et al., 2006). The 2003 SUMER survey (Medical Monitoring of Occupational Risk Exposure: *SUrveillance Médicale des Expositions aux Risques professionnels*) (DARES, 2006) found that driving was involved in the work of quarter of employees (25.4%, $n = 12{,}050$).

Employees exposed to road risk have been very little studied so far. The rare reports showed that certain occupational constraints could represent risk factors for road accidents at work. However, studies finding increased risk associated with certain occupations often failed to analyze risk in terms of exposure level. Several studies of drivers' working conditions, and work rhythm in particular, shed light on accident risk factors, but only for professional drivers. There was a definite relation between hours of work, fatigue and involvement in a road accident (McCartt et al., 2000). Other occupational categories subject to time constraints have been studied more recently: e.g., ambulance staff (Center for Disease, 2003; Kahn et al., 2001). Risk factors for road accidents at work were analyzed in the Gazel cohort of employees of Électricité de France-Gaz de France (Chiron et al., 2005); taking account of the type and amount of travel, which constitute the prime risk factors, lower categories (especially blue collar workers, followed by lower grade white collar workers) were more at risk than executives. Also, jobs involving "nervous fatigue" (assessed before the accident) correlated with road accidents at work for men, while prolonged standing correlated with such accidents for women. Many studies have reported risk factors for work-related road accidents, but none previously focused on driving-related occupational constraints.

The SUMER study has been updated in 2010. The 2010 SUMER data included not only road risk exposure at work but also a range of data on both socio-occupational and working conditions. The purpose of the present study is to analyze these new data and to compare employees exposed to road risk at work and not exposed employees regarding their constraint and conditions of exposure, in the aim of improving our knowledge in that field and thus permit a better prevention in the occupational activities.

2. Materials and method

2.1. Variables

The SUMER survey is an assessment tool for organizational constraints and employees' physical, biologic and chemical exposure (Bué et al., 2006; Arnaudo et al., 2004; Héran-Le Roy et al., 1999; Lesuffleur et al., 2014). It is a cross-sectional survey assessing occupational exposures, their duration and whatever collective or individual protection is provided. Until 1994, data were harvested exclusively by occupational physicians in interviews during their periodic workplace visits; since 2003, a self-administered questionnaire has been added, exploring work perception and the relation between work and health. It was enhanced in 2010 by a standardized questionnaire assessing psychosocial risk, anxiety and depression, accidents, sick leave, work satisfaction, subjective health, the relation between work and health and mistreatment at work. Sampling has expanded: in 2010, 90% of employees, some 22 million individuals, were covered.

The main variable of interest was "driving (car, truck, bus, coach, etc.) on public thoroughfares" for work (during the last week of work) according to the 2010 SUMER survey: i.e., specifically driving on public thoroughfares as a part of the job; commuting journeys by car were not included. Four-step weekly exposure duration (<2 h, 2–10 h, 10–20 h and ≥20 h) was also assessed to describe driving exposure in terms of duration. Among 47,983 employees included in the SUMER survey 2010, 12,775 were exposed and the exposure duration was available for 12,300 of them.

Several ordinal qualitative variables of work time characteristics and work rhythm constraints were assessed on 4-step scales: always, often, sometimes, never. These were converted into dichotomous variables: always/often, sometimes/never.

A dichotomous variable was created to distinguish employees subject to more than 3 forms of work-rhythm constraints using nine questionnaire variables: automatic shifting of a product or part, automated machine rhythm, other technical constraint, immediate dependence on one or more colleagues' work, production or time targets of 1 day or less, production or time targets of 1 h or less, external demand requiring immediate response, and permanent hierarchic surveillance or controls or computerized monitoring.

The French version of Karasek's Job Demand-Control Model was used to describe certain psychosocial risk factors at work (Niedhammer et al., 2000, 2008). It comprised 26 questions, in 3 dimensions assessing the psychosocial environment at work: psychological demand (9 items), decision latitude (9 items) and social support (8 items). Responses were: strongly disagree/disagree/agree/strongly agree; they could thus be scored 1 to 4, and 3 scores corresponding to the 3 scales could be calculated, following specific formulae:

- Psychological demand score = Q10 + Q11 + Q12 + (5-Q13) + Q14 + Q15 + Q16 + Q17 + Q18
- Decision latitude score = 4*Q4 + 4*(5-Q6) + 4*(Q8) + 2*(5-Q2) + 2*(Q5) + 2*(Q7) + 2*(Q1) + 2*(Q3) + 2*(Q9)
- Social support score = Q19 + Q20 + Q21 + Q22 + Q23 + Q24 + Q25 + Q26

The median for each score was then calculated in order to construct the three scores of psychological demands, decision latitude and social support according to the recommendations by Karasek (1985). Strong psychological demand thus corresponded to employees scoring above the median on the Psychological Demand scale, weak decision latitude to those scoring below the median on the Decision Latitude scale, and weak social support to those scoring below the median on the Social Support scale (Niedhammer et al., 2000, 2008).

Table 1
Employee situation according to Karasek's Job Demand-Control Model.

		Decision latitude	
		Low Decision latitude (≤69.7)	High Decision latitude (>69.7)
Psychological demands	Low Psychological demands (<21.5)	Passive	Relaxed
	High Psychological demands (≥21.5)	Tense (Jobstrain)	Active