

## OCCUPATIONAL HEALTH

## Occupational categories and sickness absence certified as attributable to common diseases

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**Background:** This paper focuses on the relationship between sickness absence rates certified as attributable to common (non-work-related) diseases and occupational categories. **Methods:** A cohort of 2,909 workers from an urban bus company was analysed from 1994 to 1996 (8,388.7 person-years), who reported 2,893 non-work-related sickness absence spells of three days or more (78% of all sickness absence spells in the period). Rates of sickness absence were calculated and an extension of the Andersen-Gill approach to proportional hazards modelling was used to adjust covariables. **Results:** Assistant staff (35.63 per 100 person-years), and bus drivers (37.23) had the highest incidence rates. After adjusting for demographic variables, employment duration and health status, it was found that all occupational categories had a significant rate ratio (RR) in comparison to the manager category. The strongest positive associations were found among bus drivers (RR=2.45; 95% CI: 1.52–3.97), assistant staff (RR=2.57; 1.67–3.94), and technical staff (RR=2.42; 1.57–3.74). **Conclusion:** Occupational category was an important predictor of sickness absence incidence certified as attributable to common disease. Further research on the associations between working conditions and sickness absence needs to take into account the distinction between sickness absences due to work-related diseases and those due to common diseases.

**Keywords:** common diseases, occupational categories, sickness absence

Sickness absenteeism has emerged in recent years as a significant epidemiological health issue due to its economic and public health implications. First, because workplace absenteeism caused by ill health has a large negative effect on companies and the national economies as a result of reduction in available labour force and an increase in cost of medical care and of social security.<sup>1</sup> Second, because sickness absenteeism has been proposed as an integrated measure of physical, psychological, and social functioning in studies of working populations;<sup>2,3</sup> and finally, because research has found strong associations between working conditions and sickness absence<sup>4</sup> providing valuable opportunities for health prevention. However, although several studies have assumed that working conditions will produce ill health which in turn will be followed by sickness absence,<sup>5</sup> the paths through which working conditions will lead to sickness absence are far from clear.<sup>6</sup> The bulk of sickness leave episodes are certified as attributable to common diseases,<sup>7</sup> that is, diseases medically registered as not related to occupational risk factors.<sup>8</sup> To date, however, no study has specifically assessed the relationships between working

conditions and sickness absence episodes certified as common diseases.

In order to use sickness absenteeism as an appropriate integrated indicator of occupational risk prevention it is necessary to study whether associations between working conditions and sickness absence persist after excluding work-related problems such as occupational accidents and diseases. The assumption behind this approach is that part of sickness absence commonly attributed to common diseases may be due to work-related health problems.

The objective of this study was to assess the relationship between occupational categories, as a proxy of working conditions and sickness absence due to common diseases in a cohort of urban bus company workers.

## SUBJECTS AND METHODS

*Study population*

All workers from the Metropolitan Bus Company, which forms part of the public transportation system of Barcelona city, were studied. The cohort contained people who had worked more than 6 months between 1 January 1994 and 31 December 1996. In total, 2,909 workers were recruited from whom 8,388.7 person-years were computed. Information on each worker was obtained from computer files of the Human Resources Department and Occupational Health Services (OHS) of the company.

*Occupation and covariables*

Occupational categories were coded by the OHS according to job task, grade of employment, and workplace. The

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following occupational categories were identified: managers, supervisors, technical staff, clerks, mechanical operators, electricians, assistant staff, and bus drivers.

Other information concerning personal characteristics such as sex, age (<31, 31–40, 41–50, 51–60, and >60), marital status (single, married, divorced, widow/er), and number of children (none, 1 child, 2, and 3 or more children), employment duration quartiles (<7, 7–19, 20–26, and >26 years), smoking habit (non-smoker, ex-smoker, and smoker), and history of chronic disease (none, one, and two or more diseases) was also obtained. Changes in occupation, age, employment duration, smoking habit, and chronic diseases during the follow up were taken into account in the analysis.

#### *Sickness absence records*

According to the Spanish legal definition, a sickness absence is a situation where a worker receives health attention due to common diseases or work-related diseases and he/she is disabled to work. All sickness absences lasting three or more days (calendar days) were systematically registered in company files including personal identification number, and the first and last dates of the absence. Episodes of less than three days are not medically certified. Maternity leave is not regarded as sickness absence. According to Spanish social security law, for sickness absence spells of three or more days a medical certificate is required where the physician establishes whether the sick leave was due to a common disease or due to a work-related disease (including work accidents).<sup>9</sup> Medical diagnosis was missing for the overwhelming majority of spells. After excluding work-related diseases sickness absence (797 episodes), 2,893 common disease sickness absence spells were analysed, which represented 362.2 absence years.

#### *Statistical analysis*

Rates of sickness absence were calculated for each variable category according to the following formula:

$$R_i = \frac{\sum e_i / (\sum p_i - \sum d_i)}{365 \text{ days}}$$

where  $R_i$  is the specific rate,  $e_i$  is the number of sickness absence spells,  $p_i$  is the number of person-days worked theoretically, and  $d_i$  is the number of days out of work due to sickness absence. Similarly to other studies,  $R_i$  was converted to person-years.

Because the number of recurrent events per subject was small: 25.5% of workers had two or more sickness absence spells during the follow-up period, 29.4% had only one spell and 45.1% of workers had no sickness absence spell, and the risk of recurrence varied substantially in the period between recurrences, we used counting process models, in particular the Andersen–Gill<sup>10</sup> approach to the proportional hazards model as a counting process closely related to Poisson regression. The idea was to introduce, as time-dependent covariates, the number of previous recurrences of sickness absence, which attempts to capture the dependence structure among the

recurrence times. File transformation and regression models were fitted using the S-Plus package.<sup>11</sup>

## RESULTS

The average sickness absence incidence rate for common diseases was 34.55 per 100 person-years, rates ranging from 12.61 for managers to 37.23 for bus drivers (*table 1*). Description of sickness absence rates for demographic variables may be summarized as follows (*table 2*): females (50.4) have a higher rate than males (32.9), and workers 31–40 years old (41.2) have higher rates than the other age groups: under 31 years old (28.6) or 41 to 50 years old (30.7). Divorced workers (50.8) have the highest rates compared with other marital status categories such as being single (32.7) or married (34.4). Finally, having two children was associated with a sickness absence rate of 39.8, higher than having one (32.7) or none (35.3), and even higher than having three or more (32.6).

In addition, the distribution of sickness absence rates by work duration quartiles shows high rates for workers employed for less than seven years (37.5) and those employed for 20 to 26 years (55.9). When employment duration was over 26 years the rate fell to 28.4. In relation to smoking habit, rates showed a clear gradient: non-smoker (30.1), ex-smoker (36.7), and current smoker (38.2). Rates for health status as measured by the number of chronic diseases, also show a clear trend from none (29.7), to two or more (68.8).

Taking managers as the baseline category, sickness absence rate ratios adjusted for covariables are described in *table 3*. All occupational categories have statistically significantly higher rates than managers, with most relative risks higher than two, especially for mechanical operators (2.61).

## DISCUSSION

According to legal and medical definitions in Spain, sickness absence caused by common diseases is not related

**Table 1** Workers, sickness absence spells and rates (after subtracting the number of days of absence) of common diseases in the Metropolitan Bus Company by occupational categories (at the beginning of the follow-up), Barcelona 1994–1996

Occupational categories	Workers	Sickness absence spells	Rates per 100 p-y	95% CI
Managers	104	39	12.61	9.22–17.27
Supervisors	149	113	26.03	21.65–31.30
Technical staff	183	175	32.62	28.13–37.83
Clerks	58	49	28.78	21.75–38.08
Mechanical operators	232	213	32.02	28.00–36.63
Electricians	53	37	23.85	17.28–32.92
Assistant staff	116	115	35.63	29.68–42.77
Bus drivers	2014	2152	37.23	35.69–38.84
Total	2909	2893	34.55	33.32–35.83

CI: confidence interval; p-y: person-years

**Table 2** Sickness absence rates of common diseases in the Metropolitan Bus Company according to several demographic, work, health-related behaviour and health variables (1994–1996)

Variables	Workers	Sickness absence	Rates per 100 p-y	95% CI
Gender				
Male	2808	2747	33.98	32.74–35.28
Female	101	146	50.44	42.88–59.32
Age (years)				
<31	551	465	28.60	26.12–31.32
31–40	791	945	41.17	38.63–43.88
41–50	628	555	30.66	28.21–33.32
51–60	879	872	35.29	33.03–37.71
>60	60	56	32.87	25.30–42.71
Marital status				
Single	443	422	32.72	29.75–36.00
Married	2379	2356	34.42	33.06–35.84
Divorced	70	99	50.78	41.70–61.83
Widow/er	17	16	36.13	22.13–58.97
Children				
None	642	655	35.31	32.70–38.12
1	1058	994	32.71	30.74–34.81
2	539	606	39.83	36.78–43.13
≥3	670	638	32.59	30.16–35.22
Educational level				
Illiterate	143	69	16.46	13.00–20.84
Primary school	560	523	32.84	30.14–35.78
High school	1018	1076	36.48	34.36–38.72
University	891	903	34.63	32.45–36.97
Unknown	297	322	40.04	35.90–44.66
Work duration (quartiles)				
<7 years	1197	1310	37.54	35.56–39.62
7–19 years	733	585	27.50	25.36–29.82
20–26 years	287	440	55.86	50.88–61.33
>26 years	692	558	28.36	26.10–30.81
Alcohol consumption				
Never	738	768	36.21	33.74–38.86
Weekly/occasional	1082	1029	32.66	30.72–34.72
Daily	839	838	34.61	32.34–37.03
Unknown	250	258	37.97	33.61–42.90
Tobacco				
No smoker	1245	1092	30.11	28.38–31.95
Ex-smoker	239	254	36.65	32.41–41.45
Smoker	1425	1547	38.17	36.31–40.12
Physical activities				
Never/occasional	1427	1447	35.09	33.32–36.94
Regularly	1224	1188	33.50	31.65–35.46
Unknown	258	258	36.74	32.52–41.51
Chronic disease, antecedents				
None	1554	1342	29.73	18.18–31.36
1	1282	1419	38.70	36.74–40.77
≥2	73	132	68.81	58.10–81.73
Health, self-perception				
Very good/Good	2628	2568	33.70	32.42–35.03
Fairly bad/Bad	27	64	102.84	80.49–131.39
Unknown	254	261	37.80	33.48–42.67

CI: confidence interval; p-y: person-years

to working conditions. However, definitions according to those criteria may not be necessarily appropriate. Our results showed that part of sickness absence attributable to common diseases could be work-related health problems since an association was found between occupation and sickness absence attributable to common diseases. Association between occupational categories and sickness absence attributable to work-related diseases was clear in our data (results not shown).

There is little evidence suggesting that some certified common diseases are really work-related diseases. Schwartz et al. found that 16.5% of patients of a primary medical centre declared that their diseases were related to working conditions, although this was self-reported by the workers.<sup>12</sup> Likewise, in a preliminary study it was found that around 15% of sickness absences certified as attributable to common diseases were assessed by two experts (occupational physicians) as probably work-related diseases, after occupational medical records for 207 spells were reviewed using a less strict criteria than the existing Spanish legal definition.<sup>13</sup>

Recent studies have shown strong relationships between the psychosocial work environment and sickness absence,<sup>14,15</sup> especially with sickness absence certified as attributable to mental health problems,<sup>16</sup> but without clarifying if sickness absence episodes were due to common or work-related diseases. Recognizing this difference may have important implications for both occupational risk prevention and reduction of economic impact due to sickness absence. So far companies and governments have mainly focused on reducing the duration of sick spells by regular inspection on absence events and implementing negative incentives for employers such as transferring part of benefits payment, but much less effort has been placed on occupational risk factors prevention.<sup>1</sup>

In this study, it was found that occupation, used as a proxy for working conditions, was a significant predictor of sickness absence incidence due to common diseases, even after controlling for other risk factors of sickness absence and previous sickness absence spells. Although comparison between sickness absence studies is a complex issue for methodological reasons,<sup>17</sup> several studies, which have not made a distinction between common and work-

related diseases, have found large variations between different occupational groups, with low sickness absence rates in managerial staff and high rates in blue-collar occupational categories. For instance, with London civil servants, sickness absence rates of the clerical/support employment grade were six times higher among males and almost four times higher for females compared to the highest grade;<sup>2</sup> metal industry occupations had almost six times higher sickness absence rates than the administration occupations area in a Swedish county;<sup>18</sup> and clerical workers had three times higher sickness absence rates than managerial staff in the French national electric and gas company.<sup>19</sup>

A possible explanation for the higher relative risk found could be an 'absence proneness' behaviour<sup>20</sup> in some occupational categories such as drivers or mechanical operators, which had the highest proportion of workers with two or more spells during the observational period (data not shown). However, there is no evidence of a differential 'culture of absenteeism' among this type of employee. On the other hand, relative risks have been adjusted for the number of previous sickness spells in the statistical analysis.<sup>21</sup> However, the correction for previous spells had small impact on the RR value, apart from narrowing confidence intervals.

Another potential explanation for these findings would be that managers, taken as the reference category, had less sickness absence because they could be absent from work without notifying their absence. However, in Spain after three days of absence from work, it is compulsory to present a sickness absence certificate signed by a general physician. Additionally, it could be argued that managers reported less sickness absence due to the so-called 'sickness presenteeism'.<sup>22</sup> Nevertheless, this behaviour has been found to be higher among occupational categories with heavier psychosocial and physical workload combined with relatively lower payment than managers. An alternative argument could be that they had less sickness absence because they were more satisfied and motivated with their work environment. As Peter and Siegrist have shown, chronically stressful experience at work followed by active coping is less likely to be associated to sickness absence.<sup>23</sup>

Finally, we have to consider that physician's ideas about work relatedness may not be accurate. To establish the occupational nature of a particular disease is a rather complicated and subjective process<sup>24</sup> on which income compensation approved by law may have an influence.<sup>25</sup> New curricular elements in occupational physician training seem needed to solve this key issue.<sup>26</sup>

Discussion about the relationships between working conditions and sickness absence need a conceptual model which takes into account the two main different pathways in which this relationship can occur. Working conditions could be associated to sickness absence by:

- generating work-related diseases (including work injuries) which progress to sickness absence; and
- after workers had developed common diseases, progress to a sickness absence episode as a consequence of

**Table 3** Adjusted sickness absence rate ratios (RR) and confidence intervals (95% CI) of common diseases by occupation category in the Metropolitan Bus Company, Barcelona 1994–1996

Occupational categories	RR <sup>a</sup>	95% CI
Managers	1	–
Supervisors	2.04	1.26–3.31
Technical staff	2.42	1.57–3.74
Clerks	2.35	1.37–4.03
Mechanical operators	2.61	1.65–4.13
Electricians	1.90	1.07–3.38
Assistant staff	2.57	1.67–3.94
Bus drivers	2.45	1.52–3.97

a: Adjusted for sex, age, marital status, childhood, duration of employment, smoking, and history of chronic diseases.

interaction between common disease and working conditions.

For instance, a worker with a minor respiratory disease will ask her/his general practitioner to certify sickness leave if physical and psychosocial work requirements can aggravate his/her health problem. We have to keep in mind that sick leave provides an opportunity for recuperation because sickness absence is a coping strategy to prevent more serious ill health.<sup>27</sup> A specific analysis of long-term non-work-related sickness absence and occupations may be important to evaluate the impact of working conditions on return to work. In addition, as Vahtera et al.<sup>28</sup> have pointed out, poor working conditions are a source of allostatic load and cumulative stress,<sup>29</sup> which can lead to common infections and musculoskeletal tensions.

More analysis of sickness absence by medical diagnosis selecting specific diagnosis of common disease is needed. Unfortunately, we were unable to do these analyses because the medical diagnosis was missing for an important number of sickness absence spells, and because the accuracy of medical diagnosis was unknown.<sup>30</sup> However, results from this study support the previous suggestion that sickness absence is associated to working conditions<sup>31</sup> even for those sickness absence spells certified as due to common diseases. Sickness absence data could become a useful tool for occupational health services to establish priorities for prevention and evaluation programmes.

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