Incidence of ill-health related job loss and related social and occupational factors. The "unfit for the job" study: a one-year follow-up study of 51,132 workers

Francois-Xavier Lesage [Corresp., 1] , **Frederic Dutheil** [2, 3] , **Lode Godderis** [4] , **Aymeric Divies** [5] , **Guillaume Choron** [6]

[1] Epsylon, Univ Montpellier, Univ Paul Valéry Montpellier 3, CHU, Montpellier, France

[2] CNRS, LaPSCo, Physiological and Psychosocial Stress, University Hospital of Clermont-Ferrand, CHU Clermont-Ferrand, Preventive and Occupational Medicine, WittyFit,, Université Clermont Auvergne, Clermont-Ferrand, France

[3] Faculty of Health, School of Exercise Science, Australian Catholic University, Melbourne, Victoria 3065, Australia

[4] Department of Public Health and Primary Care, Environment and Health, Katholieke Universiteit Leuven, Leuven, Belgium

[5] Occupational Health Service Ametra, Montpellier, France

[6] Univ Montpellier, CHU, Montpellier, France

Corresponding Author: Francois-Xavier Lesage
Email address: fx-lesage@chu-montpellier.fr

Objective: The analysis of ill-health related job loss may be a relevant indicator for the prioritization of actions in the workplaces or in the field of public health, and a target for health promotion. The aim of this study was to analyse the medical causes, the incidence, and the characteristics of employees medically unfit to do their job.

Methods: This one-year prospective study included all workers followed by occupational physicians in an occupational health service in the South of the France. The incidence of the unfitness notifications, grouped by the main medical causes, have been analyses. We performed a multivariate analysis in order to adjust the observed risk of job loss for the age groups, sex, occupation and the activity sectors, which are strongly associated with job loss.

Results: Seventeen occupational physicians followed up 51,132 workers. The all-cause incidence of being unfit to return to one's job was 7.78‰ (n=398). The two main causes of being unfit for one's job were musculoskeletal disorders (47.2%, n=188) and mental ill-health (38.4%, n=153). Being over 50 years old [Odds ratio (OR) 2.63, 95% confidence interval (95% CI) [2.13-3.25] and being a woman [OR 1.52, 95% CI [1.21-1.91] were associated with the all-cause unfitness, independent of occupations and activity sectors.

Conclusions: Identification of occupational and demographic determinants independently associated with ill-health related job loss may provide significant and cost-effective arguments for health promotion and job loss prevention.

Incidence of ill-health related job loss and related social and occupational factors. The « unfit for the job » study: a one-year follow-up study of 51,132 workers

François-Xavier Lesage
fx-lesage@chu-montpellier.fr
affiliation :
Epsylon, Univ Montpellier, Univ Paul Valéry Montpellier 3, CHU, Montpellier, France

Frederic Dutheil fred_dutheil@yahoo.fr
[1] Université Clermont Auvergne, CNRS, LaPSCo, Physiological and Psychosocial Stress, University Hospital of Clermont-Ferrand, CHU Clermont-Ferrand, Preventive and Occupational Medicine, WittyFit, F-63000 Clermont-Ferrand, France
[2] Australian Catholic University, Faculty of Health, School of Exercise Science, Melbourne, Victoria 3065 Australia

Godderis Lode lode.godderis@kuleuven.be
KU Leuven, Department of Public Health and Primary Care, Environment and Health, Kapucijnenvoer 35 Blok D, Box 7001, 3000 Leuven, Belgium

Aymeric Divies aymeric.divies@sistra.pf
Occupational Health Service AMETRA, Montpellier , France

Guillaume Choron - c_guillaume@live.fr
Univ Montpellier, CHU, Montpellier, France

Incidence of ill-health related job loss and related social and occupational factors. The « unfit for the job » study: a one-year follow-up study of 51,132 workers

Objective The analysis of ill-health related job loss may be a relevant indicator for the prioritization of actions in the workplaces or in the field of public health, and a target for health promotion. The aim of this study was to analyse the medical causes, the incidence, and the characteristics of employees medically unfit to do their job.

Methods This one-year prospective study included all workers followed by occupational physicians in an occupational health service in the South of the France. The incidence of the unfitness notifications, grouped by the main medical causes, have been analyses.We performed a multivariate analysis in order to adjust the observed risk of job loss for the age groups, sex, occupation and the activity sectors, which are strongly associated with job loss.

Results Seventeen occupational physicians followed up 51,132 workers. The all-cause incidence of being unfit to return to one's job was 7.78‰ (n=398). The two main causes of being unfit for one's job were musculoskeletal disorders (47.2%, n=188) and mental ill-health (38.4%, n=153). Being over 50 years old [Odds ratio (OR) 2.63, 95% confidence interval (95% CI) 2.13-3.25] and being a woman [OR 1.52, 95% CI 1.21-1.91] were associated with the all-cause unfitness, independent of occupations and activity sectors.

Conclusions Identification of occupational and demographic determinants independently associated with ill-health related job loss may provide significant and cost-effective arguments for health promotion and job loss prevention.

Key terms: Occupational medicine; Employment; Workplace; Job loss

The assessment of occupational diseases and their impact are a difficult issue. However, it is important to set the priority actions concerning health and safety at work. Most data about these occupational diseases indirectly assesses their incidence or impact. The findings of The Health and Occupation Reporting network (THOR) highlighted the gap between the epidemiological assessment by a specialist removed from the workplace network (i.e., psychiatrist) and a direct assessment by an occupational physician linked to the workplace(1).

The difficulties with the assessment of the prevalence or the incidence of occupational diseases are (i) the comprehensive identification of the cases, (ii) the reliable notification of work causalityconcerning multi factorial diseases, and (iii) the knowledge about the population from which these cases are identified. Over recent years, several occupational disease networks have been developed and data collected concerning occupational diseases. Several nationwide networks of clinical specialists have been developed in Europe (2), such as THOR in the UK (3), or the French National Occupational Disease Surveillance and Prevention Network (RNV3P) in France (4, 5). Another way to assess occupational diseases is to match different data sources. Mustard et al. (2015) matched different and independent data sources: (i) emergency department encounter records, (ii) lost-time workers compensation claims and (iii) representative samples of workers in a national health interview survey (6).

Numerous countries may also have a compensation system for occupational diseases. The data concerning the recognition of occupational diseases are fairly easy to collect by the organizations which pay the compensation. These systems, however, may provide compensation to workers for benign illnesses, such as occupational contact eczema, and, conversely, compensation may never be claimed for some frequent and fairly serious diseases, such as work-related depression or burnout syndrome. Consequently, this kind of indicator is a poor representation of the main occupational health problems in a country or a region. Likewise, the analyses of the causes of disability pensions or disability retirements are probably not very suitable for the assessment of

the incidence of occupational diseases. So, one of the main difficulties is the use of relevant and reliable indicators and the ability to collect them.

Unfitness (“inaptitude” in French), is the recognition by the occupational physician that a worker's health status is no longer fit for his current job and will require a job change. This does not mean that the worker cannot work anymore, but that he can no longer work in his current work position. In France, the assessment of the fitness or the unfitness to perform the job is exclusively carried out by the occupational physicians (OP) during a medical examination. All paid workers are systematically followed, either yearly or every two years, by the OP. Additional specific medical examinations are carried out when a medical problem appears. Moreover, when a paid worker is on sick leave for one month or more, fitness is systematically assessed by the OP (during a medical examination named "the reinstatement visit") at the end of the sick leave, when the worker returns to work. An “unfit for the job” outcome may be pronounced for several reasons which include, but are not limited to: (i) there is a change in an employee’s health status (e.g., returning to work after recovery from a serious illness or injury), (ii) a medical condition that may limit, reduce or prevent the person from effectively performing a new or current job (e.g., musculoskeletal conditions that limit mobility), (iii) a medical condition that is likely to make it unsafe both for the employee, their co-workers or the public (e.g., driving is essential to the job but the employee is subject to unpredictable and sudden unconsciousness). Each OP follows roughly 3,000 workers (7). There are currently 5,600 OPs in France. They report one of three conditions back to the employer: fit, fit subject to work modifications, or unfit for the job. Unfit for the job may lead to being assigned to a new suitable job in the same company, or the termination of the employment contract due to a medical issues. The termination of the employment contract is the main conclusion of an unfitness notification (more than 97% of cases) according to a recent study performed in one French region by the General Labour Department of the Ministry of Work (8).

A previous study explored the analysis of the “unfit for the job” among 55,026 workers using a direct collection of data from the medical records of an occupational health service in France (9).

The main limitation of this study was that only a univariate analysis was performed. Indeed, the data concerning the followed up workers were basic statistical data (e.g. sex ratio occupations, average age), not a data frame extracted from the information system. Consequently, the socio demographics cannot be merged with the data frame of unfitness. However, to our knowledge, this is the only study analysing ill-health related job loss.

The current study aimed to estimate the one-year incidence of unfitness for the job in an occupational health service, and to describe their aetiology and the characteristics of the unfit employees.

Methods

Study design and setting

This follow-up study took place between January 1st 2014 and December 31st 2014, in the occupational health service in Montpellier (France). Seventeen OPs followed up employees of this employment area (except the farming area and the employees in public services).

Procedure and participants

All the workers followed in 2014 in this occupational health service were eligible to participate in the study. General data concerning the followed workers were extracted from the information system: age, sex, length of service, occupation and industry, fitness or unfitness. Occupation was coded to four digits using the French Occupational Classification (socio professional categories PCS-2003) and the industries were coded using the European NACE-2008 nomenclature and

aggregated A10 international classification. When an OP reported an “unfit for the job”, they collected the age, sex, socio-professional group, activity sector, the diagnostic cause of the unfitness, which were supported by an expert medical opinion (e.g., by a psychiatrist, orthopedic specialist, or a rheumatologist depending on the disease) and the OP own judgment on thework causality. . The duration of the sick leave, the accident at work or the occupational disease recognition procedure, and what became of the employee (occupational reclassification, discharge for unfitness) were also collected.

Fitness of the subject for modified work, or the unfitness with occupational reclassification were not collected as an outcome. Each OP checked the cases of “unfit for the job” using an informatics query at the end of the year and completed the data collection if necessary. All data were anonymously collected. Participants were recruited during annual work medical examinations. No consent was given because anonymous data was used from usual daily clinical practices extracted from medical records. The ethics committee from the university hospital of Clermont-Ferrand, France, was questioned about a similar previous study design (9). The committee confirmed that there was no need for ethics approval for such a study design.

Statistical analysis

The incidence of unfitness to work was calculated (numerator = number of unfit workers ; denominator = number of followed up employees). The statistical analyses were conducted for all causes of unfitness together, and for the two main groups of pathologies. The relationship between the unfitness and the other characteristics was calculated using the crude Odds Ratio (ORc) and its 95% Confidence Interval (95% CI). Multivariate analyses were computerized, adjusting for age, sex, occupation and industry using logistic regression models to provide the adjusted Odds Ratio (ORa). Statistical analyses were conducted using the R and epicalc packages.

163

164 ***Results***

165

166 Overall, 51,132 employees were followed up by the 17 OPs in 2014 and were included in this
167 study. Among them, 398 cases of "unfit for the job" were reported. The overall incidence of "unfit
168 for the job" was 7.78‰.

169 Demographics and company characteristics for employees both fit and unfit for the job are
170 presented in Table 1. The mean age of followed up workers was 38.7 years (SD=11.8). The unfit
171 for the job workers are older (mean = 44.4 years; SD=11.8, $p<0.001$) .

172 Women [ORa 1.52, 95% CI 1.21-1.91] and workers over 50 years [ORa 2.63, 95% CI 2.13-
173 3.25] were more frequently unfit to the job, considering all causes together (Table 2).

174 Two groups of pathologies caused 85.7% of the cases of unfitness: the musculoskeletal
175 disorders (MSD) (47.2%) and the mental ill-health (38.4%) (Table 2).

176

177 Most of the cases of unfitness were caused by a MSD. The average age of these workers was 46.0
178 years (SD=11.3). Among the 188 cases of unfitness caused by a MSD, 32.4% were recognized as
179 an occupational injury/disease, whereas the OP estimated that 64.0% of these pathologies were
180 work related. The average length of sick leave was significant (13.1 months SD 12.3). After
181 adjustment, the unfitness caused by a MSD was associated with gender [women ORa 1.89, 95%
182 CI 1.35-2.66] and the odds ratio increased with the age groups, notably that of over 50 years old
183 (Table 2). Concerning the associations with industry, the activity sector for which the number of
184 cases of unfitness was below 10 (manufacturing, construction, and Information & communication)
185 were excluded from the analysis. Moreover, the financial and insurance sectors were aggregated
186 with real estate activities. This aggregated sector was considered as the reference group. All the
187 other sectors were significantly associated with unfitness, but after adjustment, only one sector
188 (trade, repair, transportation, accommodation and food services) remained statistically significant
189 [ORa 3.65, 95% CI 1.32-10.1] (Table 2). The higher grade white collar workers' group was less

concerned [ORa 0.12, 95% CI 0.02-0.88] by unfitness than the reference group (intermediate occupations and lower supervisors). By contrast, the blue collar workers were highly concerned by unfitness resulting from a MSD [ORa 8.13, 95% CI 4.52-14.62] (Table 2).

One hundred and fifty three declarations of unfitness caused by a mental ill-health were delivered. Eight cases (5.2%) were recognized as an occupational injury or an occupational disease. Conversely, the OP estimated that 64.7% of these diseases were work related. The average length of sick leave (10.3 months SD 10.5) was lower ($p<0.05$), and workers were younger (40.9 years versus 46.0, $p<0.001$) than for the MSD.Unlike the MSD, age and gender were less associated with mental ill-health -related unfitness. Moreover, all occupation groups and activity sectors were concerned (Table 2).

Discussion

Data from this study were directly collected by the OP who determined the "unfit for the job". Consequently, the job losses and the medical causes are as reliable as possible. Moreover, they are based on a medical examination and supported by an expert medical opinion.

Therefore, these data may be considered as reliable and of high quality, directly extracted from the medical records. Moreover, this study design allowed information concerning the denominator to be completed. The population followed by the OP involved in this study is known and requested information was extracted directly from the information system. This is a strength of the study design. Most of the experts in the network have accurate data concerning the cases (i.e., an occupational disease), but cannot collect reliable data concerning the population observed and, consequently, the precious indicators such as incidence or an associated risk.

The ill-health related job loss, known as "unfit for the job" in France, can be exclusively performed by the worker's OP. Consequently, the cases of ill-health related job losses are probably

under-evaluated. An employee with anxiety or depression caused by a conflict at work may choose to resign, but will lose unemployment insurance. By contrast, a termination for a medical reason will maintain the unemployment insurance and termination indemnity. Consequently, it is in the interest of a worker with a medical problem to be determined unfit for their job rather than to resign from the company. Particularly severe or life-threatening diseases (e.g. most cancers) are probably under-evaluated in this study design, which is probably not adapted to reliably assess the impact of such pathologies on jobs.

Ill-health related job losses and socio demographic data are easy to extract from the information systems using a simple SQL query. Most of the data are comprehensively coded in the databases of the occupational health services. Moreover, such an epidemiological system is very cost effective. It is based on the French occupational health system.

One of the major advantages of integrating a denominator (the demographics of all the workers followed up by each OP) in these cases is the ability to carry out multivariate analyses, and the fact that the analyses can provide risk assessments. These assessments would allow these risks to be monitored and geographical comparisons to be made in France, or other European countries, which could accurately identify ill-health related job losses.

The reader should be aware that this study design does not identify the work related diseases, neither can it provide a job loads attributable risk, but rather assesses the impact of diseases, work-related or not, on the capacity to maintain the current job.

In our opinion, this must not be considered as a weakness of this study. The mechanism of the observed pathologies may be partly, completely or not at all work-related. However, it is a delicate issue to determine if a disease is work-related or not (the work causality for each individual. Diseases are often multifactorial with personal, professional and extra professional components (e.g., a sub acromial impingement and musculoskeletal disorder). In fact, all data concerning the issue of work causality should be cautiously interpreted. In our study, the outcome is job loss, which is an objective data, rather than the work causality of cases, which requires a judgment. The

244 analysis of the “unfitness for the job”, even if it does not allow the work related causality to be
245 determined, allows at-risk groups to be determined and preventative actions to be promoted in
246 order to support the continuation of employment.
247
248
249 Findings
250
251 The global one-year incidence of unfitness in our study was 7.78‰. A similar study of ill-health
252 related job losses was previously conducted in 2012 in another occupational health service in the
253 east of France (9). Dutheil et al. found very similar results. The global one year incidence of job
254 losses was 7.72 ‰ in their study. Dutheil’s study confirmed the major impact of MSD and mental
255 ill-health on employment. However, the design of this previous study did not allow multivariate
256 analysis (c.f. above). Our study design allowed multivariate analysis because there was a single
257 data frame for fit and unfit workers, and consequently the possibility to adjust the Odds Ratios
258 based on the age groups, sex, occupation and activity sector which are strongly associated with job
259 losses. Our findings highlight that 85.7% of ill-health related job losses are related to MSD (47.2%)
260 and mental ill-health (38.4%) (Table 2). The high prevalence of job losses related to MSD (10, 11,
261 12) and mental ill-health (12, 13, 14) have been estimated in other countries. Recent data from the
262 THOR-GP network (UK – 2015-2016) estimated that 85% of self-reported work related ill-health
263 are caused by these two groups of pathologies (15) , which is similar to our findings. This supports
264 the relevance of the unfitness for the job as an indicator, even if it does not assess the work related
265 incidence of different pathologies. Moreover, the process of rating a pathology as work related is
266 partly subjective and complex, and may lead to a misclassification.
267 The Labour Force Survey (LFS) is the Health and Safety Executive’s data source,
268 complemented by other sources such as death certificates and reports from doctors (THOR). It
269 estimated the incidences of work related ill health by stress-anxiety-depression and MSD as
270 690/100,000 workers and 550/100,000 respectively (16). The incidences were higher than the job

loss incidence because all these cases of work-related ill health did not lead to a classification of "unfit for the job". Stress, anxiety, and depression accounted for 37% of all work related ill health cases in 2015/2016, and MSD prevalence accounted for 41% of all work related illnesses. These data suggest that mental ill-health and MSD are not only the two main causes of work related diseases, but also the two main causes of job loss.

Musculoskeletal disorders

Our findings highlight the important increase in the risk of job loss caused by musculoskeletal disorders after 50 years. This is a major risk among blue collar workers. It is a particularly worrying situation because the capacity to find a new job for people over the age of 50, in activity sectors where mechanical loads are frequent, and which is adapted to the potential disability caused by the MSD, may lead to employment problems for the concerned workers and significant social problems. Unfortunately, in our opinion, the primary prevention of workplace tasks is probably rarely or not enough adapted to the age of the worker. However, maintaining working ability in early old age is essential for sustaining economic growth in Europe (14).

Mental ill-health

First, our findings highlight the huge impact of mental ill-health on job loss. These diseases are invisible when they are observed through the national occupational diseases data (e.g. the recognized occupational diseases), notably because it is probably very difficult to determine thework causality. For example, attribution of mental illness to work is thought to involve the consideration of 18 factors (11 workplace factors and 7 personal factors of vulnerability) according Wong et al. (17). According to the French medical insurance data, only a few hundred cases of

anxiety or depression are recognized as an occupational disease by the medical insurance.

Another important finding is that all workers are concerned. There may be an increased risk for women or older workers, but all socio professional statuses and activity sectors are impacted by this issue.

Sex

The results highlight the gender inequalities in the face of job loss due to ill-health (Table 2).

Dutheil et al. observed similar univariate risks of job loss for women for MSD, mental ill-health and all-causes together (RR= 1.51, 1.70 and 1.51 respectively) (9).

This gender inequality issue probably needs particular attention. a high proportion of women work in activity sectors with high physical or psychological loads may be one reason of such inequality. For example, according the National Statistics Institute, the women constituted 87% of the nurses, and 62% of unskilled workers . The higher risk of job loss in these sectors or unskilled jobs could be a consequence of these women working in jobs that require lower levels of education. There are too few cases of job losses in this study (398 cases) to analyse the risks associated with specific occupations matched with sex ratio. However, an extended study (only 17 OPs participated in this study versus 5,000 OPs in France) could provide very accurate information. A more specific analysis of activity sectors and jobs for the observed population could provide more accurate “indications” concerning these observed data.

Age

Our findings concerning the average age of unfit workers (44.4 years), and the risks of unfitness according to the group of diseases among workers aged 50 years and older (Table 2) are similar to

the findings of the previous study carried out in 2012 (9). In this study, the average age of unfit workers was 45.9 years, and the risk of job loss caused by a MSD, a mental ill-health and all causes together, up to the age of 50, were 2.92, 1.38, and 2.51 respectively. Not surprisingly, our findings highlight the progressive increase of the odds ratios of job loss with the age of the workers, particularly for MSD.

Alavinia et al. highlighted the higher relative risk of long term sickness absence among those ≥ 50 years old (RR= 2.08 [1.33;3.24] ; ref= workers < 40 years old) (18). Their findings are consistent with ours. Older workers are a more fragile population, with an higher prevalence of chronic and disabling pathologies leading to long term sickness absence and an higher incidence of job loss. Moreover, the presence of a disabling pathology and the job loss is a really problematic cocktail for the professional reintegration. In our opinion, these population is a major priority for the primary and secondary preventive actions.

The encoding of pathologies leading to the unfitness notification, based on a common thesaurus and adapted to a clinician's routine practice, would increase the quality and processing speed of such analyses. Unfortunately, the different information systems in the occupational health services do not provide such a possibility at this time. Therefore, a common system would considerably enhance the epidemiological capacity to analyse ill-health related job losses, and its processing speed.

It would be appropriate to match our findings with other sources of data, such as expert-based networks or observations. In our opinion, our data are complementary to them.

The population included in our study was limited (50,000 workers). A more significant population would increase the power of the analysis. This would allow the more accurate identification of the sub groups of workers or specific socio-professional categories at risk of losing their jobs for medical reasons, and better provide information concerning prevention targets or further specific studies.

Conclusions

French occupational health systems have an important and cost effective epidemiological capacity. The supervisory authorities of the occupational health services, the General Labour department of the ministry of work, should consider promoting such an epidemiological approach based on occupational health service data, which could provide useful, accurate, and reliable information in the field of occupational health. Moreover, occupational health information systems contain accurate and high quality data on workplace analysis, medical records, or sociodemographic data. Moreover, several European countries, such as Belgium, could collect and analyse similar data (19). It is for these reasons that an Occupational Health System Data Analysis network should be promoted.

Acknowledgements

The authors would like to thank the Occupational physicians who participated to the study, the occupational health service AMETRA-Montpellier, all and in particular Mr Bruno Yerriah.

We thanks the research association IRIST for the publication fee.

References

1. Carder M, Turner S, McNamee R, Agius R. Work-related mental ill-health and 'stress' in the UK (2002-05) Occup Med (Lond). 2009 Dec; 59(8):539-44

2. Stocks SJ, McNamee R, Van Der Molen HF, Paris C, Urban P, Campo G et al. Monitoring trends in occupational diseases and tracing new and emerging risks in a network (Modernet). Trends in incidence of occupational asthma, contact dermatitis, noise-induced hearing loss, carpal tunnel syndrome and upper limb musculoskeletal disorders in european countries from 2000 to 2012. Occup Environ Med 2013. 70:437-

379 38

380

381 3. McDonald JC, Beck MH, Chen Y, Cherry NM. Incidence by occupation and industry of
382 work-related skin diseases in the United Kingdom, 1996-2001. Occup Med (Lond). 2006
383 Sep;56(6):398-405

384

385 4. Bonneterre V, Faisandier L, Bicout DJ, Bernardet C, Piollat J, Ameille J et al.
386 Programmed health surveillance and detection of emerging diseases in occupational
387 health : contribution of the Franch national occupational disease surveillance and
388 prevention network (RNV3P). Occup Environ Med 2010; 67:178-86

389

390 5. Bonneterre V, Faisandier L, De Gaudemaris R, Bicout DJ. Occupational exposome : a
391 network-based approach for characterizing occupational health problems. J biomed
392 Inform 2011;44:545-52

393

394 6. Mustard CA, Chambers A, Ibrahim S, Etches J, Smith P. Time trends in musculoskeletal
395 disorders attributed to work exposures in Ontario using three independent data sources,
396 2004-2011. Occup Environ Med 2015;72:252-57

397

398 7. Dutheil F, Pereira B, Moustafa F, Naughton G, Lesage FX, Lambert C. At-risk and
399 intervention thresholds of occupational stress using a visual analogue scale. PLoS One.
400 2017 Jun 6;12(6)

401 8. FERNAND J. Unfitness trajectory [Trajectoire inaptitude] – Direccte bretagne (labor department) .
402 2012 – available from http://bretagne.direccte.gouv.fr/trajectoires-inaptitudes (oct 2017)

403

404 9. Dutheil F, Naughton G, Sindyga P, Lesage FX. Ill Health-Related Job Loss: A One-Year

405 Follow-Up of 54,026 Employees. J Occup Environ Med. Sep;58(9):918-23.
406
407 10. Cherry NM, Meyer JD, Chen Y, Holt DL, McDonald JC. The reported incidence of
408 work related musculoskeletal disease in the UK: MOSS 1997-2000. Occup Med
409 2001;51(7):450-55
410
411 11. Chen Y, McDonald JC, Cherry NM. Incidence and suspected cause of work-related
412 musculoskeletal disorders, United Kingdom, 1996-2001. Occup Med (Lond). 2006
413 Sep;56(6):406-13.
414
415 12. Lderer P, Weltle D, Weber A. [Illness-related premature unfitness for work among civil
416 servants in Bavaria - an evaluation in the social medical field]. Gesundheitswesen. 2001
417 Aug-Sep;63(8-9):509-13.
418
419 13. Cherry NM, Chen Y, McDonald JC. Reported incidence and precipitating factors of
420 work-related stress and mental ill-health in the United Kingdom (1996-2001). Occup
421 Med 2006(6);56:414-21
422
423 14. Reinhardt JD, Wahrendorf M, Siegrist J. Socioeconomic Position, Psychosocial Work
424 Environment and Disability in a Ageing Workforce: A longitudinal Analysis of SHARE
425 data from 11 european countries. Occup Environ Med 2013;70:156-63
426
427 15. Carder M, McNamee R, Turner S, Hodgson JT, Holland F, Agius RM. Time trends in
428 the incidence of work-related mental ill-health and musculoskeletal disorders in the UK.
429 Occup Environ Med 2013;70:317-24
430
431 16. hse.gov.uk [Internet]. Work Related Musculoskeletal Disorder Statistics (WRMSDs) in

Great Britain 2016. Available from:
http://www.hse.gov.uk/statistics/causdis/musculoskeletal/index.htm

17. Wong MGP, Poole CJM, Agius R. Attribution of mental illness to work: a Delphi study. Occup Med (oxford) 2015; 65:391-97

18. Alavinia SM, Van den Berg TIJ, Van Duivenbooden C, Elders LAM, Burdorf A. Impact of work-related factors, lifestyle, and work ability on sickness absence among Dutch construction workers. Scand J Work Environ Health 2009 ; 35(5) :325-333

19. Godderis L. Data Warehouse for detection of occupational diseases in OHS data. Occup Med (oxford) 015; 65:651-658.

What is new in the paper?

- In addition to a previous study in France (9), we conducted a multivariate analysis of the causes of job loss in order to adjust the Odds Ratios for the age groups, sex, occupation and activity sectors which are strongly associated with the job loss.
- We support the recognition of the French occupational health system as an important and cost effective epidemiological tool.

Table 1(on next page)

Demographics, company characteristics, and incidence of unfitness for the job

		Employees unfit for the job	Employees fit for the job	Incidence ‰
		n=398 (100%)	n=50,734 (100%)	7.78
Age (years)	≤30 y	50 (12.6%)	15,298 (30.2%)	3.26
	31-40 y	91 (22.9%)	13,510 (26.7%)	6.70
	41-50 y	98 (24.6%)	12,180 (24.0%)	7.98
	51-60 y	124 (31.2%)	8,165 (16.1%)	14.96
	>60 y	35 (8.8%)	1,512 (3.0%)	22.62
Sex	Men	124 (31.2%)	21,279 (42.0%)	5.79
	Women	274 (68.8%)	29,455 (58.0%)	9.22
Occupation	Higher grade administrative and managerial occupations, higher grade professionals	24 (6.1%)	7,650 (17.0%)	3.13
	Intermediate occupations. Lower supervisors	65 (16.5%)	12,220 (27.2%)	5.29
	White collar workers. lower services, sales and clerical occupations	212 (53.8%)	19,671 (43.7%)	10.66
	Blue collar workers	93 (23.6%)	5,442 (12.1%)	16.80
Workforce	<10	105 (26.4%)	13,000 (25.6%)	8.01
	10-49	138 (34.7%)	16,102 (31.7%)	8.50
	50 - 249	93 (23.4%)	14,503 (28.6%)	6.37
	≥250	57 (14.3%)	7,129 (14.0%)	7.93
Activity sectors (aggregated A10 code)	Manufacturing (BE)	4 (1.0%)	154 (0.3%)	25.31
	Construction (FZ)	0	515 (1.0%)	0
	Wholesale and retail trade, repair of motor vehicles, transportation and storage, accommodation and food service activity (GI)	123 (30.9%)	14,051 (27.7%)	8.68
	Information & communication (JZ)	2 (5.0%)	2,306 (4.6%)	0.87
	Financial & insurance activities (KZ)	9 (2.3%)	2,954 (5.8%)	3.04
	Real estate activities (LZ)	13 (3.3%)	1,350 (2.7%)	9.54
	Professional, scientific and technical activities; administrative and support service activities (MN)	69 (17.3%)	9,696 (19.1%)	7.07
	Public administration, compulsory social security; education; human health and social work activities (OQ)	152 (38.2%)	14,909 (29.4%)	10.09
	Arts, entertainment, repair of household goods & other services (RU)	26 (6.5%)	4,799 (9.5%)	5.39

1

Table 2(on next page)

Factors associated with unfitness for the job, for the different causes of unfitness: univariate and multivariate analyses

ORc= crude Odds Ratio ; ORa= odds ratio adjusted on age, sex, occupation and industry

		Causes of unfitness for the job								
		Musculoskeletal disorders (n=188)			**Psychopathologies (n=153)**			**All causes together (n=398)**		
		ORc[CI95%]	**ORa[CI95%]**	***p***	**ORc[CI95%]**	**ORa[CI95%]**	***p***	**ORc[CI95%]**	**ORa[CI95%]**	***p***
Age (years)	*≤30 y*	1	1		1	1		1	1	
	31-40 y	1.76 [0.97 ; 3.25]	**2.37** [1.35 ; 4.18]		**2.22** [1.34 ; 3.75]	**2.23** [1.36 ; 3.65]		**2.05** [1.46 ; 2.90]	**2.43** [1.70 ; 3.45]	
	41-50 y	**3.14** [1.83 ; 5.57]	**3.81** [2.25 ; 6.45]	<0.001	**1.96** [1.16 ; 3.38]	**1.90** [1.14 ; 3.18]	<0.01	**2.46** [1.74 ; 3.44]	**2.64** [1.86 ; 3.76]	<0.001
	51-60 y	**6.56** [3.94 ; 11.39]	**7.35** [4.40 ; 12.28]		**2.4** [1.38 ; 4.22]	**2.26** [1.32 ; 3.86]		**4.59** [3.31 ; 6.37]	**4.75** [3.37 ; 6.69]	
	>60 y	8.60 [4.22 ; 17.32]	**9.93** [5.06 ; 19.49]		**3.24** [1.26 ; 7.42]	**3.22** [1.43 ; 7.23]		**6.94** [4.52 ; 10.66]	**7.62** [4.85 ; 11.96]	
	≤50 years	1	1	<0.001	1	1	0.07	1	1	<0.001
	>50 years	**3.65** [2.70 ; 4.91]	**3.41** [2.53 ; 4.61]		**1.50** [1.02 ; 2.17]	1.41 [0.98 ; 2.04]		**2.82** [2.29 ; 3.46]	**2.63** [2.13 ; 3.25]	
Sex	**Men**	1	1	<0.001	1	1	0.14	1	1	<0.001
	Women	**1.64** [1.19 ; 2.25]	**1.89** [1.35 ; 2.66]		**1.41** [1.00 ; 1.98]	1.31 [0.92 ; 1.88]		**1.48** [1.19 ; 1.83]	**1.52** [1.21 ; 1.91]	
Occupations	Intermediate occupations. Lower supervisors	1	1	<0.001	1	1	0.52	1	1	<0.001
	Higher grade administrative and managerial occupations, higher grade professionals	***0.11*** *[0.00 ; 0.69]*	*0.12 [0.02 ; 0.88]*		*0.65 [0.34 ; 1.16]*	*0.76 [0.43 ; 1.35]*		***0.59*** *[0.35 ; 0.96]*	*0.66 [0.41 ; 1.06]*	
	White collar workers. lower services, sales and clerical occupations	***4.47*** *[2.59 ; 8.27]*	***3.88*** *[2.25 ; 6.70]*		*1.09 [0.74 ; 1.64]*	*1.10 [0.74 ; 1.64]*		***2.03*** *[1.53 ; 2.72]*	***1.95*** *[1.47 ; 2.60]*	
	Blue collar workers	***9.43*** *[5.3 ; 17.85]*	***8.13*** *[4.52 ; 14.62]*		*1.02 [0.56 ; 1.79]*	*1.17 [0.66 ; 2.07]*		***3.21*** *[2.31 ; 4.49]*	***3.23*** *[2.30 ; 4.54]*	
Activity sectors (aggregated A10 code)	Financial & insurance activities (KZ) Real estate activities (LZ) *n=4326*	1	1	<0.01	1	1	0.25	1	1	0.20
	Wholesale and retail trade, repair of motor vehicles, transportation and storage, accommodation and food service activity (GI)) *n=14174*	**5.26** [2.00;20.23]	***3.65*** *[1.32; 10.1]*		1.01 [0.53;2.06]	*1.05 [0.55; 2.01]*		**1.71** [1.08;2.84]	*1.45 [0.91; 2.32]*	
	Professional, scientific and technical activities; administrative and support service activities (MN) n=9765	**4.22** [1.52 ;16.28]	*2.36 [0.83; 6.71]*		0.75 [0.36;1.62]	*0.69 [0.34; 1.39]*		1.39 [0.85;2.37]	*1.01 [0.61;1.65]*	
	Public administration, compulsory social security; education; human health and social work activities (OQ) *n=15061*	**4.33** [1.60;16.42]	*2.33 [0.84;6.44]*		1.38 [0.75;2.73]	*1.16 [0.63;2.12]*		**1.99** [1.27;3.28]]	*1.35 [0.86; 2.13]*	
	Arts, entertainment, repair of household goods & other services (RU) n=4825	2.91 [0.90;12.28]	*1.99 [0.64;6.13]*		0.76 [0.31;1.84]	*0.76 [0.34; 1.70]*		1.06 [0.58;1.97]	*0.85 [0.48; 1.51]*	

1