# Workplace bullying and psychotropic drug use: the mediating role of physical and mental health status

ISABELLE NIEDHAMMER,[1,2,3,4] SIMONE DAVID,[1,2,3] STÉPHANIE DEGIOANNI,[1,2,3] ANNE DRUMMOND,[4] PIERRE PHILIP,[5] and 143 OCCUPATIONAL PHYSICIANS*

[1] INSERM, U1018, CESP Centre for research in epidemiology and population health, Epidemiology of occupational and social determinants of health team, Villejuif, France

[2] Univ Paris-Sud, UMRS 1018, Villejuif, France

[3] Université de Versailles St-Quentin, UMRS 1018, Villejuif, France

[4] UCD School of Public Health, Physiotherapy & Population Science, University College Dublin, Dublin, Ireland

[5] Clinique du Sommeil, CHU Bordeaux-Pellegrin, Bordeaux, France

**Correspondence to:**

Dr Isabelle Niedhammer

UCD School of Public Health, Physiotherapy & Population Science

University College Dublin

Woodview House, Belfield, Dublin 4, Ireland

Tel: +353 1 716 3467

Fax: +353 1 716 3421

E-mail: isabelle.niedhammer@inserm.fr

* Drs ACQUARONE D, AICARDI F, ANDRE-MAZEAUD P, ARSENTO M, ASTIER R, BAILLE H, BAJON-THERY F, BARRE E, BASIRE C, BATTU JL, BAUDRY S, BEATINI C, BEAUD'HUIN N, BECKER C, BELLEZZA D, BEQUE C, BERNSTEIN O, BEYSSIER C, BLANC-CASCIO F, BLANCHET N, BLONDEL C, BOISSELOT R, BORDES-DUPUY G, BORRELLY N, BOUHNIK D, BOULANGER MF, BOULARD J, BOURREAU P, BOURRET D, BOUSTIERE AM, BRETON C, BUGEON G, BUONO-MICHEL M, CANONNE JF, CAPELLA D, CAVIN-REY M, CERVONI C, CHARRETON D, CHARRIER D, CHAUVIN MA, CHAZAL B, COUGNOT C, CUVELIER G, DALIVOUST G, DAUMAS R, DEBAILLE A, DE BRETTEVILLE L, DELAFORGE G, DELCHAMBRE A, DOMENY L, DONATI Y, DUCORD-CHAPELET J, DURAN C, DURAND-BRUGUEROLLE D, FABRE D, FAIVRE A, FALLERI R, FERRANDO G, FERRARI-GALANO J, FLUTET M, FOUCHE JP, FOURNIER F, FREYDER E, GALY M, GARCIA A, GAZAZIAN G, GERARD C, GIRARD F, GIUGE M, GOYER C, GRAVIER C, GUYOMARD A, HACQUIN MC, HALIMI E, IBAGNES T, ICART P, JACQUIN MC, JAUBERT B, JORET JP, JULIEN JP, KACEL M, KESMEDJIAN E, LACROIX P, LAFON-BORELLI M, LALLAI S, LAUDICINA J, LECLERCQ X, LEDIEU S, LEROY J, LEROYER L, LOESCHE F, LONDI D, LONGUEVILLE JM, LOTTE MC, LOUVAIN S, LOZE M, MACULET-SIMON M, MAGALLON G, MARCELOT V, MAREEL MC, MARTIN P, MASSE AM, MERIC M, MILLIET C, MOKHTARI R, MONVILLE AM, MULLER B, OBADIA G, PELSER M, PERES L, PEREZ E, PEYRON M, PEYRONNIN F, POSTEL S, PRESSEQ P, PYRONNET E, QUINSAT C, RAULOT-LAPOINTE H, RIGAUD P, ROBERT F, ROBERT O, ROGER K, ROUSSEL A, ROUX JP, RUBINI-REMIGY D, SABATE N, SACCOMANO-PERTUS C, SALENGRO B, SALENGRO-TROUILLEZ P, SAMSOM E, SENDRA-GILLE L, SEYRIG C, STOLL G, TARPINIAN N, TAVERNIER M, TEMPESTA S, TERRACOL H, TORRESANI F, TRIGLIA MF, VANDOMME V, VIEILLARD F, VILMOT K, VITAL N

# ABSTRACT

**Objectives**: The association between workplace bullying and psychotropic drug use is not well established. This study was aimed at exploring the association between workplace bullying, and its characteristics, and psychotropic drug use, and studying the mediating role of physical and mental health. **Methods**: The study population consisted of a random sample of 3132 men and 4562 women of the working population in the South-East of France. Workplace bullying, evaluated using the validated instrument elaborated by Leymann, and psychotropic drug use, as well as covariates, were measured using a self-administered questionnaire. Covariates included age, marital status, presence of children, education, occupation, working hours, night work, physico-chemical exposures at work, self-reported health, and depressive symptoms. Statistical analysis was performed using logistic regression analysis, and was carried out separately for men and women. **Results**: Workplace bullying was strongly associated with psychotropic drug use. Past exposure to bullying increased the risk for this use. The more frequent and the longer the exposure to bullying, the stronger the association with psychotropic drug use. Observing bullying on someone else at the workplace was associated with psychotropic drug use. Adjustment for covariates did not modify the results. Additional adjustment for self-reported health and depressive symptoms reduced the magnitude of the associations, especially for men. **Conclusion**: The association between bullying and psychotropic drug use was found to be significant and strong, and was partially mediated by physical and mental health.

**INTRODUCTION**

The use of psychotropic drugs, aimed at bringing a symptomatic response to mental disorders, has increased within the last few decades in industrialised countries, and this category of drugs is now amongst the most commonly prescribed. The ESEMeD project showed that 8% of males and 16% of females took at least one psychotropic drug in the past 12 months in Europe (Alonso et al., 2004). In France, 24% of the population (17% of men, 31% of women) were reimbursed for a psychotropic medication during the year 2000 (Lecadet et al., 2003) and psychotropic drug use may be higher than in other European countries (Alonso et al., 2004). A variety of factors may explain the differences between countries, such as access and utilization of health and mental health services, legal rules for prescription, retail and use of psychotropic drugs, but also actual differences in the prevalence of mental disorders. Anxiolytics are currently the most commonly prescribed drugs, antidepressants and hypnotics being less frequently used. This pattern is found in Europe in general (Alonso et al., 2004) and in France in particular (Lecadet et al., 2003). Under-treatment was found to be a common phenomenon: a substantial proportion of subjects with mental disorders did not use psychotropic drugs or were inappropriately treated (Alonso et al., 2004). Although benefits are associated with the use of these drugs, concern has also increased regarding their health effects (side effects), especially with long-term use, and the dependence related to use. Psychotropic drug use may be associated with health, social, and economic consequences, such as cardiac side effects (Witchel et al., 2003), falls in older age (Leipzig et al., 1999), and accidents (Wadsworth et al., 2005). Consequently, psychotropic drug use may be a serious public health issue, because of the high prevalence of use, and their consequences, and a better understanding of the factors associated with use may be useful for preventive action.

The causes of psychotropic drug use are complex and certainly multifactorial. Studies reported that psychotropic drug use was associated with female gender, older age, low socioeconomic status, or living alone (Alonso et al., 2004;Lavigne and Bourbonnais, 2010;Lecadet et al., 2003). To date, occupational factors have been understudied in relation to psychotropic drug use.

Indeed, little research has been undertaken that targets psychotropic drug use in the working population. Although job stress is suspected to be one of the major occupational risk factors for mental health outcomes, the impact of job stress on psychotropic drug use has not been

widely studied. Some studies have shown that measures of job stress, such as high psychological demands, low decision latitude, job strain, low social support, iso-strain, low reward, or effort-reward imbalance were associated with psychotropic drug use (Lavigne and Bourbonnais, 2010;Moisan et al., 1999;Pelfrene et al., 2004;Virtanen et al., 2007). However, these studies were done on relatively small or selective samples, and/or did not take adequate account of potential confounding factors such as socio-demographic factors, physical and mental health status, or important occupational risk factors such as night work and working hours. Furthermore, a still lower number of studies have explored the association between workplace bullying, considered to be one of the most damaging job stress factors, and psychotropic drug use, and the literature in this area appears still more sparse (Appelberg et al., 1993;Lavigne and Bourbonnais, 2010;Richman et al., 1999;Vartia, 2001;Traweger et al., 2004).

Workplace bullying is difficult to evaluate, and no consensus exists regarding its definition. Here, the definition by Leymann (Leymann, 1996b) was adopted: workplace bullying 'involves hostile and unethical communication, which is directed in a systematic way by one or a few individuals mainly towards one individual who is pushed into a helpless and defenceless position'. Two approaches using self-reported questionnaires have been developed in surveys: inventories of various forms of bullying, and self-report of being exposed to bullying on the basis of a given definition. According to some authors, the combination of both approaches would be adequate to define cases of bullying (Einarsen and Skogstad, 1996;Einarsen, 2000;Vartia, 1996;Vartia, 2001). Duration and frequency of bullying would also be crucial elements. In the present study, we used the questionnaire elaborated by Leymann, the Leymann Inventory of Psychological Terror (LIPT) (Leymann, 1996a), considered to have the greatest coverage and acceptable reliabilities (Cowie et al., 2002), and also the second approach based on self-report of being exposed to bullying.

The objectives of this study were to examine the associations between workplace bullying and psychotropic drug use. This study attempted to take the previous limitations described earlier into account, as it was based on a large and non-selective sample of the working population, it included a standard measure of exposure to workplace bullying, and detailed information on this exposure, took account of a large number of confounding factors, and studied the specific mediating role of physical and mental health in the association between workplace bullying and psychotropic drug use.

**METHODS**

*Population*

This cross-sectional survey was performed by INSERM in 2004 among the general working population in the southeast of France in collaboration with a network of 143 voluntary occupational physicians, who, if working full-time, selected 150 employees each randomly, and invited them to participate in the survey. Occupational medicine is mandatory for all employees in France, consequently, every employee has a medical examination with an occupational physician periodically; at the time of the survey, this was annually. In order to be included in the survey, employees had to have worked for at least 3 months in their company. The survey was based on a self-administered questionnaire which was anonymous, and was returned using a prepaid envelope. Because employees included in the survey were all working at the time of the survey, it could be assumed that those who had a major mental health disorder might be underrepresented in the sample because these people would be more likely to be on sick leave. Several papers have already been published on the topic of workplace bullying using this study sample (Niedhammer et al., 2006b;Niedhammer et al., 2006a;Niedhammer et al., 2007;Niedhammer et al., 2009).

*Variables*

Our questionnaire included a French version of the LIPT, measuring the experience of 45 forms of bullying within the previous 12 months, as well as frequency and duration of bullying. The reference period for exposure was 12 months making it possible to study exposure to bullying even in a previous job (inclusion criterion in the survey was at least 3 months in the company, consequently exposure to bullying in a previous job was also explored). Afterwards, the employees were given the following definition: 'Bullying may be defined by a situation in which someone is exposed to hostile behaviours on the part of one or more persons in the work environment which aim continually and repeatedly to offend, oppress, maltreat, or to exclude or isolate over a long period of time.' The employees were asked if they perceived themselves as being exposed to bullying within the past 12 months. Cases of bullying were defined using both Leymann's definition (exposure to at least one form of bullying within the previous 12 months, weekly or more, and for at least 6 months)

(Leymann, 1996b) and the self-report of being exposed to bullying, as recommended previously (Einarsen and Skogstad, 1996;Einarsen, 2000;Vartia, 1996;Vartia, 2001). The psychometric properties of the French version of the LIPT questionnaire were studied in a previous paper (Niedhammer et al., 2006a), and we found that the combined evaluation of bullying increased the convergent and predictive validity compared with Leymann's definition alone. Several other variables were used to characterize the exposure to workplace bullying within the 12 past months, which were the period of exposure (current or past), and the frequency and duration of exposure. In addition, we used a variable describing the fact that the employees may have been observers of bullying experienced by someone else at their workplace within the 12 past months. We also constructed a variable combining the two variables of exposure to bullying and observing bullying by creating four categories: no exposure at all, observer of bullying, exposure to bullying, and both exposure to bullying and observer of bullying.

Psychotropic drug use was measured using one question evaluating whether a medication to sleep, a tranquilizer, or another psychotropic drug for mental disorders had been taken within the previous 12 months. This variable was used as a marker of sleep and mental health disorders. Drug abuse and recreational use of these drugs were not the focus of the study.

Several variables were used as covariates because they are considered as known or suspected risk factors of psychotropic drug use in the literature and may play a confounding role in the association between bullying and psychotropic drug use: age, marital status, presence of children, educational level, occupational groups (derived from the French classification of occupations -INSEE- that is close to the International Standard Classification of Occupations -ISCO- and included: blue collar workers, clerks/service workers, associate professionals, managers/professionals), working hours per week, night work (permanent night work or alternating shifts including night shift), and the number of physico-chemical exposures at work to thermic constraints (outdoor work, cold or hot temperatures), noise, radiation, chemical exposures, or other exposures. Two health-related variables were also studied: poor self-reported health, based on a 4-level scale ranging from 'very good' (coded 1) to 'very poor' (coded 4), and defined by levels 3 and 4, and depressive symptoms measured using the CES-D scale and defined using the available thresholds established for the French population ($\geq 17$ for men and $\geq 23$ for women) to dichotomize the CES-D score (Fuhrer and Rouillon, 1989). Age, marital status, and educational level are well-known risk factors of psychotropic

drug use (Alonso et al., 2004;Lavigne and Bourbonnais, 2010;Lecadet et al., 2003;Moisan et al., 1999;Pelfrene et al., 2004). As our variable of interest was workplace bullying, a careful consideration was also given to potential occupational risk factors of psychotropic drug use, occupational group, working hours, night work, and physico-chemical exposures, that may increase the risk of psychotropic drug use (Niedhammer et al., 1995;Pelfrene et al., 2004). Finally, self-reported health and depressive symptoms were studied as markers of physical and mental health status, in order to explore their potential mediating role in explaining the association between bullying and psychotropic drug use, something never done before.

*Statistical analysis*

The crude associations between 6 variables characterizing bullying, i.e. exposure, period, frequency, duration of bullying and the two variables of observing bullying, covariates, and psychotropic drug use were studied using Pearson's Chi-Square test. Logistic regression analysis was then used to adjust for covariates (except self-reported health and depressive symptoms). Six different models were constructed with psychotropic drug use as the dependent variable. In each model, we included as independent variables simultaneously: one of the 6 variables describing bullying, as well as the covariates (model 1). Additional models were also performed with additional adjustment for poor self-reported health and depressive symptoms, that were added in the previous models as covariates (model 2). The mediating role of these two health-related variables was estimated by the change in odds ratio (OR) according to the formula: $(OR_{model\ 1} - OR_{model\ 2})/(OR_{model\ 1} - 1)$ (Lynch et al., 1996). The OR, or the prevalence-odds ratio as the study design is here cross-sectional, is the ratio of the odds in favour of disease among the exposed to the odds in favour of disease among the unexposed. As differences may be observed between men and women for the prevalences of occupational exposures (including bullying), and of health outcomes (including psychotropic drug use), and as the associations between exposures and outcomes may also differ between genders, analysis was carried out separately for men and women (Niedhammer et al., 2000). Statistical analysis was performed using SAS.

**RESULTS**

In 2004, 19655 employees were asked to participate in the survey. Among them, 7770 responded to the self-administered questionnaire, leading to a response rate of 40%. Seventy

six employees were excluded from the analysis, 57 because they had worked for less than 3 months in their company, and 19 because sex response was missing in the questionnaire. Thus, the study was based on 7694 employees, 3132 men and 4562 women, with a mean age of 40 (standard deviation: 10.3). The 12-month prevalence of psychotropic drug use was 19% and 33% for men and women respectively.

Leymann's definition alone led to a 12-month prevalence of exposure to bullying of 11% for men and 13% for women. Using the definition of exposure to bullying combining Leymann's definition and the self-reporting of bullying by the employees within the same period, the 12-month prevalence of exposure to bullying were respectively 9% and 11% for men and women. These results show that most of those defined as exposed to bullying using Leymann's definition also reported being exposed.

All the associations between the variables of bullying and psychotropic drug use were strongly significant at p<0.001 (Table 1). The prevalence of psychotropic drug use increased among people exposed to workplace bullying, especially among those who were currently exposed. People who were exposed to bullying in the past were also at higher risk of psychotropic drug use than those who had never been exposed. Significant associations were observed between the frequency and duration of exposure to bullying and psychotropic drug use. Observing bullying was also associated with an increase in the prevalence of psychotropic drug use. The highest prevalence of psychotropic drug use was observed for those exposed to bullying (with or without observing it) for both genders.

The prevalence of psychotropic drug use increased with age, among those living alone, among women having no children, among those having a lower educational level, among male clerks or service workers, among night workers, and among women exposed to physico-chemical exposures at work. The prevalence of psychotropic drug use also increased strongly with poor self-reported health and depressive symptoms (Table 2).

Table 3 provides the results of logistic regression analysis (model 1). Each model shows the association between each variable of bullying and psychotropic drug use after adjustment for covariates. All these associations were strongly significant at p<0.001, suggesting that covariates did not modify the strong associations observed in Table 1. Exposure to workplace bullying within the last 12 months was found to be a strong risk factor for psychotropic drug

use. Past exposure to bullying also increased this risk. The more frequent and the longer the exposure to bullying, the higher the prevalence of use. Tests for trend of frequency and duration of bullying showed dose-response associations significant at p<0.0001. Observing bullying of someone else increased the risk of psychotropic drug use. Exposure to bullying with or without observing bullying at the workplace led to the highest increases in the risk of psychotropic drug use.

These results from logistic regression analysis (Table 3) also showed that older age and living alone for both genders, occupation and night work for men only, and physico-chemical exposures for women only were found to be significant independent risk factors for psychotropic drug use (Table 4).

Additional adjustment for self-reported health and depressive symptoms (model 2) led to a substantial reduction in the magnitude of the ORs, and the associations between bullying and psychotropic drug use remained significant at p<0.001 in women (Table 5). Inclusion of self-reported health and depressive symptoms in the models led to a reduction of the ORs for those exposed to bullying from 3.10 to 1.31 for men and from 3.49 to 1.78 for women, i.e. a reduction of 85% and 69% respectively.

**DISCUSSION**

*Main findings*

This study shows that workplace bullying was strongly associated with psychotropic drug use. Dose-response associations were observed between frequency and duration of bullying and psychotropic drug use. Observing bullying of someone else at the workplace was a risk factor of psychotropic drug use. All these associations were independent of potential confounding factors. However, taking physical and mental health into account reduced the magnitude of the associations between bullying and psychotropic drug use, suggesting a mediating role of these health-related variables.

*Strengths and limitations of the study*

Some limitations of the study deserve to be mentioned. The response rate may be considered as low (40%), but it is similar to previous studies on this sensitive topic (Bjorkqvist et al., 1994;Einarsen et al., 1994;Hoel et al., 2001;Salin, 2001). Selection bias may not be ruled out, but the differences between respondents and non-respondents were small for sex, age, economic activities, and occupation. In addition, a comparison between the census population and the sample studied suggested that the study population was roughly representative for the same variables (Niedhammer et al., 2006a). A specific type of healthy worker effect (leading to exclude people in poor health from the labour market) may have operated, as this survey did not include employees on sickness absence within the survey period, especially those who were on sick leave because of the health consequences of workplace bullying, leading to a potential underestimation of the association between bullying and psychotropic drug use. The cross-sectional design of our study did not allow us to conclude on the causal nature of the association between workplace bullying and psychotropic drug use, and a reverse causation may not be excluded. A reporting bias may also be suspected as both workplace bullying and psychotropic drug use were measured using self-report. This reporting bias, which is connected to 'common method variance', for example through negative affectivity and social desirability, may lead to inflated associations between the two variables. Another limitation is related to the use of a rather crude measure for psychotropic drug use. Although other authors used a similar measure (Lavigne and Bourbonnais, 2010), this did not allow us to study the specific classes of psychotropics, the reason or duration for medication.

The strengths of this study were the following. Our sample included a very large number of employees of the general working population, allowing us to study a nonselective population as well as men and women separately, which has been shown to be crucial (Niedhammer et al., 2000). Another type of healthy worker effect (people in poor health shifted to less exposed jobs) was taken into account as we were able to study exposure to bullying in a previous job. A validated instrument was used to measure workplace bullying (LIPT), and various variables were constructed to describe the exposure to workplace bullying which has never been done before in the study of psychotropic drug use, and provided detailed information on exposure to bullying and its associations with psychotropic drug use. The prevalence of psychotropic drug use observed for men and women in our study (19-33%) was consistent with previous results in the French population (17-31%) (Lecadet et al., 2003), and strong and consistent associations were also found with classical risk factors such as gender, age, and marital status, in accordance with previous studies (Alonso et al., 2004;Lavigne and Bourbonnais,

2010;Lecadet et al., 2003;Moisan et al., 1999;Pelfrene et al., 2004). Regarding occupational factors, we found that occupation was significantly associated with psychotropic drug use among men (blue collar workers being at lower risk, and white collar workers at higher risk), in agreement with the results by Pelfrene et al. (Pelfrene et al., 2004). We observed an association between night work and psychotropic drug use as reported previously (Niedhammer et al., 1995). An association was also found between physico-chemical exposures at work and psychotropic drug use, that may suggest that other occupational exposures may be risk factors. Finally, as expected, strong and significant associations were found between self-reported health and depressive symptoms, and psychotropic drug use. All these results reinforce the validity of our study. The statistical analysis took into account important covariates in the study of the association between workplace bullying and psychotropic drug use; sociodemographic and occupational factors, as well as health-related factors. Although a substantial number of covariates were taken into account, some variables may have been omitted because they were unavailable in the survey, such as smoking or alcohol consumption. Psychosocial work factors, such as social support, were not taken into account because it is likely that these variables may be risk factors of bullying, and would lead to overadjustment in the analysis. We demonstrated in a previous paper that occupation was associated with bullying, especially that male managers/professionals were less likely to be exposed to bullying (Niedhammer et al., 2007). Our results that were adjusted for occupation (among others) suggested that bullying was associated with psychotropic drug use independently of occupational groups. However, as occupational group may be a risk factor of bullying, adjusting for occupation may also be considered as an overadjustment in the study of the association between bullying and psychotropic drug use. As the association was very strong, adjusting was preferred even if it may be viewed as a conservative strategy. Whereas sociodemographic and occupational covariates did not modify the strong associations between bullying and psychotropic drug use, health-related covariates reduced these associations, suggesting a mediating role of these covariates.

*Comparison with literature*

Only very few studies examined the association between workplace bullying and psychotropic drug use. Appelberg et al. (Appelberg et al., 1993) reported an association between interpersonal conflicts at work and the use of tranquilizers and hypnotics after adjustment for age, social class and neuroticism, and stratified by marital status in Finnish

men. Lavigne and Bourbonnais (Lavigne and Bourbonnais, 2010) reported an association between psychological harassment and psychotropic drug use after adjustment for gender, age, and several other psychosocial work factors among Canadian correctional officers. The study by Richman et al. (Richman et al., 1999) reported an association between generalized workplace abuse and use of prescription drugs (tranquilizers, antidepressants, and sedatives) after adjustment for age, race, and occupation among American male university employees. The study by Traweger et al. (Traweger et al., 2004) showed that being a victim of bullying was associated with the use of antidepressants, benzodiazepines, analgetics, stimulants, and phytotherapeutics in Austria, but this finding was based on a crude association without adjustment. Vartia (Vartia, 2001) reported that bullied employees used both sleep-induced drugs and sedatives more often than the other subjects; observers were also more likely to use them than nonbullied, but the use of these drugs did not correlate with the duration or the frequency of bullying among Finnish municipal employees. However, no information was provided on covariates. In all these studies, the measurement of bullying and/or psychotropic drug use were based on single items. These very few studies also underlined the scarcity of the literature on this topic.

Our results are in agreement with these studies. Furthermore, as never observed before, we found dose-response associations between frequency and duration of bullying and psychotropic drug use. Past exposure to bullying had still an impact on psychotropic drug use, pointing to the long term effects of bullying, even when the exposure had stopped. Being an observer of bullying was a risk factor of psychotropic drug use suggesting that workplaces prone to bullying may have a detrimental effect on employees' health, even if employees are not directly concerned by the phenomenon. Our results are in agreement with the study by Vartia (Vartia, 2001) finding an association between observing bullying and the use of sleep-induced drugs and sedatives. Finally, we found that physical and mental health status may mediate the association between workplace bullying and psychotropic drug use, something never reported before. Our study also stated gender differences as physical and mental health status may play a stronger mediating role among men than among women, suggesting that other factors might mediate the association between bullying and psychotropic drug use among women.

*Conclusion*

Our findings underline the strong association between workplace bullying and psychotropic drug use. Our study also demonstrates that the association between workplace bullying and psychotropic drug use may be mediated by health-related factors, which is a finding that allows a better understanding of the mechanisms leading to psychotropic drug use. More information from prospective etiological studies would be helpful. More research on management styles and organisational policies would also be useful to provide guidelines to policies oriented towards preventing bullying at the workplace. Better understanding of bullying, its determinants and consequences, as well as increasing efforts toward prevention are urgently needed.

## ACKNOWLEDGEMENTS

**REFERENCES**

Alonso J, Angermeyer MC, Bernert S, Bruffaerts R, Brugha TS, Bryson H, de GG, Graaf R, Demyttenaere K, Gasquet I, Haro JM, Katz SJ, Kessler RC, Kovess V, Lepine JP, Ormel J, Polidori G, Russo LJ, Vilagut G, Almansa J, rbabzadeh-Bouchez S, Autonell J, Bernal M, Buist-Bouwman MA, Codony M, Domingo-Salvany A, Ferrer M, Joo SS, Martinez-Alonso M, Matschinger H, Mazzi F, Morgan Z, Morosini P, Palacin C, Romera B, Taub N, Vollebergh WA (2004) Psychotropic drug utilization in Europe: results from the European Study of the Epidemiology of Mental Disorders (ESEMeD) project. Acta Psychiatr Scand Suppl55-64

Appelberg K, Romanov K, Honkasalo ML, Koskenvuo M (1993) The use of tranquilizers, hypnotics and analgesics among 18,592 Finnish adults: associations with recent interpersonal conflicts at work or with a spouse. J Clin Epidemiol 46:1315-1322

Bjorkqvist K, Osterman K, Hjelt-Back M (1994) Aggression among university employees. Aggressive Behaviour 20:173-184

Cowie H, Naylor P, Rivers I, Smith P-K, Pereira B (2002) Measuring workplace bullying. Aggression and Violent Behavior 7:33-51

Einarsen S (2000) Harassment and bullying at work: a review of the Scandinavian approach. Aggression and Violent Behavior 5:379-401

Einarsen S, Raknes BI, Matthiesen SB (1994) Bullying and harassment at work and their relationships to work environment quality: an exploratory study. European Work and Organizational Psychologist 4:381-401

Einarsen S, Skogstad A (1996) Bullying at work: epidemiological findings in public and private organizations. European journal of work and organizational psychology 5:185-201

Fuhrer R, Rouillon F (1989) La version française de l'échelle CES-D (Center for Epidemiologic Studies - Depression scale). Description et traduction de l'échelle d'autoévaluation. Psychiatr Psychobiol 4:163-166

Hoel H, Cooper CL, Faragher B (2001) The experience of bullying in Great Britain: the impact of organizational status. European journal of work and organizational psychology 10:443-465

Lavigne E, Bourbonnais R (2010) Psychosocial work environment, interpersonal violence at work and psychotropic drug use among correctional officers. Int J Law Psychiatry 33:122-129

Lecadet J, Vidal P, Baris B, Vallier N, Fender P, Allemand H (2003) Médicaments psychotropes : consommation et pratiques de prescription en France métropolitaine. I. Données nationales, 2000. Rev Med Ass Maladie 34:75-84

Leipzig RM, Cumming RG, Tinetti ME (1999) Drugs and falls in older people: a systematic review and meta-analysis: I. Psychotropic drugs. J Am Geriatr Soc 47:30-39

Leymann, H. Handanleitung für den LIPT-Fragebogen (Leymann Inventory of Psychological Terror). Materialie Nr. 33. 1996a. Deutsche Gesellschaft für Verhaltenstherapie e.V., Tübingen.

Leymann H (1996b) The content and development of mobbing at work. European journal of work and organizational psychology 2:165-184

Lynch JW, Kaplan GA, Cohen RD, Tuomilehto J, Salonen JT (1996) Do cardiovascular risk factors explain the relation between socioeconomic status, risk of all-cause mortality, cardiovascular mortality, and acute myocardial infarction? Am J Epidemiol 144:934-942

Moisan J, Bourbonnais R, Brisson C, Gaudet M, Vézina M, Vinet A, Grégoire JP (1999) Job strain and psychotropic drug use among white-collar workers. Work & Stress 13:289-298

Niedhammer I, David S, Degioanni S, 143 médecins du travail (2006a) [The French version of the Leymann's questionnaire on workplace bullying: the Leymann Inventory of Psychological Terror (LIPT)]. Rev Epidemiol Sante Publique 54:245-262

Niedhammer I, David S, Degioanni S, 143 occupational physicians (2006b) Association between workplace bullying and depressive symptoms in the French working population. J Psychosom Res 61:251-259

Niedhammer I, David S, Degioanni S, 143 occupational physicians (2007) Economic activities and occupations at high risk for workplace bullying: results from a large-scale cross-sectional survey in the general working population in France. Int Arch Occup Environ Health 80:346-353

Niedhammer I, David S, Degioanni S, Drummond A, Philip P, 143 occupational physicians (2009) Workplace bullying and sleep disturbances: findings from a large scale cross-sectional survey in the French working population. Sleep 32:1211-1219

Niedhammer I, Lert F, Marne MJ (1995) Psychotropic drug use and shift work among French nurses (1980-1990). Psychol Med 25:329-338

Niedhammer I, Saurel-Cubizolles MJ, Piciotti M, Bonenfant S (2000) How is sex considered in recent epidemiological publications on occupational risks? Occup Environ Med 57:521-527

Pelfrene E, Vlerick P, Moreau M, Mak RP, Kornitzer M, De Backer G (2004) Use of benzodiazepine drugs and perceived job stress in a cohort of working men and women in Belgium. Results from the BELSTRESS-study. Soc Sci Med 59:433-442

Richman JA, Rospenda KM, Nawyn SJ, Flaherty JA, Fendrich M, Drum ML, Johnson TP (1999) Sexual harassment and generalized workplace abuse among university employees: prevalence and mental health correlates. Am J Public Health 89:358-363

Salin D (2001) Prevalence and forms of bullying among business professionals: a comparison of two different strategies for measuring bullying. European journal of work and organizational psychology 10:425-441

Traweger C, Kinzl JF, Traweger-Ravanelli B, Fiala M (2004) Psychosocial factors at the workplace--do they affect substance use? Evidence from the Tyrolean workplace study. Pharmacoepidemiol Drug Saf 13:399-403

Vartia M (1996) The sources of bullying: psychological work environment and organizational climate. European journal of work and organizational psychology 5:203-214

Vartia ML (2001) Consequences of workplace bullying with respect to the well-being of its targets and the observers of bullying. Scand J Work Environ Health 27:63-69

Virtanen M, Honkonen T, Kivimaki M, Ahola K, Vahtera J, Aromaa A, Lonnqvist J (2007) Work stress, mental health and antidepressant medication findings from the Health 2000 Study. J Affect Disord 98:189-197

Wadsworth EJ, Moss SC, Simpson SA, Smith AP (2005) Psychotropic medication use and accidents, injuries and cognitive failures. Hum Psychopharmacol 20:391-400

Witchel HJ, Hancox JC, Nutt DJ (2003) Psychotropic drugs, cardiac arrhythmia, and sudden death. J Clin Psychopharmacol 23:58-77

Table 1. Crude associations between exposure to bullying and psychotropic drug use

| | Psychotropic drug use | | | |
| | Men | | Women | |
| | Use (N) | Use (%) | Use (N) | Use (%) |
|---|---|---|---|---|
| **Exposure to bullying** | | | | |
| No | 469 | 16.56 | 1184 | 29.34 |
| Yes | 109 | 39.78 | 289 | 59.47 |
| **Exposure to bullying** | | | | |
| No exposure | 469 | 16.56 | 1184 | 29.34 |
| Past exposure | 11 | 28.95 | 72 | 55.81 |
| Current exposure | 96 | 41.38 | 210 | 60.17 |
| **Frequency of exposure to bullying** | | | | |
| No exposure | 469 | 16.56 | 1184 | 29.34 |
| Weekly | 49 | 33.11 | 124 | 55.11 |
| Daily or almost daily | 60 | 47.62 | 165 | 63.22 |
| **Duration of exposure to bullying** | | | | |
| No exposure | 469 | 16.56 | 1184 | 29.34 |
| < 2 years | 34 | 36.17 | 114 | 55.07 |
| ≥ 2 years, but < 5 years | 41 | 36.28 | 112 | 62.57 |
| 5 years or more | 34 | 50.75 | 63 | 63.00 |
| **Observer of bullying** | | | | |
| No | 325 | 15.17 | 860 | 27.95 |
| Yes | 253 | 26.24 | 613 | 42.45 |
| **Combination exposure to bullying/observer** | | | | |
| No exposure | 300 | 14.37 | 800 | 27.02 |
| Observer | 169 | 22.72 | 384 | 35.75 |
| Exposure to bullying | 25 | 46.30 | 60 | 51.72 |
| Exposure to bullying and observer | 84 | 38.18 | 229 | 61.89 |

Chi-Square test
All associations significant at $p < 0.001$

Table 2. Crude associations between covariates and psychotropic drug use

| | Psychotropic drug use | | | |
| | Men | | Women | |
| | Use (N) | Use (%) | Use (N) | Use (%) |
|---|---|---|---|---|
| **Age (years)** | | *** | | *** |
| < 30 | 68 | 13.10 | 247 | 29.23 |
| 30-39 | 174 | 17.21 | 373 | 27.82 |
| 40-49 | 179 | 20.96 | 472 | 35.44 |
| 50 or more | 155 | 21.74 | 376 | 38.06 |
| **Marital status** | | * | | *** |
| Married, cohabiting | 370 | 17.52 | 855 | 29.95 |
| Single, separated, divorced, widowed | 208 | 20.95 | 614 | 36.99 |
| **Presence of children** | | NS | | ** |
| Yes | 303 | 18.21 | 765 | 30.91 |
| No | 274 | 19.07 | 701 | 34.58 |
| **Education** | | * | | * |
| Primary, lower vocational, lower secondary | 260 | 19.27 | 545 | 34.69 |
| Upper secondary | 101 | 22.10 | 351 | 33.82 |
| University | 215 | 16.67 | 574 | 30.18 |
| **Occupation** | | ** | | NS |
| Blue collar worker | 127 | 16.34 | 52 | 29.21 |
| Clerks, service workers | 133 | 23.25 | 793 | 32.92 |
| Associate professionals | 207 | 18.84 | 520 | 33.31 |
| Managers, professionals | 110 | 17.03 | 100 | 28.90 |
| **Working hours a week** | | NS | | NS |
| <40 | 330 | 19.20 | 1164 | 31.92 |
| ≥40 | 222 | 17.93 | 265 | 35.15 |
| **Night work** | | ** | | * |
| No | 499 | 18.02 | 1362 | 32.24 |
| Yes | 75 | 24.19 | 100 | 38.02 |
| **Number of physico-chemical exposures** | | NS | | *** |
| 0 | 285 | 17.25 | 951 | 31.23 |
| 1 | 85 | 19.36 | 297 | 33.87 |
| 2 | 69 | 21.63 | 114 | 32.76 |
| ≥ 3 | 139 | 19.97 | 111 | 44.22 |
| **Self-reported health** | | *** | | *** |
| Good | 404 | 14.65 | 1040 | 26.73 |
| Poor | 172 | 50.29 | 428 | 69.26 |
| **Depressive symptoms** | | *** | | *** |
| No | 237 | 10.50 | 838 | 24.12 |
| Yes | 324 | 42.52 | 602 | 64.59 |

Chi-Square test *: p<0.05  **: p<0.01  ***: p<0.001

Table 3. Exposure to bullying and psychotropic drug use according to logistic regression analysis

| | Psychotropic drug use | | | |
| | Men | | Women | |
| | OR | 95% CI | OR | 95% CI |
|---|---|---|---|---|
| **Exposure to bullying** | | | | |
| No | 1 | | 1 | |
| Yes | **3.10** | **2.36-4.08** | **3.49** | **2.86-4.28** |
| **Exposure to bullying** | | | | |
| No exposure | 1 | | 1 | |
| Past exposure | **2.28** | **1.10-4.71** | **3.09** | **2.14-4.47** |
| Current exposure | **3.22** | **2.40-4.32** | **3.56** | **2.82-4.51** |
| **Frequency of exposure to bullying** | | | | |
| No exposure | 1 | | 1 | |
| Weekly | **2.30** | **1.58-3.33** | **2.96** | **2.23-3.92** |
| Daily or almost daily | **4.36** | **2.97-6.40** | **4.06** | **3.10-5.33** |
| **Duration of exposure to bullying** | | | | |
| No exposure | 1 | | 1 | |
| < 2 y | **2.95** | **1.87-4.64** | **3.03** | **2.26-4.06** |
| $\geq$ 2 y, but < 5 y | **2.65** | **1.75-4.00** | **3.94** | **2.85-5.44** |
| 5 years or more | **4.25** | **2.55-7.09** | **3.84** | **2.50-5.89** |
| **Observer of bullying** | | | | |
| No | 1 | | 1 | |
| Yes | **1.92** | **1.58-2.34** | **1.92** | **1.68-2.21** |
| **Combination exposure to bullying/observer** | | | | |
| No exposure | 1 | | 1 | |
| Observer | **1.71** | **1.37-2.13** | **1.55** | **1.33-1.81** |
| Exposure to bullying | **4.84** | **2.70-8.66** | **3.12** | **2.12-4.61** |
| Exposure to bullying and observer | **3.45** | **2.52-4.71** | **4.32** | **3.41-5.46** |

OR: odds ratio CI: confidence interval

OR adjusted for age, marital status, presence of children, education, occupation, working hours a week, night work, and physico-chemical exposures

Bold OR: significant at 5%

All bullying variables were significant at $p < 0.001$

Table 4. Factors associated with psychotropic drug use according to logistic regression analysis

| | Psychotropic drug use | | | |
| | Men (N=2911) | | Women (N=4322) | |
| | OR | 95% CI | OR | 95% CI |
|---|---|---|---|---|
| **Exposure to bullying** | \*\*\* | | \*\*\* | |
| No | 1 | | 1 | |
| Yes | **3.10** | **2.36-4.08** | **3.49** | **2.86-4.28** |
| **Age (years)** | \*\*\* | | \*\*\* | |
| < 30 | 1 | | 1 | |
| 30-39 | **1.56** | **1.12-2.17** | 1.01 | 0.81-1.25 |
| 40-49 | **2.06** | **1.46-2.90** | **1.44** | **1.15-1.78** |
| 50 or more | **2.32** | **1.64-3.29** | **1.53** | **1.23-1.90** |
| **Marital status** | \*\* | | \*\*\* | |
| Married, cohabiting | 1 | | 1 | |
| Single, separated, divorced, widowed | **1.40** | **1.09-1.78** | **1.31** | **1.14-1.51** |
| **Presence of children** | | | | |
| Yes | 1 | | 1 | |
| No | 1.01 | 0.80-1.28 | 1.09 | 0.93-1.27 |
| **Education** | | | | |
| Primary, lower vocational, lower secondary | 1.17 | 0.89-1.54 | **1.22** | **1.01-1.48** |
| Upper secondary | 1.30 | 0.96-1.77 | 1.19 | 0.99-1.43 |
| University | 1 | | 1 | |
| **Occupation** | \* | | | |
| Blue collar worker | **0.61** | **0.41-0.92** | 0.78 | 0.49-1.24 |
| Clerks, service workers | 1.01 | 0.70-1.46 | 1.06 | 0.78-1.42 |
| Associate professionals | 0.82 | 0.60-1.11 | 1.18 | 0.89-1.56 |
| Managers, professionals | 1 | | 1 | |
| **Working hours a week** | | | | |
| <40 | 1 | | 1 | |
| ≥40 | 0.94 | 0.77-1.16 | 1.08 | 0.90-1.29 |
| **Night work** | \* | | | |
| No | 1 | | 1 | |
| Yes | **1.35** | **1.00-1.83** | 1.21 | 0.92-1.60 |
| **Number of physico-chemical exposures** | | | \* | |
| 0 | 1 | | 1 | |
| 1 | 1.20 | 0.90-1.59 | 1.06 | 0.89-1.25 |
| 2 | **1.49** | **1.07-2.06** | 0.98 | 0.76-1.26 |
| ≥ 3 | 1.27 | 0.97-1.67 | **1.56** | **1.18-2.08** |

OR: odds ratio CI: confidence interval
\*: p<0.05  \*\*: p<0.01  \*\*\*: p<0.001
Bold OR: significant at 5%

Table 5. Exposure to bullying and psychotropic drug use according to logistic regression analysis including additional adjustment for self-reported health and depressive symptoms

| | Psychotropic drug use | | | |
| | Men | | Women | |
| | OR | 95% CI | OR | 95% CI |
|---|---|---|---|---|
| **Exposure to bullying** | | | *** | |
| No | 1 | | 1 | |
| Yes | 1.31 | 0.95-1.80 | **1.78** | **1.41-2.24** |
| **Exposure to bullying** | | | *** | |
| No exposure | 1 | | 1 | |
| Past exposure | 1.39 | 0.62-3.12 | **2.16** | **1.44-3.23** |
| Current exposure | 1.29 | 0.92-1.81 | **1.60** | **1.23-2.10** |
| **Frequency of exposure to bullying** | | | *** | |
| No exposure | 1 | | 1 | |
| Weekly | 1.11 | 0.73-1.68 | **1.56** | **1.13-2.14** |
| Daily or almost daily | **1.59** | **1.03-2.45** | **2.00** | **1.48-2.72** |
| **Duration of exposure to bullying** | | | *** | |
| No exposure | 1 | | 1 | |
| < 2 y | 1.14 | 0.69-1.89 | **1.55** | **1.12-2.15** |
| ≥ 2 y, but < 5 y | 1.12 | 0.70-1.78 | **1.86** | **1.30-2.68** |
| 5 years or more | **2.02** | **1.14-3.60** | **2.22** | **1.37-3.60** |
| **Observer of bullying** | * | | *** | |
| No | 1 | | 1 | |
| Yes | **1.28** | **1.03-1.60** | **1.32** | **1.13-1.54** |
| **Combination exposure to bullying/observer** | | | *** | |
| No exposure | 1 | | 1 | |
| Observer | **1.29** | **1.02-1.65** | **1.23** | **1.04-1.46** |
| Exposure to bullying | 1.65 | 0.87-3.13 | **1.82** | **1.19-2.79** |
| Exposure to bullying and observer | 1.40 | 0.98-2.02 | **1.95** | **1.49-2.55** |

OR: odds ratio CI: confidence interval
OR adjusted for age, marital status, presence of children, education, occupation, working hours a week, night work, physico-chemical exposures, self-reported health, and depressive symptoms
*: p<0.05  **: p<0.01  ***: p<0.001
Bold OR: significant at 5%