

# Workplace Bullying and Sleep Disturbances: Findings from a Large Scale Cross-Sectional Survey in the French Working Population

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**Study Objectives:** The purpose of this study was to explore the associations between workplace bullying, the characteristics of workplace bullying, and sleep disturbances in a large sample of employees of the French working population.

**Design:** Workplace bullying, evaluated using the validated instrument developed by Leymann, and sleep disturbances, 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, physical and 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.

**Setting:** General working population.

**Participants:** The study population consisted of a random sample of 3132 men and 4562 women of the working population in the southeast of France.

**Results:** Workplace bullying was strongly associated with sleep disturbances. Past exposure to bullying also increased the risk for this out-

come. The more frequent the exposure to bullying, the higher the risk of experiencing sleep disturbances. Observing someone else being bullied in the workplace was also associated with the outcome. Adjustment for covariates did not modify the results. Additional adjustment for self-reported health and depressive symptoms diminished the magnitude of the associations that remained significant.

**Conclusions:** The prevalence of workplace bullying (around 10%) was found to be high in this study as well as the impact of this major job-related stressor on sleep disturbances. Although no conclusion about causality could be drawn from this cross-sectional study, the findings suggest that the contribution of workplace bullying to the burden of sleep disturbances may be substantial.

**Keywords:** Sleep disturbances, workplace bullying

**Citation:** Niedhammer I; David S; Degioanni S; Drummond A; Philip P. Workplace bullying and sleep disturbances: findings from a large scale cross-sectional survey in the French working population. *SLEEP* 2009;32(9):1211-1219.

SLEEP DISORDERS MAY BE HIGHLY PREVALENT AMONG MIDDLE-AGED POPULATIONS; STUDIES HAVE REPORTED PREVALENCES RANGING FROM 10% TO 40% in working populations,<sup>1-13</sup> with insomnia being one of the most common disorders. In addition, a 1995 study estimated the direct costs of insomnia to be more than \$2 billion in France.<sup>14</sup> Consequently, sleep disorders may be a serious public health issue because of the high prevalence of these disorders and their social and economic consequences. Poor sleep may also be associated with occupational and health-related problems, such as an increased risk of accidents, mortality, and illnesses, including, for example, coronary heart disease, diabetes, and mental disorders. Poor sleep is also associated with workplace absence due to sickness and with reduced productivity.<sup>15-18</sup> The causes of poor sleep are complex and certainly multifactorial. Studies have reported the following risk factors for having a sleep disorder: older age, female sex, low socioeconomic status, living alone, and some environmental and occupational factors, as well as poor mental and psychological health.<sup>2-4,7-9,11,19,20</sup>

Research has been undertaken that targets sleep disorders in the working population, and numerous studies have fo-

cused on shift work and its association with sleep.<sup>21,22</sup> The association between work and sleep has been considered to be worth studying because sleep disorders are expected to occur in people of working age and because psychosocial aspects of work, such as job stress, may be strongly related to sleep and sleep problems. Some studies have shown that measures of job stress, such as perceived stress, hectic work, high job demands, working under time pressure, low job control, high job strain, low social support at work, bad atmosphere at work, role conflicts, effort-reward imbalance, job dissatisfaction, low levels of interest in job, and job insecurity are associated with sleep disorders.<sup>1-7,9-13,19,20,23-27</sup> These studies, however, were done on relatively small or selective samples, examined nonstandard measures for the assessment of job-related factors, or did not take adequate account of potential confounding factors such as sociodemographic factors, physical and psychological health status, or important occupational risk factors such as shift work and working hours. Furthermore, the effects of workplace bullying, considered to be one of the most damaging factors related to job stress, on sleep disorders have been understudied, and the literature in this area appears to be sparse.<sup>3,28-30</sup>

Workplace bullying is difficult to evaluate, and no consensus exists regarding its definition. Here, the definition by Leymann<sup>31</sup> was adopted: workplace bullying or mobbing “involves hostile and unethical communication, which is directed in a systematic way by one or a few individuals mainly towards one individual who, due to mobbing, is pushed into a helpless and defenceless position, being held there by means of continuing mobbing activities.” Two approaches using self-reported ques-

Submitted for publication October, 2008

Submitted in final revised form June, 2009

Accepted for publication June, 2009

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tionnaires have been developed in surveys: (1) inventories of various forms of bullying and (2) self-reports 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.<sup>30,32-34</sup> Duration and frequency of bullying would also be crucial elements. In the present study, we combined the 2 approaches: (1) the questionnaire developed by Leymann—the Leymann Inventory of Psychological Terror<sup>35</sup>—considered to have the greatest coverage and acceptable reliabilities<sup>36</sup> and evaluating 45 forms of bullying and (2) self-report of being exposed to bullying.

Studies exploring the associations between workplace bullying and health outcomes are still lacking. Nevertheless, workplace bullying has been found to be associated with absence due to sickness,<sup>37</sup> psychosomatic complaints and somatic symptoms,<sup>38-40</sup> and mental health outcomes, such as job-induced stress, psychological health and well-being, anxiety, depression,<sup>29,30,39-47</sup> use of psychotropic drugs,<sup>28,30</sup> and physician-diagnosed psychiatric morbidity.<sup>48</sup>

The objectives of this study were to examine the associations between workplace bullying and sleep disturbances. This study attempted to take the limitations described above into account; because it was based on a large and nonselective sample of the French working population, this study included a standard measure of exposure to workplace bullying and detailed information on this exposure and took into account a large number of confounding factors.

## METHODS

### Study Sample

This cross-sectional survey was performed by the National Institute for Health and Medical Research (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, each selected 150 employees 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, the examination was performed annually. 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 to the INSERM. 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 or severe sleep disorders 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.<sup>49-51</sup>

### Measurement of Workplace Bullying

Our questionnaire included the French version of the Leymann Inventory of Psychological Terror, measuring the experience of 45 forms of bullying within the previous 12 months,

as well as the frequency and duration of the bullying. The 45 forms of bullying, derived from interviews and heuristic analyses by Leymann,<sup>31</sup> are presented in 5 thematic sections, with assignment to section dependent on the effects these situations may have on the victim: social relationships (no possibility to communicate, verbal aggression, criticism, etc.), exclusion (isolation, rejection, etc.), job situations and tasks (no tasks, too many tasks, uninteresting tasks, humiliating tasks, tasks inferior or superior to skills, etc.), personal attacks (attacks on opinions or origins, rumors, gossiping, etc.), and physical violence and threats of physical violence (including sexual harassment). Afterward, the employees were given the following definition developed by the authors: “Bullying may be defined by a situation in which someone is exposed to hostile behavior on the part of one or more persons in the work environment that 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 previous 12 months. Cases of bullying were defined using both the definition of Leymann, i.e., exposure to at least 1 form of bullying within the previous 12 months, weekly or more, and for at least 6 months,<sup>31</sup> and the self-report of being exposed to bullying, as has been previously recommended.<sup>30,32-34</sup> The psychometric properties of the French version of the Leymann Inventory of Psychological Terror questionnaire were studied in a previous paper,<sup>49</sup> and we found that the combined evaluation of bullying increased the convergent and predictive validity compared with Leymann’s definition alone.

Several variables were used to characterize the exposure to workplace bullying within the previous 12 months: period of exposure (current or past), frequency and duration of exposure, and the fact that the employees may have been observers of bullying directed toward someone else at their workplace within the past 12 months. We also constructed a variable combining the 2 variables of exposure to bullying and observation of bullying by creating 4 categories: no exposure at all, observer of bullying, exposure to bullying, and both exposure to bullying and observer of bullying.

### Measurement of Sleep Disturbances

Sleep disturbances were measured using 2 items evaluating difficulty initiating sleep and difficulty returning to sleep after experiencing a premature awakening. These 2 items were based on 4 response categories, which were “no trouble at all,” “a little trouble,” “some trouble,” and “a great deal of trouble.” These items were dichotomized to distinguish people with no or little trouble and those with some or a great deal of trouble. Thereafter, sleep disturbances were defined by either trouble initiating sleep or trouble returning to sleep after experiencing a premature awakening, or both.

### Covariates

Several variables were used as covariates: age, marital status, presence of children in the home, education level, occupation groups, working hours per week, night work (time schedules involving night work, such as permanent night work or alternating shifts including night shift), and the number of physical or

chemical exposures at work, exposure to temperature extremes (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 Center for Epidemiologic Studies Depression scale<sup>50</sup> and defined using the available thresholds established for the French population ( $\geq 17$  for men and  $\geq 23$  for women) to dichotomize the score.<sup>52</sup>

## Statistical Analysis

First, the crude associations between 6 variables characterizing bullying (i.e., exposure, period, frequency, duration of bullying, and the 2 variables of observing bullying) and sleep disturbances were studied using the Pearson  $\chi^2$  test. The associations between covariates and sleep disturbances were also studied using the same test. Next, we used logistic regression analysis to adjust for the same covariates (except self-reported health and depressive symptoms). Consequently, we constructed 6 different models with sleep disturbances as the dependent variable. In each model, we included as independent variables 1 of the 6 variables describing bullying, as well as the covariates. Additional models were also performed with additional adjustment for poor self-reported health and depressive symptoms.

Statistical analysis was performed using SAS (SAS, Inc., Cary, NC).<sup>53</sup> Because differences in the prevalence of occupational exposures (bullying) and of health outcomes (sleep disturbances) may be observed in men and women and because the associations between exposures and outcomes may also differ between sexes, analysis was carried out separately for men and women.<sup>54</sup>

## RESULTS

### Description of the Study Sample

In 2004, 19,655 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 response to the question on male or female sex was missing in the questionnaire. Thus, the study was based on 7694 employees—3132 men and 4562 women—with a mean age of 40 (SD: 10.3). A description of the study sample is shown in Table 1.

Table 2 describes the characteristics of bullying in the study sample. Leymann's definition alone (exposure to at least 1 form of bullying within the past 12 months, for more than 6 months, and weekly or more) led to a 12-month prevalence 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 9% and 11% for men and women, respectively. These results show that most of those defined as exposed to bullying using Leymann's definition also reported being exposed.

**Table 1**—Description of the Sample Studied

	Men n = 3132 No. (%)	Women n = 4562 No. (%)
Age, y		
< 30	523 (16.75)	853 (18.76)
30-39	1017 (32.56)	1349 (29.67)
40-49	862 (27.60)	1344 (29.57)
50+	721 (23.09)	1000 (22.00)
Marital status		
Married, cohabiting	2131 (68.06)	2876 (63.13)
Single, separated, divorced, widowed	1000 (31.94)	1680 (36.87)
Children present in the home		
Yes	1681 (53.76)	2497 (54.98)
No	1446 (46.24)	2045 (45.02)
Education		
Primary, lower vocational, lower secondary	1367 (43.79)	1589 (34.91)
Upper secondary	462 (14.80)	1044 (22.93)
University	1293 (41.41)	1919 (42.16)
Occupation		
Blue-collar worker	784 (25.14)	180 (3.97)
Clerk, service worker	582 (18.67)	2432 (53.64)
Associate professional	1104 (35.41)	1573 (34.69)
Manager, engineer	648 (20.78)	349 (7.70)
Work/wk, h		
< 40	1738 (58.26)	3680 (82.96)
$\geq 40$	1245 (41.74)	756 (17.04)
Night work		
No	2792 (89.92)	4258 (94.14)
Yes	313 (10.08)	265 (5.86)
Number of physico-chemical exposures		
0	1667 (53.23)	3079 (67.49)
1	443 (14.14)	883 (19.36)
2	322 (10.28)	348 (7.63)
$\geq 3$	700 (22.35)	252 (5.52)
Self-reported health		
Good	2766 (88.97)	3899 (86.28)
Poor	343 (11.03)	620 (13.72)
Depressive symptoms		
No	2270 (74.57)	3499 (78.82)
Yes <sup>a</sup>	774 (25.43)	940 (21.18)
Sleep disturbances		
No	2597 (82.92)	3548 (77.77)
Yes	535 (17.08)	1014 (22.23)

<sup>a</sup>Center for Epidemiologic Studies Depression score  $\geq 17$  for men and  $\geq 23$  for women

### Crude Associations Between Bullying and Sleep Disturbances

Table 3 provides the results of the associations between the variables of bullying and sleep disturbances. All of these associations were strongly significant at  $P < 0.001$ . The prevalence of sleep disturbances 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 a higher risk of having sleep disturbances than were those who had never been exposed. The more frequent the exposure to workplace bullying, the higher the prevalence of sleep disturbances. No dose-response association was observed between the duration

**Table 2**—Description of Exposure to Bullying within the Previous 12 Months

	Men n = 3132 No. (%)	Women n = 4562 No. (%)
Exposed to bullying		
No	2857 (91.22)	4074 (89.30)
Yes	275 (8.78)	488 (10.70)
Timeframe of exposure to bullying		
None	2857 (91.34)	4074 (89.46)
Past	38 (1.21)	130 (2.85)
Current	233 (7.45)	350 (7.69)
Frequency of exposure to bullying		
None	2857 (91.22)	4074 (89.30)
Weekly	149 (4.76)	225 (4.93)
Daily or almost daily	126 (4.02)	263 (5.77)
Duration of exposure to bullying, y		
0	2857 (91.22)	4074 (89.31)
< 2	94 (3.00)	209 (4.58)
≥ 2 < 5	114 (3.64)	179 (3.92)
5+	67 (2.14)	100 (2.19)
Observer of bullying		
No	2165 (69.13)	3115 (68.28)
Yes	967 (30.87)	1447 (31.72)
Was bullied or observed bullying		
Neither	2111 (67.40)	2998 (65.72)
Observed bullying	746 (23.82)	1076 (23.59)
Was bullied	54 (1.72)	117 (2.56)
Both	221 (7.06)	371 (8.13)

**Table 3**—Associations between Exposure to Bullying and Prevalence of Sleep Disturbances (No, %)

	Men No. (%)	Women No. (%)
Exposed to bullying		
No	416 (14.56)	777 (19.07)
Yes	119 (43.27)	237 (48.57)
Timeframe of exposure to bullying		
None	416 (14.56)	777 (19.07)
Past	5 (13.16)	49 (37.69)
Current	113 (48.50)	183 (52.29)
Frequency of exposure to bullying		
None	416 (14.56)	777 (19.07)
Weekly	55 (36.91)	103 (45.78)
Daily or almost daily	64 (50.79)	134 (50.95)
Duration of exposure to bullying, y		
0	416 (14.56)	777 (19.07)
< 2	40 (42.55)	89 (42.58)
≥ 2 < 5	47 (41.23)	96 (53.63)
5+	32 (47.76)	52 (52.00)
Observer of bullying		
No	272 (12.56)	553 (17.75)
Yes	263 (27.20)	461 (31.86)
Was bullied or observed bullying		
Neither	249 (11.80)	508 (16.94)
Observed bullying	167 (22.39)	269 (25.00)
Was bullied	23 (42.59)	45 (38.46)
Both	96 (43.44)	192 (51.75)

Data were analyzed using the  $\chi^2$  test. All associations are significant at  $P < 0.001$ .

of exposure to bullying and sleep disturbances; the prevalence of sleep disturbances was high whatever the duration of bullying. Observing bullying was also associated with an increase in the prevalence of sleep disturbances. The study of the combination of exposure to bullying and observing bullying led to different results for men and women. For men, the highest prevalence of sleep disturbances was observed for those exposed to bullying (with or without observing it), and, for women, the highest prevalence found among those who were simultaneously exposed to bullying and observers of bullying.

### Crude Associations Between Covariates and Sleep Disturbances

Except for the covariates of marital status and occupation, the associations between the covariates studied and sleep disturbances were found to be significant at least for 1 sex (Table 4). The prevalence of sleep disturbances increased with age, among men who had children, among women who had a lower education level, among those working 40 hours or more a week, among women who worked at night, and among those exposed to physical-chemical exposures at work. The prevalence of sleep disturbances also increased strongly with poor self-reported health and depressive symptoms.

### Associations Between Bullying and Sleep Disturbances After Controlling for Covariates

Table 5 provides the results of logistic regression analysis. Each model shows the association between each variable of

bullying and sleep disturbances after adjustment for covariates. All of these associations were strongly significant at  $P < 0.001$ , suggesting that covariates did not modify the strong associations observed in Table 3. Exposure to workplace bullying within the last 12 months was found to be a strong risk factor for sleep disturbances. Past exposure to bullying also increased this risk among women. The more frequent the exposure to bullying, the higher the prevalence of sleep disturbances. Observing bullying of someone else increased the risk of having sleep disturbances. The combination of exposure to bullying and observing bullying at the workplace led to the highest increase in risk for women.

Additional adjustment for poor self-reported health and depressive symptoms led to a reduction in the magnitude of the odds ratios, but the associations remained significant at  $P < 0.01$  (Table 6). These additional results confirmed those provided in Table 5. Note that dose-response associations were observed for duration of bullying for both sexes.

## DISCUSSION

### Main Findings

The results of this study show that workplace bullying was strongly associated with sleep disturbances. Past exposure to bullying increased the risk of sleep disturbances among women, and, the more frequent the exposure to bullying, the higher this risk. Observing bullying of someone else at the workplace



**Table 4**—Associations between Covariates and Prevalence of Sleep Disturbances (No, %)

	Men		Women	
	No.	% <sup>a</sup>	No.	% <sup>b</sup>
Age, y				
< 30	70	13.38	140	16.41
30-39	169	16.62	266	19.72
40-49	161	18.68	297	22.10
50+	134	18.59	304	30.40
Marital status		NS		NS
Married, cohabiting	373	17.50	620	21.56
Single, separated, divorced, widowed	162	16.20	392	23.33
Children present in the household		<sup>c</sup>		NS
Yes	320	19.04	563	22.55
No	215	14.87	443	21.91
Education		NS		<sup>c</sup>
Primary, lower vocational, lower secondary	240	17.56	397	24.93
Upper secondary	76	16.45	229	21.93
University	217	16.78	386	20.11
Occupation		NS		NS
Blue collar worker	121	15.43	46	25.56
Clerk, service worker	109	18.73	551	22.66
Associate professional	198	17.93	348	22.12
Manager, engineer	107	16.51	67	19.20
Work/wk, h		<sup>c</sup>		<sup>b</sup>
< 40	267	15.36	779	21.17
≥ 40	247	19.84	204	26.98
Work at night		NS		<sup>a</sup>
No	472	16.91	933	21.91
Yes	62	19.81	73	27.55
Physical-chemical exposures, no.		<sup>c</sup>		<sup>b</sup>
0	249	14.94	608	19.75
1	87	19.64	231	26.16
2	55	17.08	90	25.86
≥ 3	144	20.57	85	33.73
Self-reported health		<sup>b</sup>		<sup>b</sup>
Good	360	13.02	614	15.75
Poor	173	50.44	395	63.71
Depressive symptoms		<sup>b</sup>		<sup>b</sup>
No	206	9.09	466	13.32
Yes <sup>d</sup>	320	41.34	524	55.74

Results of  $\chi^2$  test<sup>a</sup>P < 0.05<sup>b</sup>P < 0.001<sup>c</sup>P < 0.01<sup>d</sup>CES-D score ≥ 17 for men and ≥ 23 for women**Table 5**—Exposure to Bullying and Sleep Disturbances According to Logistic Regression Analysis

	Men OR (95% CI)	Women OR (95% CI)
Exposed to bullying		
No	1	1
Yes	4.40 (3.35-5.78)	3.83 (3.12-4.70)
Timeframe of exposure to bullying		
None	1	1
Past	0.91 (0.35-2.38)	2.63 (1.80-3.86)
Current	5.47 (4.09-7.32)	4.35 (3.44-5.51)
Frequency of exposure to bullying		
None	1	1
Weekly	3.25 (2.27-4.66)	3.38 (2.54-4.49)
Daily or almost daily	6.34 (4.31-9.33)	4.28 (3.27-5.60)
Duration of exposure to bullying, y		
0	1	1
< 2	4.52 (2.91-7.03)	3.22 (2.38-4.34)
≥ 2 < 5	4.20 (2.81-6.28)	4.63 (3.37-6.36)
5+	4.58 (2.74-7.66)	3.91 (2.57-5.95)
Observer of bullying		
No	1	1
Yes	2.53 (2.07-3.09)	2.20 (1.89-2.57)
Was bullied or observed bullying		
Neither	1	1
Observed bullying	2.08 (1.66-2.62)	1.70 (1.42-2.03)
Was bullied	5.33 (2.96-9.60)	3.04 (2.03-4.55)
Both	5.71 (4.18-7.79)	5.12 (4.03-6.50)

Odds ratio (OR) adjusted for age, marital status, presence of children in the home, education level, occupation, number of hours working per week, working at night, and physical-chemical exposures with 95% confidence intervals (CI).

All bullying variables were significant at P < 0.001.

was a risk factor for having sleep disturbances. Women exposed to both bullying and observing the bullying were at particular increased risk of having sleep disturbances. All of these associations were independent of potential confounding factors.

### Strengths and Limitations of the Study

The response rate may be considered low (40%), but it is similar to that of previous studies on this sensitive topic.<sup>42,55-57</sup> Selection bias may not be ruled out, but the differences between respondents and nonrespondents were small for the questions

regarding sex, age, economic activities, and occupation. In addition, a comparison between the census population and the sample studied suggested that the study sample was roughly representative for age, economic activities, and occupations.<sup>49</sup> In addition, this potential selection bias may have an impact on prevalence estimates of workplace bullying for example, but it seems unlikely that it has greatly altered the association between workplace bullying and sleep disturbances.

A healthy-worker effect may have been a factor if people in poor health shifted to less exposed jobs or left their jobs, leading to a potential underestimation of the association between workplace bullying and sleep disturbances. This is reinforced by the fact that this survey included employees who were working at the time of the survey and did not include employees who were absent due to illness within the survey period, including those who were on sick leave because of the health consequences of workplace bullying. This suggests that our findings on the associations between workplace bullying and sleep disturbances are more likely to be underestimated than overestimated.

The cross-sectional design of our study did not allow us to make conclusions on the causal nature of the association between workplace bullying and sleep disturbances, and a reverse causation may not be excluded (workers with sleep disturbances may be more likely to be exposed to bullying). A reporting bias may also be suspected because both workplace bully-

**Table 6**—Exposure to Bullying and Sleep Disturbances According to Logistic Regression Analysis Including Additional Adjustment for Poor Self-Reported Health and Depressive Symptoms

	Men		Women	
	OR	95% CI	OR	95% CI
Exposed to bullying	<sup>a</sup>		<sup>a</sup>	
No	1		1	
Yes	1.84	1.34-2.53	1.60	1.26-2.05
Timeframe of exposure to bullying	<sup>a</sup>		<sup>a</sup>	
Never	1		1	
Past	0.34	0.11-1.06	1.58	1.02-2.47
Current	2.29	1.64-3.22	1.61	1.21-2.13
Frequency of exposure to bullying	<sup>a</sup>		<sup>a</sup>	
None	1		1	
Weekly	1.48	0.98-2.24	1.47	1.05-2.06
Daily or almost daily	2.39	1.54-3.71	1.73	1.26-2.38
Duration of exposure to bullying, y	<sup>b</sup>		<sup>a</sup>	
0	1		1	
< 2	1.73	1.05-2.85	1.33	0.94-1.90
≥ 2 < 5	1.74	1.09-2.77	1.82	1.25-2.65
5+	2.21	1.23-3.96	1.87	1.14-3.06
Observed bullying	<sup>a</sup>		<sup>b</sup>	
No	1		1	
Yes	1.71	1.37-2.14	1.30	1.09-1.56
Was bullied or observed bullying	<sup>a</sup>		<sup>a</sup>	
Neither	1		1	
Observed bullying	1.60	1.25-2.05	1.20	0.98-1.47
Was bullied	1.71	0.89-3.30	1.46	0.91-2.34
Both	2.38	1.66-3.40	1.81	1.36-2.40

Odds ratio (OR) adjusted for age, marital status, presence of children in the home, education level, occupation, number of hours working per week, working at night, physical-chemical exposures, self-reported health, and depressive symptoms with 95% confidence intervals (CI).

<sup>a</sup>P < 0.001

<sup>b</sup>P < 0.01

ing and sleep disturbances 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 bullying and outcome.

Another limitation is related to the use of a rather crude measure for sleep disturbances (already used by others)<sup>58</sup> that did not allow us to study severity and duration of these disturbances. We also studied sleep disturbances by a score higher than 4 on the basis of the sum of the 2 initial items (score ranging from 2 to 8) and found very similar results to those provided in our Tables, confirming the robustness of our results. We were also able to study the 2 subtypes of sleep disturbances (trouble falling asleep and trouble staying asleep) separately and found significant associations between all bullying variables and both subtypes of sleep disturbances, even after adjustment for all covariates. Stronger associations (odds ratios of larger magnitude) were observed for trouble staying asleep. In addition, because strong and consistent associations were found between classic risk factors (age, educa-

tion, working hours, night work, physical-chemical exposures at work, self-reported health, and depressive symptoms) and sleep disturbances, these results reinforce the validity of our study. Finally, our study did not include some previously reported risk factors for having sleep disturbances, such as use of alcohol and stimulants (e.g., caffeine or tobacco), poor sleeping environment, specific family stressors, and medical and psychiatric history. However, it seems unlikely that these factors would completely explain the strong associations observed here between workplace bullying and sleep disturbances.

The strengths of this study were (1) 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<sup>54</sup>; (2) a validated instrument was used to measure workplace bullying (Leymann Inventory of Psychological Terror), and various variables were constructed to describe the exposure to workplace bullying, which has never been done in the study of sleep disturbances, and provided detailed information on exposure to bullying and its associations with sleep disturbances; and (3) the statistical analysis took into account important covariates—sociodemographic and occupational factors—and these covariates did not modify the strong associations between bullying and sleep disturbances. Additional adjustment for health-related variables diminished the associations that remained significant. It is likely that the additional adjustment for poor self-reported health and depressive symptoms constitutes an overadjustment because self-reported health and depressive symptoms may be intermediate variables between workplace bullying and sleep disturbances,<sup>37,47,50</sup> or even consequences of sleep disturbances.<sup>15,16,18</sup> Consequently, the actual associations between bullying and sleep disturbances may be closer to those observed in Table 5.

We also observed that the associations between bullying and sleep disturbances were significant after adjustment for the psychosocial work factors by Karasek (i.e., psychological demands, decision latitude, and social support), although the magnitude of the associations was somewhat reduced. Note, however, that adjusting for psychosocial work factors may lead to underestimation of the effects of workplace bullying on sleep disturbances because these factors may be considered as risk factors for being bullied. We also performed an additional analysis stratified on social support at work and observed results that were different according to sex: the association between bullying and sleep disturbances was no longer significant among men with high levels of social support at work, whereas this association remained significant among women with high levels of support. These findings suggest, at least partly, that social support at work may act as a buffer on the association between bullying and sleep disturbances or that workplaces with high levels of social support may promote better working conditions with lower levels of bullying. Indeed, we observed that high social support was significantly associated with a lower prevalence of bullying and a lower frequency and duration of bullying, as well as a lower prevalence of observing someone else being bullied.

## Comparison with the Literature

Few studies have examined the association between workplace bullying and sleep disturbances. The study by Eriksen

et al.<sup>3</sup> showed that exposure to threats and violence at work predicted poor sleep quality in a population of nurses' aides in Norway, after adjustment for age, sex, marital status, presence of preschool-aged children in the household, and other occupational factors. Vartia et al.<sup>30</sup> reported that bullied employees used sleep-inducing drugs and sedatives more often than did subjects who were not bullied; observers were also more likely to use sleep-inducing drugs and sedatives, as compared with the subjects who were not bullied, but the use of these drugs did not correlate with the duration or the frequency of bullying. In this study, based on a sample of Finnish municipal employees, no information was provided on confounding factors. In these 2 studies, the measurement of bullying or sleep-related outcomes was based on a single item. Other studies have underlined the association between low levels of social support at work and sleep disorders.<sup>3,6,9,19,20,59</sup> Authors have studied other markers, such as bad perceived atmosphere at work, that can also be considered as proxies of the quality of interpersonal relationships at work.<sup>4</sup>

Our results are in agreement with the results of these studies. Our finding of dose-response associations between frequency (and partly duration) of exposure to bullying and sleep disturbances have not been previously reported. Past exposure to bullying still had an impact on sleep disturbances among women, highlighting the long-term effects of bullying, even when the exposure had stopped. Finally, being an observer of bullying was a risk factor for having sleep disturbances, and the combination of exposure to bullying and observing bullying was still a stronger risk factor, especially for women. Our results are in agreement with the study by Vartia et al.,<sup>30</sup> who found an association between observing bullying and the use of sleep-inducing drugs and sedatives, although these authors did not distinguish, among people observing bullying, between those who were directly exposed to bullying and those who were not.

## Conclusion

Our findings highlight the strong association between workplace bullying and sleep disturbances and suggest that workplaces that are prone to bullying may have a detrimental effect on employees' sleep, even if employees are not directly concerned by the phenomenon. Given the high prevalence of workplace bullying observed in France, and its impact on sleep, it may be assumed that such a job-stress factor may substantially contribute to the burden of sleep-related disorders. Because this study did not provide information about causality, more prospective studies are needed to better understand bullying, its determinants, and its consequences. Efforts toward prevention should also be increased.

## ACKNOWLEDGMENTS

The authors thank Drs. JL Battu, C Beyssier, N Blanchet, C Breton, M Buono-Michel, JF Canonne, G Dalivoust, A Faivre, F Fournier, G Gazazian, G Gibelin-Dol, E Griffaton, T Ibagnes, B Jaubert, J Leroy, M Lozé, G Magallon, P Presseq, G Roux, and C Vitrac, as well as Drs. J Chiaroni, C Kaltwasser, and M Signouret, for their help in constructing the network of voluntary occupational physicians, and, last but not least, S Mocaer

and P Sotty for their support and interest in this research program. A pretest of this survey was performed in 2003 thanks to the contribution of Drs. AM Boustière, C Breton, C Cervoni, A Faivre, C Gravier, E Halimi, M Isnard, MC Jacquin, M Lafon-Borelli, J Laudicina, D Londi, M Lozé, G Magallon, V Marcelot, M Méric, C Milliet, F Occhipinti, P Occhipinti, H Raulot-Lapointe, and MO Vincensini. The authors' thanks also go to T Theorell for his help in providing the German version of the Leymann Inventory of Psychological Terror questionnaire and to I Revue and R Revue for their help in translating and back-translating this questionnaire. Finally, the authors thank all of the employees who participated to the survey and made this study possible. This study was supported by the DRTEFP PACA of the French Minister of Labor.

## Occupational Physicians

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## DISCLOSURE STATEMENT

This was not an industry supported study. The authors have indicated no financial conflicts of interest.

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