Psychosocial Stressors at Work and the Risk of Sickness Absence Due to a Diagnosed Mental Disorder
A Systematic Review and Meta-analysis

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IMPORTANCE Mental health problems are associated with considerable occupational, medical, social, and economic burdens. Psychosocial stressors at work have been associated with a higher risk of mental disorders, but the risk of sickness absence due to a diagnosed mental disorder, indicating a more severe condition, has never been investigated in a systematic review and meta-analysis.

OBJECTIVE To synthesize the evidence of the association of psychosocial stressors at work with sickness absence due to a diagnosed mental disorder among adult workers.

DATA SOURCES Seven electronic databases (MEDLINE, Embase, PsycInfo, Web of Science, CINAHL, Sociological Abstracts, and International Bibliography of the Social Sciences), 3 gray literature databases (Grey Literature Report, WHO-IRIS and Open Grey), and the reference lists of all eligible studies and reviews were searched in January 2017 and updated in February 2019.

STUDY SELECTION Only original prospective studies evaluating the association of at least 1 psychosocial stressor at work from the 3 most recognized theoretical models were eligible: the job demand-control-support model, including exposure to job strain (high psychological demands with low job control); effort-reward imbalance model; and organizational justice model. Study selection was performed in duplicate by blinded independent reviewers. Among the 28 467 citations screened, 23 studies were eligible for systematic review.

DATA EXTRACTION AND SYNTHESIS This meta-analysis followed the PRISMA and MOOSE guidelines. Data extraction and risk of bias evaluation, using the Risk of Bias in Nonrandomized Studies–Interventions tool, were performed in duplicate by blinded independent reviewers. Data were pooled using random-effect models.

MAIN OUTCOMES AND MEASURES Sickness absence due to a mental disorder with a diagnosis obtained objectively.

RESULTS A total of 13 studies representing 130 056 participants were included in the 6 meta-analyses. Workers exposed to low reward were associated with a higher risk of sickness absence due to a diagnosed mental disorder compared with nonexposed workers (pooled risk ratio [RR], 1.76 [95% CI, 1.49-2.08]), as were those exposed to effort-reward imbalance (pooled RR, 1.66 [95% CI, 1.37-2.00]), job strain (pooled RR, 1.47 [95% CI, 1.24-1.74]), low job control (pooled RR, 1.25 [95% CI, 1.02-1.53]), and high psychological demands (pooled RR, 1.23 [95% CI, 1.04-1.45]).

CONCLUSIONS AND RELEVANCE This meta-analysis found that workers exposed to psychosocial stressors at work were associated with a higher risk of sickness absence due to a mental disorder. A better understanding of the importance of these stressors could help physicians when evaluating their patients’ mental health and work capacity.
Mental disorders are a major cause of disability worldwide and one of the leading reasons for physician visits in the United States, Canada, and Europe. Working adults are particularly at risk for mental disorders. There is a significant association of mental disorders with work capacity and productivity, and approximately 33% of workers with mental disorders will be prescribed sick leave. Because of their high prevalence and recurrence, sickness absence (SAs) due to mental disorders are associated with considerable occupational, medical, social, and economic burdens.

Although approximately one-third of all absences from work certified by physicians are due to mental disorders, physicians have reported difficulties in assessing work capacity, particularly in the case of a mental disorder. Limited evidence is available on work-related factors associated with SAs due to a diagnosed mental disorder among adult workers.

There is cumulative evidence of the adverse association of these psychosocial stressors at work with the risk of mental disorders. The association of these stressors with the risk of SA due to a diagnosed mental disorder, an objective measure indicating a more severe condition, has never been investigated in a systematic review and meta-analysis, which can help physicians when evaluating their patients’ mental health and work capacity.

This systematic review and meta-analysis aimed to synthesize and evaluate the prospective evidence of the association of psychosocial stressors at work from the JDCS, ERI, and organizational justice models with SA due to a diagnosed mental disorder among adult workers.

**Methods**

**Specific Considerations**

This review follows the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) reporting guideline and the Meta-analysis of Observational Studies in Epidemiology (MOOSE) reporting guideline. The protocol was registered in PROSPERO (No. CRD42018091632) and published in 2018. The search strategy was created to conduct a broader systematic review of the association of psychosocial stressors at work with all mental disorders. The present review focuses on the association of these stressors with SA due to a diagnosed mental disorder. The association with depression and antidepressive medication use will be presented elsewhere (PROSPERO; No. CRD42018107666).

**Eligibility Criteria**

**Study Design**

Only original prospective studies that evaluated the association of at least 1 psychosocial stressor at work from the JDCS, ERI, or organizational justice models with SA due to a diagnosed mental disorder were included. Cross-sectional, qualitative, and case-control studies were excluded.

**Population**

The population of interest comprised working adults. Studies including only ill participants (eg, return-to-work or absence recurrence studies) were excluded to avoid reverse causality. For a comparison group to be eligible, the nonexposed group had to be from the same study population as the exposed group.

**Exposure**

Exposure to adverse psychosocial stressors at work from the JDCS, ERI, and organizational justice models were considered. These stressors include high psychological demands, low job control, low social support at work, high effort, low reward, and poor procedural, distributive, or relational justice. Combinations of these stressors from the 3 theoretical models were also considered: exposure to job strain, effort-reward imbalance, and low organizational justice. Only studies that measured these psychosocial stressors at work using validated tools or a proxy of validated tools (ie, translation) were included.

**Outcome**

The outcome of interest was SA due to a mental disorder with a medical diagnosis delivered by a physician. This outcome includes absences of different lengths (generally from 1 to 90 days).

**Key Points**

**Question**

Do psychosocial stressors at work increase the risk of sickness absence due to a diagnosed mental disorder?

**Findings**

In this systematic review and meta-analysis, psychosocial stressors at work were associated with an elevated risk of sickness absence due to a diagnosed mental disorder. The risk was up to 76% higher among workers exposed to these work stressors compared with nonexposed workers.

**Meaning**

Given that psychosocial stressors at work are frequent and modifiable, physicians should be aware of their importance when evaluating their patients’ mental health and work capacity.
Information Sources
Seven electronic databases were consulted: MEDLINE (all Ovid and MEDLINE databases, from 1946 to present), Embase, PsycINFO (Ovid), Web of Science, CINAHL (EBSCOhost), Sociological Abstracts, and International Bibliography of the Social Sciences. The reference lists of all eligible studies and all relevant reviews (systematic or narrative) were also consulted. Furthermore, 3 gray literature databases were consulted: Grey Literature Report, WHO-IRIS, and Open Grey. The complete search strategy was first performed in January 2017 and updated in October 2017. Another update was conducted in February 2019 for the 3 most important databases (MEDLINE, Embase, and PsycINFO).

Search Strategy
The search strategy combined 4 sets of keywords adapted to each database. First, terms that refer to (1) population (workers), (2) exposure (psychosocial stressors at work), and (3) outcome (mental disorders) were combined in 1 group. Second, concepts that referred to (4) both population and exposure (eg, work stress) were combined with the outcome terms in another group. Finally, these 2 groups were merged to obtain a pool of unique citations. The complete search strategy is available in eAppendix 1 in the Supplement.

Selection Process
All citations and abstracts were extracted from the databases, and duplicates were removed. All titles and abstracts were screened by 2 trained blinded independent reviewers (C.S.D. and K.A.) and classified into 4 groups: (1) yes: all eligibility criteria were clearly met; (2) maybe: eligibility criteria cannot be evaluated without consulting the full text; (3) no: at least 1 of the eligibility criteria was clearly not met; and (4) review: all nonoriginal papers related to the association of psychosocial stressors at work with mental disorders (ie, systematic and narrative reviews, book chapters, and commentaries). This latter group (ie, the review group) was used to screen the reference lists. All studies classified in 1 of the 2 relevant groups (the yes and maybe groups) by at least 1 of the reviewers were retained for full-text screening. All retained full texts were screened in duplicate by 5 blinded independent reviewers (C.S.D., K.A., R.N., V.M., and A.-P.B.P.-G.). Each reviewer had full texts in common with each of the other reviewers. Disagreements were resolved by consensus between the reviewers or by consultation with the principal investigator (C.B.). For articles written in languages other than English or French, we used Google Translate (https://translate.google.com/) for a first screening according to title and abstract only when an English abstract was not available (n = 19). During full-text screening, we used Google Translate to translate the Methods section of the article to assess whether the article met the eligibility criteria, such as the study design and assessment of the outcome (n = 98). If the article appeared to fulfill the eligibility criteria, or if any doubt remained, the text was translated by a professional translator, and the study authors were contacted to ensure that the translation was correct (n = 1).

Data Collection
Data extraction was performed in duplicate by 2 trained and blinded independent reviewers (C.S.D. and A.-P.B.P.-G.) with the use of a standardized extraction grid. Data items (including detailed information on the population, study design, exposure, outcomes, analyses, covariates, and results) are synthesized in eTable 1 in the Supplement.

Quality Evaluation and Risk of Bias
The risk of bias for each included study was evaluated in duplicate, using the recommended Risk of Bias in Non-Randomized Studies–Interventions (ROBINS-I) tool, by 2 trained and blinded independent reviewers (C.S.D. and M.L.-R.) and by consultation with the principal investigator (C.B.) and a biostatistician (D.T.). In the ROBINS-I tool, risks of bias are classified as low, moderate, serious, or critical. According to the ROBINS-I tool, the best classification for the risk of confounding bias is moderate, given the potential for confounding inherent in observational studies. The ROBINS-I tool was slightly adapted to our research field after consensus was reached between researchers (C.S.D., D.T., M.L.-R., D.L., and C.B.) (eAppendix 2 in the Supplement). For example, we decided that the best classification for the risk of bias in selection of the participants into the study would be set at moderate because of the potential of bias introduced by the healthy worker effect in occupational studies.40-44

Meta-analysis
Meta-estimates using random-effect models were calculated for each psychosocial stressor at work using Review Manager (RevMan) software, version 5.3 (Cochrane Community). To reduce the source of heterogeneity and the potential for misclassification with an aggregated measure of exposure, studies that used only work-unit or organizational-level measures (n = 2)42,43 of psychosocial stressors at work were excluded from the meta-analyses. When a study used both measures, the results of the individual-level measures were used in the meta-analyses. Effort and psychological demands were combined into 1 measure, given the similarity between these 2 stressors. We used estimates adjusted for the potential confounders identified from the quality evaluation criteria: age, sex, and socioeconomic status. When these adjusted estimates were not provided, we chose the model that included most of these confounders. Hazard ratios, odds ratios, and Poisson rate ratios were transformed into risk ratios (RRs).45 Between-study heterogeneity was tested using the $I^2$ statistic, and the risk of publication bias was verified with funnel plot graphs for the 3 meta-analyses that included the most studies (n > 7). Sensitivity analyses were conducted to explore the sources of heterogeneity and the association of studies with lower methodological quality.
Results

A total of 28,467 citations were screened based on title and abstract (Figure 1; eFigure 1 in the Supplement). After the exclusion of studies that did not meet inclusion criteria, 3,627 studies were retained for full-text screening. Overall, 26 studies met the eligibility criteria. Of these, 3 studies were excluded because they were duplicate analyses of already included studies.26-28,29,43,49 Finally, 23 studies were included in the present systematic review.25-33,42-44,49-59

Most of the study populations originated from European countries26-32,42-44,49,50,52,53,56,58 or Canada,25,33,54,55,57 and 2 were from Japan51,59 (eTable 1 in the Supplement). Study populations included many occupation types: blue-collar and white-collar workers,25,26,28,29,31,33,44,50,56,57 health care workers,32,52-55,58 manufacturing workers,43,51 distribution and transportation workers,28 and information technology workers,59 as well as population-based samples.27,42,49 Follow-up ranged from 6 months to 12 years. The minimum number of days a worker had to be absent from work to be considered as a case varied between studies: 1 to 5 days (n = 6),25,33,43,54,55,57 6 to 10 days (n = 5),27,44,52,56,59 15 to 30 days (n = 4),31,32,49,51 42 to 90 days (n = 3),30,53,58 or 1 year or 300 days during 2 consecutive years (n = 5).26,28,29,42,56 All mental disorder diagnoses were issued or validated by a physician.

Most studies used Cox proportional hazards regression, logistic regression, or Poisson regression models. However, 1 study used probit regression,26 and 1 study used a Pearson correlation53; these 2 studies could not be included in the meta-analyses.

Results of the risk-of-bias evaluation using the ROBINS-I tool are presented in the Table25-33,42-44,49-59 and are detailed in eAppendix 3 in the Supplement. Thirteen studies showed the best classification (moderate) for the risk of bias due to confounding.25,26,28,30,32,42-44,50,52,54-56 Two studies presented a critical risk of bias because no confounding adjustment was performed.53,58 Nine studies presented the best classification (moderate) for the risk of bias in the selection of the participants into the study.25,26,30,33,42,43,54,59 Three studies were at critical risk of selection bias at the beginning of the study because of their very low participation rates at baseline (30%-48%).31,32,49 Seven studies presented a low risk of bias in the classification of exposure because they used validated tools to measure psychosocial stressors at work at the individual level and excluded prevalent cases from the analyses.25,27,30,33,51,53,58 Four studies that had not provided a reference for the validation of the tool used to measure exposure or had only used an organizational-level measure of the exposure, which is prone to misclassification bias, were classified as serious risk.29,42,43,52 Concerning bias due to missing data, 6 studies were at low risk of bias.28,31,32,43,52,55 7 were at moderate risk,25,31,49,51,53,56,59 and 9 were at serious risk of bias.26,27,29,30,32,44,50,54,57 All studies except one58 presented a low risk of bias in the measurement of the outcome. As recommended,39,60 5 studies with a critical risk of bias in at least 1 area31,32,49,53,58 were not included in the meta-analyses.

After the exclusion of studies that used only work-unit or organizational-level exposures,42,43 probit regression,26 or Pearson correlation25 and of studies with a critical risk of bias,31,32,49,53,58 13 studies representing 130,056 participants were included in the meta-analyses (Figure 2 and Figure 3).

Workers exposed to low reward (3 studies; 38,659 participants)25,29,54 were at highest risk of SA due to a mental disorder (pooled RR, 1.76 [95% CI, 1.49-2.08]), as were those exposed to effort-reward imbalance (pooled RR, 1.66 [95% CI, 1.37-2.00]); 3 studies; 38,659 participants),25,29,54 job strain (pooled RR, 1.47 [95% CI, 1.24-1.74]); 8 studies; 81,284 participants),27,28,30,31,54,55,57,59 low job control (pooled RR, 1.25 [95% CI, 1.02-1.53]); 5 studies; 37,606 participants),27,30,50,51,54 and high psychological demands (pooled RR, 1.23 [95% CI, 1.04-1.45]); 7 studies; 74,951 participants),25,27,29,30,50,51,54 An association was also observed for low social support at work (9 studies; 47,140 participants),27,30,50,51,54-57,59 but this association was not statistically significant (RR, 1.12 [95% CI, 0.99-1.26]). Depending on the psychosocial stressor at work studied,
heterogeneity was low ($I^2 = 0\%$ for reward and $I^2 = 34\%$ for effort-reward imbalance) or moderately high ($I^2 = 45\%$ for social support, $I^2 = 56\%$ for psychological demands, $I^2 = 58\%$ for job strain, and $I^2 = 72\%$ for job control).

Sensitivity analyses with the inclusion of studies using work-unit or organizational-level exposures showed similar results but increased the heterogeneity ($I^2 = 65\%-93\%$) (eTable 2 in the Supplement). Other sensitivity analyses were all similar to the main results, (1) including studies using hazard ratios only, (2) including studies using job strain categorized in quadrants only, (3) including studies using job content questionnaire only, (4) including the results from coworker support instead of supervisor support for studies that have these results stratified by the 2 types of support, (5) excluding studies in which the prevalent cases were not clearly excluded at baseline, (6) excluding studies with disability pension, or (7) including studies with a critical risk of bias.

Not enough studies using the organizational justice models were available to calculate a meta-estimate. The results presented in eTable 1 in the Supplement show protective associations of good relational, procedural, and organizational justice (hazard ratios, 0.69-0.79).26,44

No indication of publication bias was found in the funnel plots for job strain, psychological demands, or social support (eFigure 2 in the Supplement). Not enough studies were available to evaluate the potential of publication bias for the other psychosocial stressors at work.
Figure 2. Psychosocial Stressors at Work From the Job-Demand-Control-Support Model and the Risk of Sickness Absence Owing to a Diagnosed Mental Disorder

<table>
<thead>
<tr>
<th>Source</th>
<th>log RR (SE)</th>
<th>RR (95% CI)</th>
<th>Favors low job strain</th>
<th>Favors high job strain</th>
<th>Weight, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bourbonnais and Vézina, 1995</td>
<td>0.0476 (0.484)</td>
<td>1.05 (0.41-2.71)</td>
<td>——</td>
<td>——</td>
<td>2.7</td>
</tr>
<tr>
<td>Bourbonnais and Mondor, 2001</td>
<td>0.2109 (0.2369)</td>
<td>1.23 (0.70-2.17)</td>
<td>——</td>
<td>——</td>
<td>6.2</td>
</tr>
<tr>
<td>Bourbonnais et al, 2005</td>
<td>0.8751 (0.268)</td>
<td>2.40 (1.42-4.06)</td>
<td>——</td>
<td>——</td>
<td>6.9</td>
</tr>
<tr>
<td>Inoue et al, 2010</td>
<td>0.7971 (0.3966)</td>
<td>2.22 (1.02-4.83)</td>
<td>——</td>
<td>——</td>
<td>3.8</td>
</tr>
<tr>
<td>Mäntymäki et al, 2012 (lower NM workers)</td>
<td>0.2542 (0.0765)</td>
<td>1.29 (1.11-1.50)</td>
<td>——</td>
<td>——</td>
<td>18.1</td>
</tr>
<tr>
<td>Mäntymäki et al, 2012 (manual workers)</td>
<td>0.3969 (0.2032)</td>
<td>1.29 (1.11-1.50)</td>
<td>——</td>
<td>——</td>
<td>15.4</td>
</tr>
<tr>
<td>Bourgonnais et al, 1995</td>
<td>0.2109 (0.2369)</td>
<td>1.23 (0.70-2.17)</td>
<td>——</td>
<td>——</td>
<td>3.5</td>
</tr>
<tr>
<td>Bourgonnais and Mondor, 2001</td>
<td>0.2109 (0.2369)</td>
<td>1.23 (0.70-2.17)</td>
<td>——</td>
<td>——</td>
<td>15.4</td>
</tr>
<tr>
<td>Bourgonnais et al, 2005</td>
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<td>2.40 (1.42-4.06)</td>
<td>——</td>
<td>——</td>
<td>4.5</td>
</tr>
<tr>
<td>Inoue et al, 2010</td>
<td>0.7971 (0.3966)</td>
<td>2.22 (1.02-4.83)</td>
<td>——</td>
<td>——</td>
<td>7.1</td>
</tr>
<tr>
<td>Bourgonnais et al, 2005</td>
<td>0.8751 (0.268)</td>
<td>2.40 (1.42-4.06)</td>
<td>——</td>
<td>——</td>
<td>7.1</td>
</tr>
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<td>Inoue et al, 2010</td>
<td>0.7971 (0.3966)</td>
<td>2.22 (1.02-4.83)</td>
<td>——</td>
<td>——</td>
<td>4.5</td>
</tr>
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<td>Bourgonnais et al, 2005</td>
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<td>2.40 (1.42-4.06)</td>
<td>——</td>
<td>——</td>
<td>4.5</td>
</tr>
<tr>
<td>Inoue et al, 2010</td>
<td>0.7971 (0.3966)</td>
<td>2.22 (1.02-4.83)</td>
<td>——</td>
<td>——</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Heterogeneity: τ² = 0.03; χ² = 23.85; P = .008; I² = 58%
Overall effect: z = 4.50; P < .001

<table>
<thead>
<tr>
<th>Source</th>
<th>log RR (SE)</th>
<th>RR (95% CI)</th>
<th>Favors low PD</th>
<th>Favors high PD</th>
<th>Weight, %</th>
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<tbody>
<tr>
<td>Bourbonnais et al, 2005</td>
<td>0.5636 (0.1875)</td>
<td>1.76 (1.22-2.54)</td>
<td>——</td>
<td>——</td>
<td>12.3</td>
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<tr>
<td>Inoue et al, 2010</td>
<td>0.01 (0.3689)</td>
<td>1.01 (0.49-2.08)</td>
<td>——</td>
<td>——</td>
<td>4.5</td>
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<tr>
<td>Juvani et al, 2014</td>
<td>-0.1862 (0.2793)</td>
<td>0.83 (0.48-1.44)</td>
<td>——</td>
<td>——</td>
<td>7.1</td>
</tr>
<tr>
<td>Lahelma et al, 2016</td>
<td>0.3913 (0.1996)</td>
<td>1.48 (1.00-2.19)</td>
<td>——</td>
<td>——</td>
<td>11.4</td>
</tr>
<tr>
<td>Mather et al, 2015</td>
<td>0.3102 (0.0586)</td>
<td>1.30 (1.12-1.53)</td>
<td>——</td>
<td>——</td>
<td>27.0</td>
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<td>Ndjaboué et al, 2017</td>
<td>0.0939 (0.1541)</td>
<td>1.10 (0.81-1.49)</td>
<td>——</td>
<td>——</td>
<td>15.3</td>
</tr>
<tr>
<td>van Hoffen et al, 2018</td>
<td>0.2088 (0.0956)</td>
<td>1.03 (0.85-1.24)</td>
<td>——</td>
<td>——</td>
<td>22.2</td>
</tr>
</tbody>
</table>

Heterogeneity: τ² = 0.02; χ² = 16.51; P = .06; I² = 45%
Overall effect: z = 1.80; P = .07

<table>
<thead>
<tr>
<th>Source</th>
<th>log RR (SE)</th>
<th>RR (95% CI)</th>
<th>Favors low JC</th>
<th>Favors high JC</th>
<th>Weight, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bourbonnais et al, 2005</td>
<td>0.2904 (0.1622)</td>
<td>1.34 (0.97-1.84)</td>
<td>——</td>
<td>——</td>
<td>19.0</td>
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<tr>
<td>Inoue et al, 2010</td>
<td>1.3091 (0.4636)</td>
<td>3.70 (1.49-9.19)</td>
<td>——</td>
<td>——</td>
<td>4.4</td>
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<td>Lahelma et al, 2016</td>
<td>0.5117 (0.2034)</td>
<td>1.67 (1.12-2.49)</td>
<td>——</td>
<td>——</td>
<td>15.0</td>
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<td>Mather et al, 2015</td>
<td>0.0181 (0.0586)</td>
<td>1.02 (0.91-1.14)</td>
<td>——</td>
<td>——</td>
<td>31.5</td>
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<tr>
<td>van Hoffen et al, 2018</td>
<td>0.0919 (0.0711)</td>
<td>1.10 (0.95-1.26)</td>
<td>——</td>
<td>——</td>
<td>30.1</td>
</tr>
</tbody>
</table>

Heterogeneity: τ² = 0.03; χ² = 13.51; P = .04; I² = 56%
Overall effect: z = 2.43; P = .02

<table>
<thead>
<tr>
<th>Source</th>
<th>log RR (SE)</th>
<th>RR (95% CI)</th>
<th>Favors low SS</th>
<th>Favors high SS</th>
<th>Weight, %</th>
</tr>
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<tr>
<td>Bourbonnais and Vézina, 1995</td>
<td>-0.3352 (0.3016)</td>
<td>0.72 (0.40-1.29)</td>
<td>——</td>
<td>——</td>
<td>3.5</td>
</tr>
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<td>Bourbonnais and Mondor, 2001</td>
<td>0.5629 (0.2044)</td>
<td>1.76 (1.18-2.62)</td>
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<td>6.7</td>
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<td>Bourbonnais et al, 2005</td>
<td>0.4805 (0.1661)</td>
<td>1.67 (1.17-2.44)</td>
<td>——</td>
<td>——</td>
<td>9.0</td>
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<td>Inoue et al, 2010</td>
<td>-0.1044 (0.3558)</td>
<td>0.90 (0.45-1.81)</td>
<td>——</td>
<td>——</td>
<td>2.6</td>
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<td>Lahelma et al, 2016</td>
<td>-0.1982 (0.1943)</td>
<td>0.82 (0.56-1.20)</td>
<td>——</td>
<td>——</td>
<td>7.2</td>
</tr>
<tr>
<td>Mather et al, 2015</td>
<td>0.1274 (0.0745)</td>
<td>1.14 (0.98-1.31)</td>
<td>——</td>
<td>——</td>
<td>19.4</td>
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<tr>
<td>Otha et al, 2017</td>
<td>0.1264 (0.0745)</td>
<td>1.11 (0.98-1.31)</td>
<td>——</td>
<td>——</td>
<td>19.4</td>
</tr>
<tr>
<td>Stansfeld et al, 1997 (men)</td>
<td>-0.0851 (0.2083)</td>
<td>0.92 (0.61-1.38)</td>
<td>——</td>
<td>——</td>
<td>6.5</td>
</tr>
<tr>
<td>Stansfeld et al, 1997 (women)</td>
<td>-0.0851 (0.2083)</td>
<td>0.92 (0.61-1.38)</td>
<td>——</td>
<td>——</td>
<td>6.5</td>
</tr>
<tr>
<td>van Hoffen et al, 2018</td>
<td>0.0707 (0.0697)</td>
<td>1.07 (0.94-1.23)</td>
<td>——</td>
<td>——</td>
<td>20.1</td>
</tr>
</tbody>
</table>

Heterogeneity: τ² = 0.09 (99.126) = 100.0
Overall effect: z = 1.80; P = .07

A, Job strain. B, Psychological demands (PDs). C, Job control (JC). D, Social support (SS). The data marker sizes are proportional to the weight of the studies included in the meta-analysis.
Discussion

This systematic review and meta-analysis found that exposure to psychosocial stressors at work was associated with an increased risk of SA due to a diagnosed mental disorder. Exposure to job strain was associated with a 47% increased risk of SA. The risk of SA was also 66% higher for those exposed to effort-reward imbalance. A similar increased risk was observed for low reward (76%), which could suggest that this stressor plays an important role in the adverse effect of effort-reward imbalance. Elevated risks, but of a smaller magnitude, were also observed for low job control (25%), high psychological demands (23%) and low social support at work (12%).

These results are in line with those of previous systematic reviews on the risk of various mental disorders or SA due to various psychosocial health conditions. In contrast to most of these reviews, the present meta-analysis was based solely on objectively measured mental disorders (physician-confirmed diagnosis), thus limiting the risk of common method bias. Moreover, these results provide new information, to our knowledge, on the association of these work stressors with more severe mental disorders that lead to SAs, which could be of very long duration (>300 days).

The evaluation of the risk of bias using the ROBINS-I tool highlights some bias and methodological issues that are inherent and/or common in occupational research. First, the healthy worker effect in occupational studies may introduce a selection bias. Workers who are highly exposed to psychosocial stressors at work may quit their job because of this exposure, before their health condition sufficiently deteriorates to lead to SAs. Previous studies demonstrate that, when present, the healthy worker effect is generally associated with an underestimation of the true effect. Thus, the healthy worker effect is unlikely to explain the associations observed in the present meta-analyses.

Second, the low participation rate at baseline and the high proportion of participants lost to follow-up and missing data found in some studies are associated with an increased risk of selection bias. However, we excluded the 3 studies with a critical risk of bias due to low participation rates at baseline (30%-48%). All the included studies had a participation rate of 60% or higher, and 8 of 13 studies had a participation rate of 70% or higher. Given that more-exposed and less-healthy workers are more likely to refuse to participate and are more likely to be lost to follow-up, this selection bias, if present, will tend to underestimate the true association and thus, is unlikely to explain the associations observed. In future studies, statistical methods (such as inverse probability weighting of being selected or multiple imputation) could be used, at least as sensitivity analyses, to address these methodological limitations.

Finally, the exclusion of prevalent cases at baseline was not always done or clearly stated in the articles. The presence of a mental disorder or a history of mental disorder at baseline could potentially be associated with participants’ responses to the self-reported questionnaires and with an increased risk of reverse causality. These participants may perceive their work conditions more negatively than those without a mental disorder or without a history of mental disorder at baseline, which could overestimate the association. However, sensitivity analyses that excluded studies that did not report excluding prevalent cases at baseline showed similar results to the main analyses (eTable 2 in the Supplement). Furthermore, about half of the studies included in the meta-analyses controlled for depressive symptoms at baseline and/or for a history of mental disorders or SAs. Thus, if present, the effect of reverse causation should be of a small magnitude. A recent study using life-course data found that the association between job strain and common mental disorders was independent of psychiatric morbidity at 2 earlier points in the individual’s life and of other early life factors, suggesting that this association could not be explained by reverse causation.
Despite the fact that no restrictions on geography or language were made in our eligibility criteria, most of the included studies were from high-income European countries and from Canada. This could partly be due to the fact that these countries have public health policies that include national health care coverage, thus facilitating data access to conduct such studies. Caution should therefore be exercised in the generalization of these results to other countries. Finally, an evaluation of sex differences was not possible because not enough studies conducted analyses separately by sex (n = 6). 25,26,33,49,56,57

Strengths and Limitations
This systematic review has several strengths, including a rigorous selection process following PRISMA and MOOSE guidelines, the consultation of several databases (including gray literature), no restriction on geography or language, and no indication of publication bias. Moreover, to our knowledge, this is the first systematic review in the field of occupational health research that made an in-depth evaluation of the risk of bias using the ROBINS-I tool, as recommended. 38 Finally, the results were robust to several sensitivity analyses.

This systematic review also has some limitations. Our initial search ended in January 2017. However, we conducted an update of the search strategy for the 3 principal databases (MEDLINE, Embase, and PsycINFO) in February 2019. Because these 3 databases are the most appropriate ones for this topic, it is unlikely that relevant studies published during these last 2 years were missed by our updated search. Between-study heterogeneity was moderately high in some meta-analyses, indicating that studies might show some differences in their characteristics that could limit the use of a meta-analysis. However, the exploration of this heterogeneity in sensitivity analyses did not reveal major differences in the pooled estimates. Finally, the quality evaluation of the included studies identified some risk of selection bias. However, this bias is most likely to result in an underestimation of the true association and thus, if present, would not change the conclusion of the meta-analyses.

Conclusions
The results of this systematic review and meta-analysis provide new knowledge showing that psychosocial stressors at work are associated with an increased risk of SA due to a diagnosed mental disorder. These results reinforce the strength of previous evidence showing that workers exposed to psychosocial stressors at work are at a higher risk of mental disorders. A better understanding of the association of these stressors with the risk of SA could help physicians when evaluating their patients’ mental health and work capacity. Considering the high social and economic burdens associated with SAs, disability, and mental disorders in general, these results are also of great importance for public health. Psychosocial stressors at work are frequent and modifiable. 63 Thus, efforts should be made by employers and public health decision makers, with the support of physicians, to develop organizational policies supporting workplaces in reducing these psychosocial stressors at work and, therefore, reducing the risk of mental disorders among workers.
Psychosocial Stressors at Work and the Risk of Absence Due to a Diagnosed Mental Disorder


