BMJ Open

Effect of psychosocial work factors on the risk of depression: a protocol of a systematic review and meta-analysis of prospective studies

Caroline S Duchaine,[1,2,3] Karine Aubé,[1] Mahee Gilbert-Ouimet,[1] Ana Paula Bruno Pena Gralle,[1,2,3] Michel Vezina,[4] Ruth Ndjaboue,[2] Victoria K Massamba,[1,2,3] Xavier Trudel,[1,3] Alain Lesage,[5,6] Lynne Moore,[1,3] Danielle Laurin,[1,2,7] Chantal Brisson[1,2,3]

To cite: Duchaine CS, Aubé K, Gilbert-Ouimet M, *et al*. Effect of psychosocial work factors on the risk of depression: a protocol of a systematic review and meta-analysis of prospective studies. *BMJ Open* 2019;**9**:e033093. doi:10.1136/bmjopen-2019-033093

► Prepublication history and additional material for this paper are available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2019-033093).

Received 22 July 2019
Revised 08 October 2019
Accepted 11 October 2019

For numbered affiliations see end of article.

Correspondence to
Dr Caroline S Duchaine; caroline.duchaine@crchudequebec.ulaval.ca

ABSTRACT

Introduction Depression is a common and disabling health problem that contributes to an important social and economic burden, particularly among the working age population. The deleterious effect of psychosocial work factors on depression has been documented. However, the most recent systematic reviews had restrictive eligibility criteria and, since their publications, several original studies have been published. The proposed systematic review aims to update, evaluate and synthesise the effect of psychosocial work factors from three recognised theoretical models, the demand-control-support, effort-reward imbalance and organisational justice models, on the risk of depression among workers.

Method and analysis A systematic literature search will be conducted in seven academic databases (Medline, Embase, CINAHL, Web of Science, PsycInfo, Sociological abstracts and IBSS) as well as three grey literature databases. The search strategy was first run on January 2017, updated in October 2017 and will be updated 6 months prior to submission for publication. Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses recommendations, study selection will be carried out using a rigorous multistep screening process in duplicate by independent reviewers. Prospective studies evaluating the effect of at least one psychosocial work factor from the three theoretical models on depression or antidepressant medication use among working adults will be included. Extracted data will be used for evidence synthesis as well as to assess risk of bias and methodological quality. Meta-estimates will be provided after considering homogeneity and number of studies.

Ethics and dissemination This study will only draw from published studies and grey literature available in electronic databases; ethics approval is not required. The results of this review will be published in a peer review journal and presented at relevant conferences. Given that psychosocial work factors are frequent and modifiable, the results can help reduce the social and economic burden of depression and support public policy-makers to improve occupational health standards.

PROSPERO registration number CRD42018107666

Strengths and limitations of this study

- This systematic review will update the knowledge on the effect of psychosocial work factors on the risk of depression.
- This is the first systematic review on this topic that will include an exhaustive search in seven common electronic databases and three grey literature databases without language restrictions.
- The methodological quality of included studies will be evaluated using a validated tool specifically developed to assess the risk of bias in non-randomised studies-intervention.
- Given that psychosocial work factors and self-reported depression can be assessed using different tools, heterogeneity in the pooled data may be a limitation of this review; however, sensitivity and subgroup analyses will help overcome this limitation.

INTRODUCTION

Depression is one of the most common mental disorders in the world. It is estimated that 322 million people worldwide live with a depressive disorder.[1] According to the WHO, in 2016, depression ranked fifth as cause of years lived with disability and it is estimated to become the second leading cause by 2020.[2] The working age population seems particularly affected by depression.[3] For example, in the USA, the annual cost of major depressive disorder for the labour force was estimated at US$36.6 billion.[4] Moreover, in 2013, the mean annual cost per person due to loss of productivity associated with medically certified absences and presenteeism due to depression was estimated at up to US$7149 in seven countries.[5] Given that depression places a tremendous burden on both public health and the economy, documenting the

deleterious impact of new modifiable risk factors is a priority.[6]

Psychosocial work factors have been identified as important risk factors for depression among workers.[7–9] These modifiable factors are mainly evaluated using three theoretical models, namely the demand-control-support (DCS),[10 11] effort-reward imbalance (ERI)[12] and organisational justice (OJ) models.[13] According to the DCS model, exposure to high psychological demands at work combined with low job control, a condition known as job strain, can lead to physiological and psychological stress that can cause health problems, such as depression. A third factor, low social support at work can amplify the effect of job strain on health. The ERI model postulates that health problems could develop when there is an imbalance between the efforts one commits in their work and the rewards received in return (including economic, social and organisational rewards). The OJ model refers to the equity in the rules and social norms of an organisation, including the distribution of resources, the processes and procedures in this distribution and respect and rewards from supervisors. According to this model, lack of perceived justice at work can adversely impact health.

In the last 5 years, three systematic reviews have evaluated the effect of these psychosocial work factors on the risk of depression and depressive symptoms.[7–9] However, according to our preliminary results, at least 16 recent prospective studies have been published since the publication of these reviews; highlighting the need for an updated systematic review and meta-analysis on this topic. Moreover, these systematic reviews had restrictive eligibility criteria, including restrictions to studies published in English[8 9] or other European languages,[7] to studies published in peer review journals only[7 9] and to studies conducted in Western countries.[9] These restrictions could have resulted in the authors missing important studies or in the introduction of bias in the obtained results.

Thus, the aim of this study is to update, evaluate and synthesise the evidence of the effect of adverse psychosocial work factors from the DCS, ERI and OJ models on the risk of depression among workers.

METHODS

This review protocol followed the Preferred Reporting Items for Systematic Reviews and Meta-analyses Protocols[14] recommendations and was registered in PROSPERO in 2018. The report of this systematic review will comply with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses review guidelines.[15]

Specific considerations

As mentioned in a previously published protocol,[16] this review will be part of a larger systematic review on the effect of psychosocial work factors on all mental health problems. The first review retained only outcomes for certified absences from work due to a diagnosed mental health problem,[16] while the present review will focus on depression and antidepressant medication use. Certified absence from work will only be included as an outcome in the present review if the authors specifically evaluated certified absences due to diagnosed depression (ICD-10 code F32-F34). The information sources and the electronic search strategy presented here are the same as those presented in the protocol for the review on certified work absences.[16] The eligibility criteria, study selection and data extraction applied during the full text screening refer only to the current review on depression.

Eligibility criteria

Study design

To be included, studies must use a prospective longitudinal design and present original results. Case–control studies can also be included if they use a longitudinal design, for example, nested case–control studies conducted within a cohort study. Pooled analyses of cohort studies will only be included if the authors pooled results from studies not previously published before in an original article. Cross-sectional, intervention and qualitative studies will be excluded.

Population

The study population includes all working adults, with no restrictions based on the country of origin, type of job, age or sex. In order to minimise the reverse causality bias, studies that only include ill participants will not be considered (eg, return-to-work studies, studies on the recurrence of depression and studies that include only participants with chronic diseases). Due to pregnancy-related characteristics that may confound the association between psychosocial work factors and depression, studies on pregnant women will also be excluded. For duplicate studies that present results from the same cohort and for the same measurement time, only the study with the most complete results or, if the results are similar, with the highest methodological quality will be included. If two or more studies provide results from the same population but with different follow-ups, only the most recent study will be included. However, if the follow-up periods do not overlap, the two studies will be included.

Exposure (intervention)

Studies must have evaluated at least one psychosocial work factor from the DCS,[10 17 18] the ERI[12 19] or the OJ[13] models using a validated instrument. The psychosocial work factors from these models include: psychological demands, job control, job strain, social support at work, iso-strain (exposed to both job strain and low social support), efforts, reward, efforts-reward imbalance and procedural, distributive, relational and OJ. An a priori list of known and validated instruments to measure these factors was provided in the previously published protocol (online supplementary material table S1).[16] This list will be improved during the screening step.

Table 1 Well-known and validated subjective instruments to measure depression

Instrument	Description	Validation
Center for Epidemiologic Studies Depression Scale (CESD / CESD-R)[29 30]	Self-report questionnaire (20 items). The CESD-R is a screening test for depression and depressive disorder. The CESD-R measures symptoms defined by the American Psychiatric Association's Diagnostic and Statistical Manual (DSM-V) for a major depressive episode. Time frame: last 2 weeks.	Good psychometric properties: high internal consistency, strong factor loading. Validation with depression in the general population.[31]
Composite International Diagnostic Interview (CIDI)[32]	Structured interview administered by trained (but lay) interviewer. CIDI is a comprehensive, fully-structured interview for the assessment of mental disorders according to the ICD-10 and DSM-IV, intended for use in epidemiological studies, for clinical or research purposes. Time frame: last 4 weeks.	Good validation and concordance with standardised clinical assessments conducted by a clinician to diagnose mental disorders. Areas under curve for the 12-month prevalence of anxiety disorder and any mood disorder were 0.88 and 0.83 respectively. The CIDI has a good concordance with blinded clinical diagnoses.[33–35]
Beck Depression Inventory (BDI / BDI-II)[36 37]	Self-report questionnaire (21 items) to assess depressive symptoms and symptom severity. BDI was originally based on clinical observations and patient descriptions. BDI-II was developed to correspond with DSM-IV criteria for depression. Two subscales: affective and somatic symptoms. Time frame: past week (BDI) / last 2 weeks (BDI-II).	High internal consistency: alpha coefficients around 0.86 for psychiatric and 0.81 for non-psychiatric populations. Good sensitivity and specificity for depression in comparison with gold standards. High reliability, concurrent, content and structural validity.[38]
Patient Health Questionnaire-9 (PHQ-9)[39]	Self-report questionnaire (9 items). Instrument for screening, diagnosing, monitoring and measuring the severity of depression. Time frame: last 2 weeks.	Criterion validity was assessed against an independent structured mental health professional interview. The sensitivity was 88% and the specificity was 88% for major depression. Good construct validity to recognise major depression, but also depressive disorder in the general population[40–42]

Comparison group

The comparison group must be a group of workers from the same study population that are not exposed to psychosocial work factors.

Outcomes

To be included, studies must have assessed, as an outcome, an objective measure of depression or a subjective measure of depression using a validated instrument. An objective measure of depression is defined as a depressive disorder (ICD-10 code F32-F34 or ICD-9 code 296.2, 296.3, 300.4 and 311) diagnosed by a health professional (eg, physician, psychologist and psychiatrist). This diagnosis can be obtained in the context of the study or using data from hospital or family physician files, medical charts, administrative files or from insurance companies. It will also include absence from work or hospitalisation due to diagnosed depression. Subjective measures of depression will be included only if the instrument used has been validated, follows Diagnostic and Statistical Manual (DSM)-IV or current DSM-V diagnostic criteria for a depressive disorder or has good concordance threshold with a research physician-diagnosed depressive disorder. A list of these instruments was developed a priori by the research team and will be improved during full-text screening (table 1). Studies using instruments that do not meet our criteria or assess burnout, anxiety or psychological distress will not be considered. Antidepressant medication use assessed objectively using registers obtained from hospital, pharmacy, medical clinic, insurance or public health data (self-reported use will be excluded) will be evaluated as a secondary outcome for more severe and/or chronic depression.

Other review eligibility criteria

Given that the oldest model (DCS) considered in our review was published in 1979, only studies published in 1979 or later will be considered for inclusion. No language restrictions will be applied in the search criteria. For articles in languages other than English or French, we will use 'Google translate' for a first screening according to title and abstract. During full-text screening, we will use this tool to translate the method section of the article. If the article seems to fulfil the eligibility criteria, or if doubt remains, the text will be translated by a professional translator.

Information sources

Seven electronic bibliographic databases will be consulted: Medline (all Ovid Medline(R) 1946 to present), Embase

(embase.com), CINAHL (EBSCOhost), Web of Science, PsycInfo (Ovid), Sociological abstracts and IBSS. The search strategy was first run on January 2017, updated in October 2017 and will be updated 6 months prior to submission for publication. In addition to these electronic databases, we will also consult three international grey literature databases: the grey literature report from the New York Academy of Medicine, the WHO-IRIS, which contains all reports of the WHO, and open grey, a system for information on grey literature in Europe. Finally, we will consult all reference lists of selected articles, systematic reviews, narrative reviews, book chapters and commentaries pertinent to this topic. All these databases and sources of information were consulted in another systematic review from our research team, demonstrating the feasibility of this process.[16]

Search strategy

Four sets of keywords will be combined to identify relevant citations. First, terms that refer to the population (eg, workers), the exposure (eg, psychosocial work factors) and the outcome (eg, depression) will be combined to obtain a first group of citations. Then, terms that refer to both the population and the exposure (eg, work stress) will be combined with the same terms that refer to the outcome used in the first step to obtain a second group of citations. Finally, the two groups will be combined with the use of the Boolean operator OR to obtain a group of unique citations. Keywords will be adapted in each electronic database (eg, Medical Subheading terms where appropriate). An example of the search strategy performed in Medline (OVID) on 31 October 2017 was presented in the previously published protocol and is provided in the Supplementary files (online supplementary table S2).[16] Six months prior to submission, an update will be done and the search strategy will be carefully re-examined and improved, accordingly.

Study records

Data management

The bibliographic citations identified using the search strategy will be pooled into Endnote (8.2 version) and duplicates will be eliminated. Inclusion and exclusion criteria will be detailed in a screening form that will be tested before the beginning of the screening process. All reviewers will be trained on how to use this screening form.

Selection process

As this review is part of a broader systematic review, the selection of articles according to title and abstract until January 2017 has been completed for all electronic databases. The results of the updated search will be screened using the same process. Two independents reviewers (CSD and KA) will screen the studies by the titles and abstracts and then classify the studies into four groups (1) YES: all the eligibility criteria were met, (2) NO: at least one of the criteria was clearly not met, (3) UNCLEAR: the eligibility cannot be evaluated solely by reading the title/abstract and (4) REVIEWS: all articles that are not original articles, including systematic or narrative literature reviews, book chapters, commentaries, editorials or letters whose subject clearly relates to the effect of psychosocial work factors on mental health.

In order to ensure that both reviewers similarly understood the eligibility criteria, two samples of 500 articles screened by title and abstract by each reviewer will be compared. The results of the title and abstract screening step will be pooled and all relevant articles identified by at least one of the reviewers will be retained for the screening of the full text.

Full-text screening will be done in duplicate by five reviewers (CSD, KA, RN, VKM, APBPG), ensuring that each reviewer has articles in common with all the other reviewers. Disagreements will be resolved by consensus or by the opinion of the principal investigator (CB). We will also manually search the reference lists of included articles, systematic reviews, narrative reviews, book chapters and commentaries pertinent to this topic and identified during screening by title and abstract in order to find articles that may have been missed.

Data collection process

A standardised extraction grid will be designed and tested with five studies by two independent reviewers. This grid will be improved prior to completing the extraction process. Two independent reviewers will also perform the data extraction in duplicate. Disagreements will be resolved by consensus or by the opinion of the principal investigator (CB).

Data items

Extracted data will include: (1) description of the study population (cohort name, year of study, country, type of workers, sample size, participation and attrition rates, age, gender, socioeconomic status); (2) study design and duration of follow-up; (3) psychosocial work factors evaluated (type of factors, instrument used, validation, categorisation, time of exposure assessment); (4) depression (type of measured used (objective or subjective, medication, absence, hospitalisation), source of the data, diagnostic codes, validation); (5) analysis (type of statistical models, confounding variables included, treatment of missing data and losses at follow-up, sensitivity analyses); and (7) results (exposure prevalence, number of cases, effect measures with CIs for each analysis performed).

Risk of bias and confidence in cumulative evidence

The risk of bias and the methodological quality level for each included study will be evaluated using the risk of bias in non-randomised studies-intervention (ROBINS-I) tool, a tool specifically developed to assess the risk of bias in non-randomised studies.[20] This process will be done in duplicate by two independent reviewers. The ROBINS-I tool proposes evaluating seven domains of potential bias in non-randomised studies: (1) confounding bias, (2)

selection bias at study entry, (3) information bias in the exposure of interest, (4) bias due to change of exposure groups for some participants during the follow-up period, (5) selection bias due to missing data and loss at follow-up, (6) information bias in the outcome and (7) bias introduced by selective reporting of results. The ROBINS-I tool will be tested on three studies and the results will be discussed within a committee including the two reviewers, the principal investigator (CB) and a biostatistician. The tool will be minimally adapted if necessary for the purpose of the present systematic review.

Data synthesis

Study data will be synthetised in tables for evaluation. Pooled estimates will be calculated separately for each psychosocial work factor according to the three theoretical models and for each outcome (depression and medication). A random model will be used and heterogeneity will be tested using the I^2 statistic.[21 22] Subgroup analyses will be conducted if the number of studies is sufficient (n≥2 for each subgroup) according to: (1) methodological quality (high vs low), (2) type of instrument used to evaluate depression (either depression was evaluated objectively via medical files, subjectively via questionnaire, or obtained from lay interviewers) and (3) sex. Qualitative evaluation will be provided if quantitative synthesis is not appropriate.

Meta-regressions will be performed if the number of studies included is ≥10.[23] This meta-regression will bring additional information on variation in relative risks according to studies' characteristics. The following explanatory variables will be included in the model for each psychosocial variable and each outcome: gender, risk of bias, type of instrument used for the measurement of work factors and outcome, mean age, and other relevant differences between the studies that could explain heterogeneity. Random-effect meta-regression will be used to consider the residual heterogeneity not modelled by the explanatory variables.

Meta-bias

Funnel plot graphs and the Egger statistical test will be used to visually and quantitatively verify the presence of a publication bias. A graph will be produced for each meta-analysis performed.

Patient and public involvement

Patients and public were not involved in the development of the research question or in the design of this study.

Ethics and dissemination

Given that this study will only be based on data from published studies or grey literature available in electronic databases, ethics approval is not required. First, the results of this systematic review and meta-analysis will be published in a peer review journal and presented at relevant national and international conferences. Second, this review is made in collaboration with public policy-makers and will support the improvement of national and/or occupational health standards, such as the Canadian National Standard for Psychological Healthy and Safety in the Workplace.[24] Finally, this review will provide evidence that could potentially: (1) aid physicians in identifying factors contributing to their patients' mental health problems[25] and (2) support workplace decision-makers to improve psychosocial working conditions.[26–28] Given that psychosocial works factors are frequent and modifiable, the results of this systematic review may provide evidence to support prevention strategies that can help reduce the social and economic burden associated with depression among workers.

Author affiliations
[1]Population Health and Optimal Health Practices Unit, CHU de Québec-Université Laval Research Center, Québec City, Québec, Canada
[2]Centre de recherche sur les soins et les services de première ligne de l'Université Laval, Québec City, Québec, Canada
[3]Social and Preventive Medicine, Laval University, Québec City, Québec, Canada
[4]Institut national de santé publique du Québec, Québec City, Québec, Canada
[5]Department of Psychiatry, University of Montreal, Montreal, Québec, Canada
[6]Institut universitaire en sante mentale de Montreal, Montreal, Québec, Canada
[7]Faculty of Pharmacy, Laval University, Québec City, Québec, Canada

Twitter Lynne Moore @Moore

Acknowledgements The authors thank the Canadian Institute of Health Research for financial support. They also thank Carole Brault, librarian at the CHU de Québec Research Center, for her precious help in the elaboration of the search strategy and in compiling identified citations.

Contributors CB is the principal investigator of the study. With the close contribution of MG-O she planned and designed this study protocol and revised the first draft. CSD, MG-O, KA, RN, VKM and DL contributed to the elaboration of the eligibility criteria and the search strategy as well as planning the quality evaluation. CSD, KA and APBPG wrote the first draft of the manuscript and revised the final version. CB, XT, MG-O, RN and MV bring expertise in the definition of psychosocial work factors. MV prepared the dissemination plan. MG-O brings expertise in gender differences. AL and RN bring expertise in the definition of mental health problems. LM brings expertise in the design of systematic reviews and meta-analyses. All authors revised and approved the final version of this manuscript.

Funding This protocol was supported by the Canadian Institute of Health Research (CIHR grant number#201404KRS-329015-KRS-CFBA-35698).

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

1 World Health Organization. *Depression and other common mental disorders. global Helath estimates*. Geneva: WHO, 2017.
2 Vos T, Abajobir AA, Abate KH, *et al*. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the global burden of disease study 2016. *The Lancet* 2017;390:1211–59.
3 Henderson M, Harvey SB, Øverland S, *et al*. Work and common psychiatric disorders. *J R Soc Med* 2011;104:198–207.
4 Kessler RC, Akiskal HS, Ames M, *et al*. Prevalence and effects of mood disorders on work performance in a nationally representative sample of U.S. workers. *Am J Psychiatry* 2006;163:1561–8.

5 Evans-Lacko S, Knapp M. Global patterns of workplace productivity for people with depression: absenteeism and presenteeism costs across eight diverse countries. *Soc Psychiatry Psychiatr Epidemiol* 2016;51:1525–37.
6 Astbury J. *Gender disparities in mental health. mental health: a call for action by World health Ministers. Ministerial round tables 2001. 54th World health assembly*. Geneva: World Health Organization, 2001.
7 Rugulies R, Aust B, Madsen IE. Effort-reward imbalance at work and risk of depressive disorders. A systematic review and meta-analysis of prospective cohort studies. *Scand J Work Environ Health* 2017;43:294–306.
8 Madsen IEH, Nyberg ST, Magnusson Hanson LL, *et al*. Job strain as a risk factor for clinical depression: systematic review and meta-analysis with additional individual participant data. *Psychol Med* 2017;47:1342–56.
9 Theorell T, Hammarström A, Aronsson G, *et al*. A systematic review including meta-analysis of work environment and depressive symptoms. *BMC Public Health* 2015;15:738.
10 Karasek RA. Job demands, job decision latitude, and mental strain: implications for job redesign. *Adm Sci Q* 1979;24:285–308.
11 Johnson JV. Theoretical developments in psychosocial work environment research. *Int J Health Serv* 1989;19:457–8.
12 Siegrist J. Adverse health effects of high-effort/low-reward conditions. *J Occup Health Psychol* 1996;1:27–41.
13 Moorman RH. Relationship between organizational justice and organizational citizenship behaviors: do Fairness perceptions influence employee citizenship? *J Appl Psychol* 1991;76:845–55.
14 Moher D, Shamseer L, Clarke M, *et al*. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Syst Rev* 2015;4:1.
15 Liberati A, Altman DG, Tetzlaff J, *et al*. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *J Clin Epidemiol* 2009;62:e1–34.
16 Duchaine CS, Gilbert-Ouimet M, Aubé K, *et al*. Effect of psychosocial work factors on the risk of certified absences from work for a diagnosed mental health problem: a protocol of a systematic review and meta-analysis of prospective studies. *BMJ Open* 2018;8:e025948.
17 Karasek R, Brisson C, Kawakami N, *et al*. The job content questionnaire (JCQ): an instrument for internationally comparative assessments of psychosocial job characteristics. *J Occup Health Psychol* 1998;3:322–55.
18 Karasek R, Theorell T. *Health work stress, productivity and reconstruction of working life*. New York: Wiley, 1990: 381 p.
19 Siegrist J, Starke D, Chandola T, *et al*. The measurement of effort-reward imbalance at work: European comparisons. *Soc Sci Med* 2004;58:1483–99.
20 Sterne JAC, Hernán MA, Reeves BC, *et al*. ROBINS-I: a tool for assessing risk of bias in non-randomised studies of interventions. *BMJ* 2016;355.
21 Higgins JPT*et al*. Measuring inconsistency in meta-analyses. *BMJ* 2003;327:557–60.
22 Egger M, Smith GD, Phillips AN. Meta-Analysis: principles and procedures. *BMJ* 1997;315:1533–7.
23 The Cochrane Collaboration. Cochrane Handbook for systematic reviews of interventions: the Cochrane collaboration, 2011. Available: https://handbook-5-1.cochrane.org/front_page.htm
24. Mental Health Commission of Canada. National standard of Canada for psychological health and safety in the workplace Canada: mental Helath Commission of Canada, 2013. Available: https://www.mentalhealthcommission.ca/English/what-we-do/workplace/national-standard
25 Mental Health Commission of Canada. Psychological health & safety. An action guide for employers Canada: Mental Health Commission of Canada, 2012. Available: https://www.mentalhealthcommission.ca/sites/default/files/Workforce_Employers_Guide_ENG_1.pdf
26 Gilbert-Ouimet M, Brisson C, Vézina M, *et al*. Intervention study on psychosocial work factors and mental health and musculoskeletal outcomes. *Healthc Pap* 2011;11 Spec No:47–66.
27 Bourbonnais R, Brisson C, Vézina M. Long-Term effects of an intervention on psychosocial work factors among healthcare professionals in a hospital setting. *Occup Environ Med* 2011;68:479–86.
28 Brisson C, Cantin V, Larocque B, *et al*. Intervention research on work organization and health: research design and preliminary results on mental health. *Can J Commun Ment Health* 2006;25:241–59.
29 Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Applied Psychological Measurement* 1977;1:385–401.
30 Eaton W, Muntaner C, Smith C. Center for Epidemiologic Studies Depression Scale: Review and revision (CESD and CESD-R). In: Maruish ME, ed. *The use of psychological testing for treatment planning and outcomes assessment*. 3rd ed. Mahwah, NJ: Lawrence Erlbaum, 2004: p. 363–377.
31 Van Dam NT, Earleywine M. Validation of the Center for Epidemiologic Studies Depression Scale--Revised (CESD-R): pragmatic depression assessment in the general population. *Psychiatry Res* 2011;186:128–32.
32 World Health Organization. The world Health organization world mental health composite international diagnostic interview (WHO WMH-CIDI), 1990. Available: https://www.hcp.med.harvard.edu/wmhcidi/ [Accessed 17 Jun 2019].
33 Kessler RC, Abelson J, Demler O, *et al*. Clinical calibration of DSM-IV diagnoses in the world mental health (WMH) version of the world Health organization (who) composite international diagnostic interview (WMHCIDI). *Int J Methods Psychiatr Res* 2004;13:122–39.
34 Haro JM, Arbabzadeh-Bouchez S, Brugha TS, *et al*. Concordance of the composite international diagnostic interview version 3.0 (CIDI 3.0) with standardized clinical assessments in the who world mental health surveys. *Int J Methods Psychiatr Res* 2006;15:167–80.
35 Kessler RC, Avenevoli S, Green J, *et al*. National comorbidity survey replication adolescent supplement (NCS-A): III. concordance of DSM-IV/CIDI diagnoses with clinical reassessments. *J Am Acad Child Adolesc Psychiatry* 2009;48:386–99.
36 Beck AT, WARD CH, MENDELSON M, *et al*. An inventory for measuring depression. *Arch Gen Psychiatry* 1961;4:561–71.
37 Beck AT, Steer RA, Carbin MG. Psychometric properties of the Beck depression inventory: twenty-five years of evaluation. *Clin Psychol Rev* 1988;8:77–100.
38 Wang Y-P, Gorenstein C. Psychometric properties of the Beck depression Inventory-II: a comprehensive review. *Braz J Psychiatry* 2013;35:416–31.
39 Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. *Psychiatr Ann* 2002;32:509–15.
40 Obbarius A, van Maasakkers L, Baer L, *et al*. Standardization of health outcomes assessment for depression and anxiety: recommendations from the ICHOM depression and anxiety Working group. *Qual Life Res* 2017;26:3211–25.
41 Martin A, Rief W, Klaiberg A, *et al*. Validity of the brief patient health questionnaire mood scale (PHQ-9) in the general population. *Gen Hosp Psychiatry* 2006;28:71–7.
42 Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med* 2001;16:606–13.