Psychological Medicine (2016), **46**, 3263–3274. © Cambridge University Press 2016
doi:10.1017/S0033291716002269

REVIEW ARTICLE

Interventions for enhancing return to work in individuals with a common mental illness: systematic review and meta-analysis of randomized controlled trials

Y. T. Nigatu[1,2]*, Y. Liu[1,2], M. Uppal[1,2], S. McKinney[1,2], S. Rao[3], K. Gillis[3] and J. Wang[1,2,4]

[1] *Department of Psychiatry, Cumming School of Medicine, University of Calgary, Alberta, Canada*
[2] *Mathison Centre for Mental Health Research and Education, Hotchkiss Brain Institute, University of Calgary, Alberta, Canada*
[3] *Department of Psychiatry, Faculty of Medicine, University of Ottawa, Ontario, Canada*
[4] *Department of Community Health Sciences, Cumming School of Medicine, University of Calgary, Alberta, Canada*

Common mental disorders (CMDs) are highly prevalent in the working population, and are associated with long-term sickness absence and disability. Workers on sick leave with CMDs would benefit from interventions that enable them to successfully return to work (RTW). However, the effectiveness of RTW interventions for workers with a CMD is not well studied. The objective of this review is to assess the effectiveness of existing workplace and clinical interventions that were aimed at enhancing RTW. A systematic review of studies of interventions for improving RTW in workers with a CMD was conducted. The main outcomes were proportion of RTW and sick-leave duration until RTW. Randomized controlled trials (RCTs) were identified from Medline/PubMed, PsycINFO, EMBASE, SocINDEX, and Human resource and management databases from January 1995 to 2016. Two authors independently selected studies, assessed risk of bias and extracted data. We pooled studies that we deemed sufficiently homogeneous in different comparison groups and assessed the overall quality of the evidence. We reviewed 2347 abstracts from which 136 full-text articles were reviewed and 16 RCTs were included in the analysis. Combined results from these studies suggested that the available interventions did not lead to improved RTW rates over the control group [pooled risk ratio 1.05, 95% confidence interval (CI) 0.97–1.12], but reduced the number of sick-leave days in the intervention group compared to the control group, with a mean difference of −13.38 days (95% CI −24.07 to −2.69).

Received 12 May 2016; Revised 4 August 2016; Accepted 9 August 2016; First published online 9 September 2016

Key words: Clinical trial, intervention, mental illness, meta-analysis, return to work.

Introduction

Common mental disorders (CMDs) such as anxiety, depressive and adjustment disorders are highly prevalent in the working populations and are associated with long-term sickness absence and poor work functioning (Ahola *et al.* 2011; Perbellini *et al.* 2012). Sickness absence due to these disorders is increasing in many high-income countries, contributing substantially to disability claims and permanent exclusion from the labour market (Kivimaki *et al.* 2004). For instance, a UK study showed that mental disorders account for almost 40% of sickness absence claimants (Shiels *et al.* 2004). In Canada, mental disorders accounted for 30% of short- and long-term disability claims (Mental Health Commission of Canada, 2016). Interventions enhancing return to work (RTW) among sick-listed workers with CMDs, therefore, have significant public health and economic implications. Primarily, RTW is a goal for workers who are absent from their job, as they want to avoid negative consequences, such as prolonged work disability and loss of earnings (Arends *et al.* 2013).

To enhance RTW, a number of interventions have been developed in the past decades, including psychotherapy, stress-reduction treatment, pharmacotherapy, and psychoeducation. Some studies suggested that psychological interventions focusing on restoring contact with the workplace and multidisciplinary interventions (i.e. interventions involving professionals from more than two healthcare disciplines and working in an integrated team) might have positive effects on achieving a fast and safe RTW (Martin *et al.* 2013; Netterstrøm *et al.* 2013). Graded activity approaches might also improve initial (partial) RTW rates and reduce sickness absence, but the recurrence of sickness absence appears to be high and continues to be a

* Address for correspondence: Dr Y. T. Nigatu, Department of Psychiatry, Cumming School of Medicine, University of Calgary, 3280 Hospital Dr. NW, Calgary, AB T2N 4Z6, Canada.
(Email: yeshambel.nigatu1@ucalgary.ca)

challenge. Another group of studies revealed that these interventions had no superior effect over control groups (Nystuen & Hagen, 2006; Vlasveld *et al.* 2013*a*, *b*; Volker *et al.* 2015*a*, *b*). A study even showed that patients in the intervention group had more sickness absence and a delayed RTW than the control group (Martin *et al.* 2013). Organization and system level factors such as the social security system, sickness certification process, and occupational healthcare policy might contribute to the effectiveness of a certain RTW intervention.

In occupational mental health literature, interventions differ with regard to content and methods, but have some shared elements. Interventions developed for RTW in workers with a CMD are primarily based on cognitive behavioral therapy (CBT) principles and coping strategies. These strategies share common goals and can be combined into interventions that address work issues. Descriptive reviews have been conducted on sickness absence and work disability in individuals with musculoskeletal disorders, depression and adjustment disorders (Franche *et al.* 2005; Durand *et al.* 2007; Williams *et al.* 2007; Bethge & Muller-Fahrnow, 2008; Blank *et al.* 2008; Shaw *et al.* 2008; Carroll *et al.* 2010; Cornelius *et al.* 2011; Desiron *et al.* 2011; Hamberg-van Reenen *et al.* 2012; Higgins *et al.* 2012; Hoefsmit *et al.* 2012; Pomaki *et al.* 2012; Streibelt & Egner, 2012; Odeen *et al.* 2013; Dewa *et al.* 2015; McDowell & Fossey, 2015). However, there are only two meta-analyses in individuals with depression and adjustment disorders (Arends *et al.* 2012; Nieuwenhuijsen *et al.* 2014). These reviews also excluded employees with other CMDs and focused entirely on sickness absence without addressing RTW. Particularly, RTW is a major challenge at workplaces in the mental health field. Moreover, major depressive disorder, anxiety disorders and other stress-related disorders are internalizing disorders, which represent overlapping variations of emotional distress in response to life stressors and difficulties. From a clinical practice perspective, it is important to aggregate commonly diagnosed mental illnesses in workplaces including depression, anxiety disorders (panic attacks, generalized anxiety disorder and phobias), obsessive compulsive disorder (OCD), and post-traumatic stress disorder (PTSD). Anxiety and depressive disorders have also a high rate of co-morbidity. In a large clinical sample, current and lifetime co-morbidity of the DSM-IV anxiety and mood disorders was found to be 55% and 75%, respectively (Brown *et al.* 2001). Therefore it is prudent to address them together.

The objective of this study was to systematically review and examine the effectiveness of interventions aimed at enhancing RTW in individuals with a CMD.

Method

Protocol and registration

This systematic review and meta-analysis was conducted in accordance with PRISMA guidelines (Liberati *et al.* 2009). A protocol was developed in advance of conducting this review and registered at PROSPERO (CRD42016033092) http://www.crd.york.ac.uk/PROSPERO.

Information sources and literature search

An extensive search in biomedical, psychological and economic databases Medline/PubMed, PsycINFO, EMBASE, SocINDEX, Open Grey, and Human resource and management databases was conducted to find relevant articles regarding interventions enhancing RTW in individuals with CMD. Other search methods included screening references listed in relevant systematic reviews and identified RCTs, searching abstracts of relevant meetings, and personal communication with content experts in the field. Our search strategies for each database and PRISMA flow chart are shown in the Supplementary Appendix. We searched for relevant articles written in English with a publication date from January 1995 to 2016. Two authors (M.U. and S.M.) performed the search on electronic databases. Duplicates were searched for and excluded, obtaining a final sample of references to be screened. References were initially screened by two authors (Y.T.N. and Y.L.) by titles and abstracts and finally by reading the full text if indicated. When the reviewers did not agree about the inclusion or exclusion of a certain paper, discussion took place to achieve consensus.

Eligibility criteria

Studies were selected if they met the following criteria:

Population

Employees aged $\geqslant$18 years who were absent from work due to a CMD including depressive disorders, any anxiety disorders (panic attacks, generalized anxiety disorder and specific phobias), OCD, PTSD or adjustment disorders.

Interventions

Any clinical or work-focused interventions aimed at enhancing RTW.

Study design

Randomized controlled trial (RCT) and cluster RCTs were included. When there were different publications

for the same intervention, we included the one that presented the latest results and most relevant outcome measures to our review, which was RTW.

Outcome *measures*

(1) RTW was defined as proportion (percentage) of employees who returned to work after the intervention; (2) time or duration until full RTW was defined as the number of sick-leave days until RTW in employees with CMD from the day of randomization until full RTW to the employee's previous position with equal earnings, for at least 4 weeks without (partial or full) recurrence. Recurrences of sick leave within 4 weeks of full RTW are considered as belonging to the initial period of sick leave.

Data synthesis and analysis

We designed a data extraction sheet, and two authors (Y.T.N. and Y.L.) independently assessed each of the studies included in the final sample (see Table 1 for included study details). We included relevant information about the study (publication year, sample size, population, design, intervention, person who delivered the intervention and control, follow-up period, result by type of outcome). Data from the retrieved RCTs were used to perform a meta-analysis of the RCTs on RTW and time until full RTW in terms of sick-leave duration. Cochrane Review Manager 5.2 was used for the meta-analysis. For time until RTW, we used mean and standard deviations (S.D.s) as the index of integration. For papers with missing S.D. data, S.D.s were calculated on the basis of 95% confidence intervals (CIs).

As different mental disorders and interventions were included, we used random-effects models to calculate the across-study effect size. To assess heterogeneity, we used the I^2 statistic. Publication bias was assessed through visual inspection of the funnel plot.

Assessment of risk of bias of individual studies

The quality of the studies was assessed by using the Cochrane Collaboration's risk of bias tool (Higgins *et al*. 2011). Y.T.N. and Y.L. independently assessed the risk of bias of the included studies. We used the following items to assess risk of bias in the included studies: random sequence generation (selection bias), allocation concealment (selection bias), blinding of participants and personnel (performance bias), blinding of outcome assessment (detection bias), incomplete outcome data (attrition bias), and selective reporting (reporting bias) and other biases.

We presented the proportion of risk that came from studies at low, unclear, or high risk of bias for each item in the tool. It is difficult to apply double blinding in trials of psychological interventions, therefore we considered blinding as positive if the assessor was blind.

Results

Description of studies

We retrieved 2347 peer-reviewed articles from five main databases. The titles and abstracts of these articles were examined, and 136 articles were selected by excluding ineligible articles that were either unrelated to CMD or the subjects were not workers, with 97% level of agreement between two authors (Y.T.N. and Y.L.) during screening. The full texts of these 136 papers were subsequently examined. A total of 11 RCTs and five cluster RCTs were ultimately selected (Brouwers *et al.* 2006; Nystuen & Hagen, 2006; Rebergen *et al.* 2009; Sogaard & Bech, 2009; Bakker *et al.* 2010; van der FeltzCornelis *et al.* 2010; van Oostrom *et al*. 2010; Lagerveld *et al.* 2012; Hees *et al.* 2013; Martin *et al.* 2013; Netterstrøm *et al.* 2013; Noordik *et al.* 2013; Vlasveld *et al.* 2013*a*, *b*; Pedersen *et al.* 2015; Volker *et al.* 2015*a*, *b*).

Table 1 describes the overall characteristics of the 16 trials. Overall, 3345 patients were included in the meta-analysis. Ten out of 16 studies included employees who were absent due to a CMD. Three studies targeted employees with work-related stress (Rebergen *et al*. 2009; van Oostrom *et al.* 2010; Netterstrøm *et al.* 2013), and two studies were limited to employees with major depressive disorder (Hees *et al*. 2013; Vlasveld *et al.* 2013*a*). One study was conducted in employees with adjustment disorders (van der Klink *et al.* 2003). No RCTs were conducted on enhancing RTW in patients with anxiety disorders, OCD or PTSD.

The majority of the studies targeted employees who had been absent from work from 2 weeks to >4 weeks, and one study targeted police officers without specified time-frame of absence (Rebergen *et al.* 2009).

RTW definition

All of the selected studies denoted RTW as an outcome, which was defined by either the number of sick-leave days until RTW and/or the proportion of RTW cases. Of the included studies, five reported both RTW and the number of sick-leave days until RTW (van der Klink *et al.* 2003; Lagerveld *et al.* 2012; Noordik *et al.* 2013; Vlasveld *et al.* 2013*a*, *b*; Volker *et al.* 2015*a*, *b*). The follow-up time to assess the proportion of RTW varied by study as did the findings. Two studies (van der Klink *et al.* 2003; Netterstrøm *et al.* 2013) assessed RTW by 3 months, three studies (van der Feltz-Cornelis *et al.* 2010; van Oostrom *et al.* 2010;

Table 1. *Studies included in the meta-analysis of RTW interventions in individuals with a common mental illness*

Study	Sample size	Sick-listed due to	Design	Follow-up period	Intervention			Type of outcome/ results	
					Type of intervention	Intervention delivered by	Control	RTW	Time until full RTW
Bakker *et al.* (2010)	156	CMD	Cluster RCT	12 months	Minimal Intervention for Stress-related mental disorders with Sick leave (MISS); the primary-care physicians used specific methods of communication to help the patient, such as consultations on a time-contingent course, diagnosis, referral and monitoring until achieving functional recovery	Primary-care physicians	CAU	No effect	–
Brouwers *et al.* (2006)	194	CMD	RCT	18 months	Problem-solving intervention and graded activity; aimed at activating and supporting the patients by restoring coping and adopting a problem-solving approach	Social workers	CAU	No effect	–
Hees *et al.* (2013)	117	Depression	RCT	18 months	Occupational therapy and residents provided treatment	Occupational therapist	CAU	–	No effect
Martin *et al.* (2013)	168	CMD	RCT	12 months	Coordinated and Tailored Work Rehabilitation (CTWR): ICF based RTW process consisted of activities to overcome barriers and strengthen resources (e.g. stress management training, physical exercise, contact with the workplace), and implementation of the action plan and regular updates according to the individual's current situation with formal psychotherapy if necessary	Psychologist	CAU	Negative	–
Lagerveld *et al.* (2012)	155	CMD	RCT	12-month follow-up	Work focused CBT consisted of regular CBT treatment plus a module focusing on work and RTW, which is a similar intervention with van der Klink *et al.*	Psychotherapists	CAU	No effect	Positive effect
Netterstrøm *et al.* (2013)	140	Stress	RCT	3 months	Multidisciplinary Stress Treatment Program; consisted of individual stress treatment sessions; workplace dialogue, and participation in a group-based mindfulness-based stress reduction course including eight 2-h sessions every week over 8 weeks	Psychologist	CAU	Positive effect	–

Noordik *et al.* (2013)	126	CMD	Cluster RCT	12-month	Exposure based (RTW-E) interventions stress inoculation training, cognitive restructuring, graded activity, and time contingency during the RTW and exposure to more demanding work situations	Occupational physicians	CAU	No effect	–
Nystuen & Hagen (2006)	83	CMD	RCT	12-month	A solution-focused therapy, focused on coping strategies, support between the participants and solutions and goals for the future	Psychologist	CAU	No effect	–
Pedersen *et al.* (2015)	400	CMD	RCT	6 months	Psychoeducation, focused on stress and work life and consisted of a mixture of didactic lectures and group discussions based on problem-solving techniques and coping strategies	Psychiatric nurses	CAU	No	–
Rebergen *et al.* (2009)	240	Work-related Stress	RCT	12 months	GBC: A guideline-based care based on an activating approach, time contingent process evaluation, and cognitive behavioral principles	Occupational physicians	CAU	No effect	–
Sogaard & Bech (2009)	836	CMD	RCT	12 months	Psychiatric examination including diagnostics with the present state examination and feedback about treatment and rehabilitation. The GPs and the social workers facilitate the RTW process and rehabilitation	Psychiatrist and GPs	CAU	No effect	–
van der Feltz-Cornelis *et al.* (2010)	51	CMD	Cluster RCT	6 months	Psychiatrist consultation: OPs receive supportive psychiatric consultations including suggestion for RTW and successful strategies aimed at work functioning	Psychiatrist	CAU	No effect	–
van der Klink *et al.* (2003)	192	Adjustment disorders	Cluster RCTs	3 months	Problem-solving intervention and graded activity consisted of: activating patients to develop problem-solving strategies for work-related problems extend these activities to more demanding ones	Occupational physicians	CAU	Positive effect	Positive effect
van Oostrome *et al.* (2010)	145	Distress	RCT	6 months	Participatory workplace intervention (Stepwise communication process to identify and solve obstacles to RTW)	Social worker	CAU	No effect	–
Vlasveld *et al.* (2013*a*, *b*)	126	Depression	RCT	12 months	Collaborative care: consisted of OP as a case manager and consulting psychiatrist. It includes the 6–12 sessions of problem-solving treatment, manual guided self-help, and workplace intervention	Occupational physician care manager	CAU	No effect	No effect

Table 1 (*cont.*)

Study	Sample size	Sick-listed due to	Design	Follow-up period	Intervention		Type of outcome/ results	
					Type of intervention	Intervention delivered by	Control	RTW	Time until full RTW
Volker *et al.* (2015*a*, *b*)	216	CMD	Cluster RCT	12 months	E-health module embedded in Collaborative Occupational healthcare aimed at cognitions with regard to RTW, problem-solving skills, exercises, pain and fatigue management and relapse prevention	Occupational physicians (web-based)	CAU	No effect	No effect

CMD, Common mental disorders; RCT, randomized controlled trial; RTW, return to work; CAU, care as usual (conventional case management); CBT, cognitive behavioral therapy; GP, general practitioner; GBC, guideline-based care; ICF, International Classification of Functioning, Disability and Health.

Pedersen *et al*. 2015) by 6 months, and 11 studies examined RTW 12–18 months (Brouwers *et al.* 2006; Nystuen & Hagen, 2006; Rebergen *et al.* 2009; Bakker *et al.* 2010; Sogaard & Bech, 2010; Lagerveld *et al.* 2012; Hees *et al.* 2013; Martin *et al.* 2013; Noordik *et al.* 2013; Vlasveld *et al.* 2013*a*, *b*, Volker *et al.* 2015*a*, *b*).

The content of RTW interventions

Interventions used in the RCTs included problem solving strategies, CBT, developing and restore coping strategies, exposure-based therapy, occupational therapy, psychoeducation, diagnosis and consultation and referral. There was no trial that examined the effectiveness of pharmacotherapy (i.e. antidepressant or anxiety medications) on RTW.

Five studies included work-focused interventions to enhance RTW in such a way that the patients were motivated to develop problem-solving strategies for work-related problems (van der Klink *et al.* 2003; Brouwers *et al.* 2006; Lagerveld *et al.* 2012; Vlasveld *et al.* 2013*a*, *b*; Volker *et al.* 2015*a*, *b*). For instance, the coordinated and tailored work rehabilitation was focused on identifying work disability and functioning, overcoming barriers and strengthening resources for RTW (e.g. stress management training, physical exercise, and contact with the workplace (Martin *et al.* 2013). Two studies (van der Feltz-Cornelis *et al.* 2010; Vlasveld *et al.* 2013*a*, *b*) included a collaborative and multidisciplinary approach where the occupational physicians (OPs) worked together with psychiatrists to facilitate RTW. OPs were trained to provide treatment for mental disorders and became known as occupational physician care managers.

Overall, there were some variations across interventions during the implementation, particularly in the context of the intervention itself and the person who delivered the intervention. However, most trials had common elements in the interventions, such as CBT, stress reduction and fostering patients' problem-solving skills. These strategies focused on workplace dialogue and addressing individuals' specific barriers to RTW (Brouwers *et al.* 2006; Nystuen & Hagen, 2006; Rebergen *et al.* 2010; van der Feltz-Cornelis *et al.* 2010; Lagerveld *et al.* 2012; Hees *et al.* 2013; Netterstrøm *et al.* 2013; Vlasveld *et al.* 2013*a*, *b*; Volker *et al.* 2015*a*, *b*).

Effect of the interventions on outcomes

RTW

To assess the effectiveness of the interventions on RTW, we pooled data from the studies comparing interventions involving some form of CBT *v.* the control group using RevMan 5.3 (http://tech.cochrane.org/revman). The average proportion of RTW in the experimental and control group was 65 and 60%,

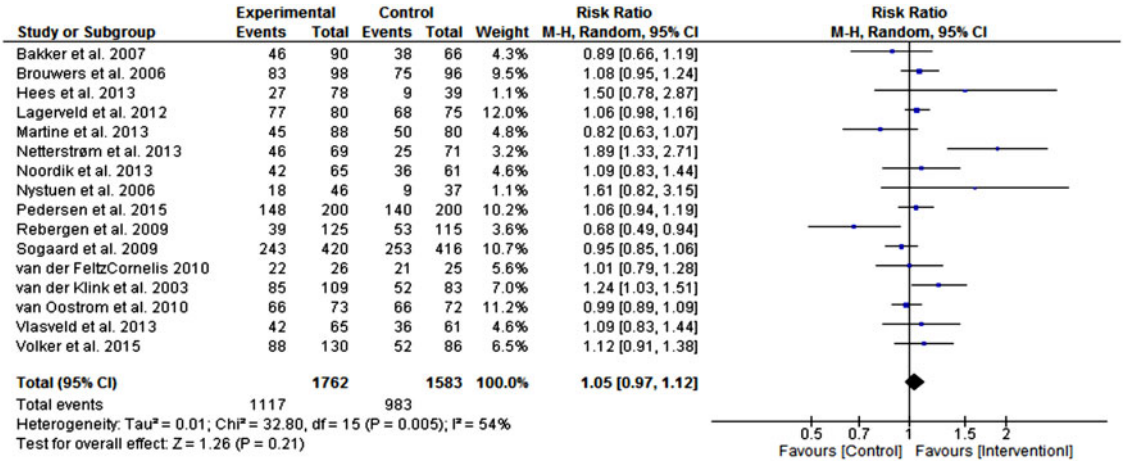

Fig. 1. Forest plot of overall effectiveness of interventions on return to work proportion.

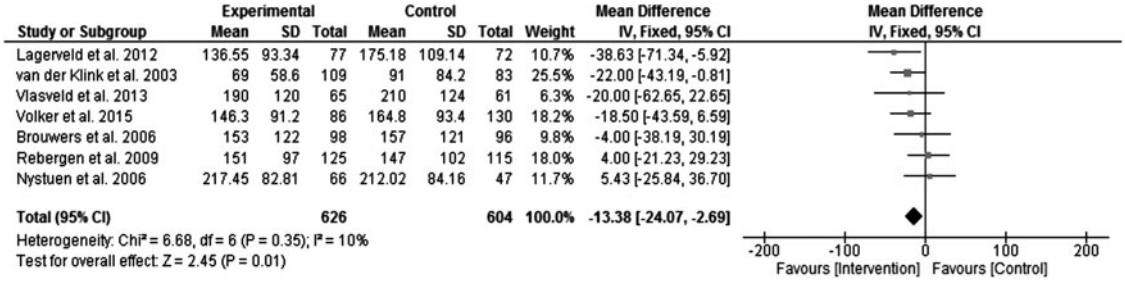

Fig. 2. Forest plot of overall effectiveness of interventions on sick-leave days until return to work.

respectively. Overall, the pooled risk ratio (RR) for RTW rate was 1.05 (95% CI 0.97–1.12), with 54% heterogeneity ($p = 0.005$), indicating there is no clear evidence supporting the effectiveness of the available RTW intervention on RTW proportions.

Post-hoc analysis by separating Dutch and Scandinavian studies showed that the pooled RR for RTW was 1.05 (95% CI 0.98–1.12) and 1.10 (95% CI 0.90–1.35), respectively, indicating that origin of the trials (and thereby the social security system) had no effect on the outcome of the intervention except heterogeneity. Figs 2 and 3 show forest plots of RTW proportions for Dutch and Scandinavian studies, respectively.

Sick-leave duration until RTW

To estimate the average sick-leave duration until full RTW, we pooled data from six studies that reported sick-leave days until RTW. The average sick-leave duration until RTW for the intervention and control groups was 151 days (S.D. = 95) and 165 days (S.D. = 103). The meta-analysis showed that the intervention group had significantly shorter sick-leave duration until RTW than the control group, with a mean difference of −13.38 days (95% CI −24.07 to −2.69), and heterogeneity ($I^2 = 10\%$, $p = 0.35$) (Fig. 4). The standardized mean difference was –0.14 (95% CI −0.26 to −0.01) indicating small effect size based on Cohen's rule.

Risk of bias in included studies

Fig. 3 presents the assessment of bias presented as percentages across all included studies scores for each item. The most prevalent shortcomings 'high risk' were found in the item about blinding of participants and personnel (performance bias in which only five of the 16 studies scored 'low risk'). Seven out of 16 studies had unclear risk regarding blinding of the outcome assessment. Although attrition bias appeared to be smaller in the included studies, there was a lack of information about adherence to the intervention in which the non-significant results might be related to the quality and consistency of the intervention implementation.

Discussion

This systematic review and meta-analysis identified 16 RCTs published since 1995. All interventional trials were designed based on CBT approaches with variations in content and forms of implementation. The results showed that compared to the control group,

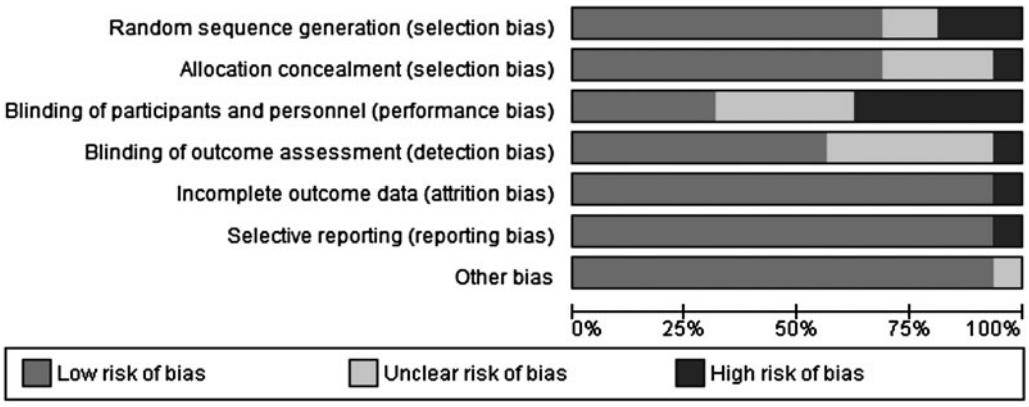

Fig. 3. Methodological quality graph. Reviewers' risk assessment of bias presented as percentages across all included studies.

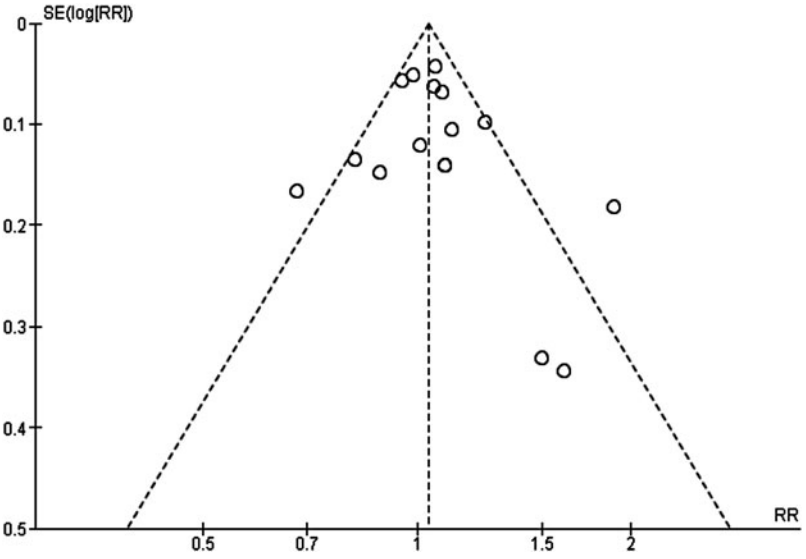

Fig. 4. Funnel plot of published return-to-work studies.

no significant difference was found in overall success of RTW. The average sick-leave duration until RTW was significantly shorter for the intervention group. In general, interventions focusing on RTW are limited and results are inconclusive when it comes to establishing the most effective forms of intervention.

Most of the studies that fitted the search terms did not examine interventions that specifically and explicitly addressed RTW. Rather, they examined the recovery of mental health symptoms or resumption of employment, which might not automatically lead to full RTW (van der Feltz-Cornelis *et al.* 2007; Thunnissen *et al.* 2008; Waghorn *et al.* 2014). In this review, we examined 16 RCTs on RTW in which the interventions varied by settings and by therapists who delivered the skills or interventions. Out of these, 11 studies were conducted in The Netherlands where the occupational healthcare guideline separates the treatment sector from the sick-leave certification, and the OPs play an important role in the guidance of sickness absence and in facilitating the RTW process (Bakker *et al.* 2010). The higher the performance and quality of the personnel, the faster employees returned to work. The remaining studies came from the Scandinavian countries where the sick-leave certification is often administered by physicians. This system could result in lack of attention to working conditions and unsuccessful implementation of the RTW process by physicians (Bakker *et al.* 2010). The essence of the included trials was targeted to mitigate the professional gaps by developing collaborative, multidisciplinary and guideline-based interventions with respect to RTW. In particular, the Dutch trials evaluated interventions combining the competences of OPs, care managers and psychiatrists.

Among the included RCTs, three trials with positive effects included CBT, stress reduction and fostering

patients' problem-solving skills in the interventions (van der Klink *et al.* 2003; van Oostrom *et al.* 2010; Lagerveld *et al.* 2012; Netterstrøm *et al.* 2013). Martine *et al.*'s study also had these features, yet their results suggested that patients in the intervention group had more sickness absence benefits and a delayed RTW compared to the control group. Implementation and program failures might explain the delayed RTW in the intervention group. Undetected or unreported psychiatric disorders among sickness absentees may also have contributed to the prolonged time to RTW (Sogaard & Bech, 2009).

The pooled results found no evidence that the available interventions aimed at enhancing RTW in employees with a CMD were effective. However, there was evidence to support that the interventions reduced the duration of sick leave until RTW by 13 days, which is equivalent of an effect size of 0.14. According to Cohen's rule, this effect size is small indicating that the resulting difference might not be clinically relevant (Cohen, 1988). However, the 13-day difference might have significant economic implication as it represents considerable savings in healthcare and employment costs at the population level. A previous review (Nieuwenhuijsen *et al.* 2014) also found moderate effect of occupational care with CBT on sick leave in depressed patients. Another review also showed little evidence regarding the effectiveness of workplace interventions on sickness absence regardless of the type of work disability (van Oostrom *et al.* 2009). In the existing studies, the RTW process was solely focused on the context of sickness absence. However, it is not clear to what extent these participants were ready to RTW, and the factors that are associated with readiness to RTW including quality of life, work functioning and self-efficacy readiness to RTW (Vlasveld *et al.* 2013*a*, *b*; Volker *et al.* 2015*a*, *b*) were not measured in these trials. Generally, the existing RCTs provided weak evidence about the effectiveness of psychotherapy (irrespective of collaborative or multidisciplinary, work-focused CBT or CBT alone) on RTW and sick leave.

Strengths and limitations of the review

This review has methodological strengths and limitations. First, an extensive and systematic search was conducted including a range of relevant databases. Considerable efforts were made to retrieve all available articles published since 1995 to 2016. Second, we pooled data of comparable parameters about RTW proportions and sick-leave days until full RTW to reduce the bias of the descriptive analysis.

Despite these strengths, the review has some limitations. First, the search was restricted to reports of RCTs published in peer-reviewed journals, excluding other sources which may include relevant studies. To assess this, we used the funnel plot to investigate how much our results were potentially influenced by publication bias. Second, most of the trials had relatively small samples – only two trials (out of 16) had a sample of more than 400 participants. Third, the validity of our results may be influenced by performance bias as blinding was unattainable for most of the psychological interventions. Lack of blinding normally inflates the difference between experimental and control groups, but their difference is small in the present study. Moreover, it is not clear the extent which the trial participants of the trials were ready to RTW. Previous studies showed that individuals who scored high on the RTW inability factor (indicator of readiness to work) were associated with low future work participation (Braathen *et al.* 2014), indicating that the participants might not intend to initiate any activities or change behaviors to support their RTW. The unmeasured levels of readiness to RTW may have contributed to the small difference in RTW in the meta-analysis. Finally, this review focused on interventions that aimed at enhancing RTW. Studies on workplace relapse/recurrence prevention were not included. Relapse/recurrence prevention in workplace should be a focus of future research.

In conclusion, this review found no evidence supporting the effectiveness of RTW interventions in employees with a CMD. The RTW interventions have a modest effect on reducing the number of days of sick leave to RTW, which is positive. As mental health problems are affecting a large proportion of working population, and are often disabling and recurrent, having a reduced number of days of sick leave or faster RTW has both public health and economic implications. The effects of psychotherapy on RTW to date underline the need for more well- designed RCTs in this field.

Supplementary material

The supplementary material for this article can be found at http://dx.doi.org/10.1017/S0033291716002269.

Acknowledgements

This study was supported by an operating grant from the Canadian Institutes of Health Research (MOP: 119399)

Declaration of Interest

None.

References

Ahola K, Virtanen M, Honkonen T, Isometsa E, Aromaa A, Lonnqvist J (2011). Common mental disorders and subsequent work disability: a population-based Health 2000 Study. *Journal of Affective Disorders* **134**, 365–372.

Arends I, Bruinvels DJ, Rebergen DS, Nieuwenhuijsen K, Madan I, Neumeyer-Gromen A, Bultmann U, Verbeek JH (2012). Interventions to facilitate return to work in adults with adjustment disorders. *Cochrane Database of Systematic Reviews* **12**, CD006389.

Arends I, Bültmann U, van Rhenen W, Groen H, van DER, Klink JJ (2013). Economic evaluation of a problem solving intervention to prevent recurrent sickness absence in workers with common mental disorders. *PLoS ONE* **8**, e71937.

Bakker IM, van Marwijk HW, Terluin B, Anema JR, van Mechelen W, Stalman WA (2010). Training GP's to use a minimal intervention for stress-related mental disorders with sick leave (MISS): effects on performance: results of the MISS project; a cluster-randomised controlled trial. *Patient Education and Counseling* **78**, 206–211.

Bethge M, Muller-Fahrnow W (2008). Efficacy of intensified inpatient rehabilitation in musculoskeletal disorders: systematic review and meta-analysis. *Die Rehabilitation* **47**, 200–209.

Blank L, Peters J, Pickvance S, Wilford J, Macdonald E (2008). A systematic review of the factors which predict return to work for people suffering episodes of poor mental health. *Journal of Occupational Rehabilitation* **18**, 27–34.

Braathen TN, Brage S, Tellnes G, Irene O, Chris J, Eftedal M (2014). A prospective study of the association between the readiness for return to work scale and future work participation in Norway. *Journal of Occupational Rehabilitation* **24**, 650–657.

Brouwers EP, Tiemens BG, Terluin B, Verhaak PF (2006). Effectiveness of an intervention to reduce sickness absence in patients with emotional distress or minor mental disorders: a randomized controlled effectiveness trial. *General Hospital Psychiatry* **28**, 223–229.

Brown TA, Campbell LA, Lehman CL, Grisham JR, Mancill RB (2001). Current and lifetime comorbidity of the DSM-IV anxiety and mood disorders in a large clinical sample. *Journal of Abnormal Psychology* **110**, 585–599.

Carroll C, Rick J, Pilgrim H, Cameron J, Hillage J (2010). Workplace involvement improves return to work rates among employees with back pain on long-term sick leave: a systematic review of the effectiveness and cost-effectiveness of interventions. *Disability and Rehabilitation* **32**, 607–621.

Cohen J (1988). *Statistical Power Analysis for the Behavioral Sciences*. 2nd edn. Erlbaum: Hillsdale, NJ.

Cornelius LR, van DER, Klink JJ, Groothoff JW, Brouwer S (2011). Prognostic factors of long term disability due to mental disorders: a systematic review. *Journal of Occupational Rehabilitation* **21**, 259–274.

Desiron HA, de Rijk A, van Hoof E, Donceel P (2011). Occupational therapy and return to work: a systematic literature review. *BMC Public Health* **11**, 615-2458-11-615.

Dewa CS, Loong D, Bonato S, Joosen MC (2015). The effectiveness of return-to-work interventions that incorporate work-focused problem-solving skills for workers with sickness absences related to mental disorders: a systematic literature review. *BMJ Open* **5**, e007122-2014-007122.

Durand MJ, Vezina N, Loisel P, Baril R, Richard MC, Diallo B (2007). Workplace interventions for workers with musculoskeletal disabilities: a descriptive review of content. *Journal of Occupational Rehabilitation* **17**, 123–136.

Franche RL, Cullen K, Clarke J, Irvin E, Sinclair S, Frank J, Institute for Work & Health (IWH) Workplace-Based Rtw Intervention Literature Review Research Team (2005). Workplace-based return-to-work interventions: a systematic review of the quantitative literature. *Journal of Occupational Rehabilitation*, **15**, 607–631.

Hamberg-Van Reenen HH, Proper KI, Van den Berg M (2012). Worksite mental health interventions: a systematic review of economic evaluations. *Occupational and Environmental Medicine*, **69**, 837–845.

Hees HL, De Vries G, Koeter MW, Schene AH (2013). Adjuvant occupational therapy improves long-term depression recovery and return-to-work in good health in sick-listed employees with major depression: results of a randomised controlled trial. *Occupational and Environmental Medicine* **70**, 252–260.

Higgins A, O'halloran P, Porter S (2012). Management of long term sickness absence: a systematic realist review. *Journal of Occupational Rehabilitation* **22**, 322–332.

Higgins JP, Altman DG, Gotzsche PC, Juni P, Moher D, Oxman AD, Savovic J, Schulz KF, Weeks L, Sterne JA, Cochrane Bias Methods Group and Cochrane Statistical Methods Group (2011). The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ (Clinical Research Edition)*, **343**, d5928.

Hoefsmit N, Houkes I, Nijhuis FJ (2012). Intervention characteristics that facilitate return to work after sickness absence: a systematic literature review. *Journal of Occupational Rehabilitation*, **22**, 462–477.

Kivimaki M, Forma P, Wikstrom J, Halmeenmaki T, Pentti J, Elovainio M, Vahtera J (2004). Sickness absence as a risk marker of future disability pension: the 10-town study. *Journal of Epidemiology and Community Health*, **58**, 710–711.

Lagerveld SE, Blonk RWB, Brenninkmeijer V, Wijngaardsde MEIJ L, Schaufeli WB (2012). Work-focused treatment of common mental disorders and return to work: a comparative outcome study. *Journal of Occupational Health Psychology*, **17**, 220–234.

Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JPA, Clarke M, Devereaux PJ, Kleijnen J, Moher D (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. *BMJ* **339**, b2700.

Martin MH, Nielsen MB, Madsen IE, Petersen SM, Lange T, Rugulies R (2013). Effectiveness of a coordinated and tailored return-to-work intervention for sickness absence beneficiaries with mental health problems. *Journal of Occupational Rehabilitation*, **23**, 621–630.

Mcdowell C, Fossey E (2015). Workplace accommodations for people with mental illness: a scoping review. *Journal of Occupational Rehabilitation*, **25**, 197–206.

Mental Health Commission of Canada (2016). Mental Health Indicators of Canada (http://www.mentalhealthcommission.ca/English/focus-areas/mental-health-indicators-canada). Accessed 2 August 2016.

Netterstrøm B, Friebel L, Ladegaard Y (2013). Effects of a multidisciplinary stress treatment programme on patient return to work rate and symptom reduction: results from a randomised, wait-list controlled trial. *Psychotherapy and Psychosomatics*, **82**, 177–186.

Nieuwenhuijsen K, Faber B, Verbeek JH, Neumeyer-Gromen A, Hees HL, Verhoeven AC, van der Feltz-Cornelis CM, Bultmann U (2014). Interventions to improve return to work in depressed people. *Cochrane Database of Systematic Reviews* **12**, CD006237.

Noordik E, van der Klink JJ, Geskus RB, De Boer MR, van Dijk FJ, Nieuwenhuijsen K (2013). Effectiveness of an exposure-based return-to-work program for workers on sick leave due to common mental disorders: a cluster-randomized controlled trial. *Scandinavian Journal of Work, Environment & Health*, **39**, 144–154.

Nystuen P, Hagen KB (2006). Solution-focused intervention for sick listed employees with psychological problems or muscle skeletal pain: a randomised controlled trial [ISRCTN39140363. *BMC Public Health* **6**, 69.

Odeen M, Magnussen LH, Maeland S, Larun L, Eriksen HR, Tveito TH (2013). Systematic review of active workplace interventions to reduce sickness absence. *Occupational medicine (Oxford, England)*, **63**, 7–16.

Pedersen P, Sogaard HJ, Labriola M, Nohr EA, Jensen C (2015). Effectiveness of psychoeducation in reducing sickness absence and improving mental health in individuals at risk of having a mental disorder: a randomised controlled trial. *BMC Public Health* **15**, 763-015-2087-5.

Perbellini L, Tisato S, Quintarelli E, Dal PS, Pelizza L, Riolfi A, Zonzin C, Romeo L (2012). Mental disorders related to persistent negative working conditions. *La Medicina del Lavoro*, **103**, 437–448.

Pomaki G, Franche RL, Murray E, Khushrushahi N, Lampinen TM (2012). Workplace-based work disability prevention interventions for workers with common mental health conditions: a review of the literature. *Journal of Occupational Rehabilitation*, **22**, 182–195.

Rebergen DS, Bruinvels DJ, Bezemer PD, Van Der Beek AJ, van Mechelen W (2009). Guideline-based care of common mental disorders by occupational physicians (CO-OP study): a randomized controlled trial. *Journal of Occupational & Environmental Medicine* **51**, 305–312.

Rebergen DS, Bruinvels DJ, Bos CM, Van Der Beek AJ, van Mechelen W (2010). Return to work and occupational physicians' management of common mental health problems--process evaluation of a randomized controlled trial. *Scandinavian Journal of Work, Environment & Health*, **36**, 488–498.

Shaw W, Hong QN, Pransky G, Loisel P (2008). A literature review describing the role of return-to-work coordinators in trial programs and interventions designed to prevent workplace disability. *Journal of Occupational Rehabilitation* **18**, 2–15.

Shiels C, Gabbay MB, Ford FM (2004). Patient factors associated with duration of certified sickness absence and transition to long-term incapacity. *British Journal of General Practice* **54**, 86–91.

Sogaard HJ, Bech P (2009). The effect on length of sickness absence by recognition of undetected psychiatric disorder in long-term sickness absence. A randomized controlled trial. *Scandinavian Journal of Public Health*, **37**, 864–871.

Sogaard HJ, Bech P (2010). The effect of detecting undetected common mental disorders on psychological distress and quality of life in long-term sickness absence: a randomised controlled trial. *Scandinavian Journal of Public Health*, **38**, 845–856.

Streibelt M, Egner U (2012). A meta-analysis of the impact of sample, kind of outcome measurement and time of follow up on occupational re-integration after vocational retraining. *Die Rehabilitation*, **51**, 398–404.

Thunnissen M, Duivenvoorden H, Busschbach J, Hakkaart-van Roijen L, van Tilburg W, Verheul R, Trijsburg W (2008). A randomized clinical trial on the effectiveness of a reintegration training program versus booster sessions after short-term inpatient psychotherapy. *Journal of Personality Disorders* **22**, 483–495.

van der Feltz-Cornelis CM, Hoedeman R, De Jong FJ, Meeuwissen JAC, Drewes HW, van der Laan NC, Ader HJ (2010). Faster return to work after psychiatric consultation for sicklisted employees with common mental disorders compared to care as usual. A randomized clinical trial. *Neuropsychiatric Disease and Treatment* **6**, Art 375–385; 11.

van der Feltz-Cornelis CM, Meeuwissen JA, De Jong FJ, Hoedeman R, Elfeddali I (2007). Randomised controlled trial of a psychiatric consultation model for treatment of common mental disorder in the occupational health setting. *BMC Health Services Research* **7**, 29.

van der Klink JJ, Blonk RW, Schene AH, Van DIJK FJ (2003). Reducing long term sickness absence by an activating intervention in adjustment disorders: a cluster randomised controlled design. *Occupational and Environmental Medicine*, **60**, 429–437.

van Oostrom SH, Driessen MT, De Vet HC, Franche RL, Schonstein E, Loisel P, van Mechelen W, Anema JR (2009). Workplace interventions for preventing work disability. *Cochrane Database of Systematic Reviews* CD006955. doi(2), CD006955.

van Oostrom SH, van Mechelen W, Terluin B, De Vet HCW, Knol DL, Anema JR (2010). A workplace intervention for sick-listed employees with distress: results of a randomised controlled trial. *Occupational & Environmental Medicine* **67**, 596–602.

Vlasveld MC, van der Feltz-Cornelis CM, Ader HJ, Anema JR, Hoedeman R, van Mechelen W, Beekman AT (2013*a*). Collaborative care for sick-listed workers with major depressive disorder: a randomised controlled trial from the Netherlands Depression Initiative aimed at return to work and depressive symptoms. *Occupational and Environmental Medicine* **70**, 223–230.

Vlasveld MC, van der Feltz-Cornelis CM, Anema JR, van Mechelen W, Beekman AT, van Marwijk HW, Penninx

BW (2013*b*). The associations between personality characteristics and absenteeism: a cross-sectional study in workers with and without depressive and anxiety disorders. *Journal of Occupational Rehabilitation* **23**, 309–317.

Volker D, Zijlstra-Vlasveld MC, Anema JR, Beekman AT, Brouwers EP, Emons WH, van Lomwel AG, van der Feltz-Cornelis CM (2015*a*). Effectiveness of a blended web-based intervention on return to work for sick-listed employees with common mental disorders: results of a cluster randomized controlled trial. *Journal of Medical Internet Research* **17**, e116.

Volker D, Zijlstra-Vlasveld MC, Brouwers EP, van Lomwel AG, van der Feltz-Cornelis CM (2015*b*). Return-to-work self-efficacy and actual return to work among long-term sick-listed employees. *Journal of Occupational Rehabilitation*, **25**, 423–431.

Waghorn G, Dias S, Gladman B, Harris M, Saha S (2014). A multi-site randomised controlled trial of evidence-based supported employment for adults with severe and persistent mental illness. *Australian Occupational Therapy Journal* **61**, 424–436.

Williams RM, Westmorland MG, Lin CA, Schmuck G, Creen M (2007). Effectiveness of workplace rehabilitation interventions in the treatment of work-related low back pain: a systematic review. *Disability and Rehabilitation*, **29**, 607–624.