Systematic review and meta-analysis of interventions aimed at enhancing return to work for sick-listed workers with common mental disorders, stress-related disorders, somatoform disorders and personality disorders

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ABSTRACT

Objectives Mental disorders are associated with significant functional impairment, sickness absence and disability. The consequences of sickness absence warrant investigation into interventions aimed at enhancing return to work (RTW) for workers with mental disorders. The present systematic review and meta-analysis aim to synthesise evidence on the effectiveness of interventions aimed at enhancing RTW in sick-listed workers with mental disorders.

Methods EconLit, Embase, PsychInfo, PubMed, Svemed+ and Web of Science were searched for peer-reviewed, randomised or controlled studies assessing employment-related outcomes of interventions. A meta-analysis was conducted and meta-regressions were performed to explore prespecified potential sources of heterogeneity between studies.

Results The literature search yielded 3777 publications of which 42 (n=38 938) were included in the systematic review and 32 (n=9459) had appropriate data for the meta-analysis. The pooled effect size (95 % CI) was 0.14 (0.07 to 0.22). Meta-regressions revealed that the heterogeneity could not be attributed to study quality, timing of the intervention or length of the intervention. However, it could be partly explained by number of components included in the intervention, if the intervention included contact to the work place and by the disorder targeted by the intervention.

Conclusions The results reveal strong evidence for interventions including contact to the work place and multicomponent interventions and moderate evidence for interventions including graded RTW. In addition, the results provide strong evidence for interventions targeting stress compared with interventions targeting other mental disorders. The findings point to important implications for policy and design of future interventions.

INTRODUCTION

Mental disorders are prevalent in the labour force in developed countries and associated with significant personal and public expenses.[1] Inherent to the definition of mental disorders is that they imply significant distress and functional impairment for the person affected.[2 3] This is mirrored in the strong association between mental disorders and low work function as well as increased sickness absence.[4] Common mental disorders are the leading cause of sickness absence in the majority of high-income countries and the main impetus behind 1/3 of all disability benefits.[5]

The consequences of reduced work functioning and increased sickness absence should not be disregarded. For the individual, work often constitutes an important source of social integration and social identity.[6] Further, work can afford structure, purpose and meaning in daily life for both healthy individuals and individuals with mental health problems.[7 8] Thus, at the personal level, absence from work may have consequences for social and psychological well-being. For society, sickness absence due to mental disorders represents a significant financial burden comparable to or exceeding that of physical disabilities (eg, blindness, musculoskeletal disorders[9 10]). This is likely due to a combination of increased prevalence of sickness absence, low probability of return to work (RTW) following sickness absence and a high risk of recurrent sickness absence found in workers with mental disorders.[4]

The clinical, social and economic consequences of sickness absence and reduced work functioning in workers with mental disorders have increasingly been recognised by policy makers and researchers alike. This has led to development of a variety of interventions aimed at increasing RTW among sick-listed workers with mental disorders. Although the primary goal of these interventions is the same (ie, facilitating RTW), the contents and methods vary, and no gold standard exists.[4] At a general level, these interventions often contain one or more of the following four components: (1) Organisational change, defined as enhanced collaboration or integration of central partakers, (2) Graded RTW, (3) Therapeutic elements, for example, therapeutic conversations or therapy and (4) Contact to the work place. Whether each of these components by themselves or in combination significantly increase RTW among sick-listed workers with mental disorders has yet to be established.

Within the field of occupational medicine, several reviews and meta-analyses exist of RTW-interventions for sick-listed workers with musculoskeletal disorders and other non-communicable diseases[11 12]. However, only a handful of reviews and meta-analyses have been conducted for interventions aimed at RTW for sick-listed workers with mental health disorders. Only three of these reviews included a meta-analysis,[13–15] and two of these were

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disorder-specific (ie, aimed at adjustment disorders[13]: or depression[14]). Nigatu and colleagues[15] included a broader spectrum of mental disorders in their review and meta-analysis. The authors reviewed the literature on interventions aimed at enhancing RTW in sick-listed workers with common mental disorders, CMD (defined by the authors as depressive disorders, anxiety disorders and adjustment disorders). The authors concluded that there is no evidence to support the effectiveness of available interventions. However, this conclusion was based solely on interventions involving elements of Cognitive Behavioral Therapy (CBT). Thus, the authors excluded interventions that did not include CBT-elements and that were not aimed at sick-listed workers with CMD. As depressive disorders and anxiety disorders only make up 2 out of the 10 most high-prevalence and high-cost mental disorders affecting workers,[16] it may be beneficial to adopt a more comprehensive approach, addressing a larger segment of mental disorders and a wider variety of RTW-interventions.

The aim of the present review and meta-analysis was to collate and update the existing evidence for interventions aimed at facilitating RTW in sick-listed workers with mental disorders. Interventions aimed at a broad spectrum of high-prevalence, high-cost mental disorders (ie, anxiety disorders, depressive disorders, adjustment disorders, stress-related disorders, personality disorders and somatoform disorders) were included.

METHODS

A systematic review and meta-analysis for studies of interventions aimed at enhancing RTW for sick-listed workers with anxiety disorders, depressive disorders, adjustment disorders, stress-related disorders, personality disorders and somatoform disorders were performed.

A review protocol was prospectively registered with Prospero (registration number: CRD 42017070410). Our review conforms to the PRISMA guidelines for systematic reviews and meta-analyses.

Search strategy

An extensive search of the electronic databases EconLit, Embase, PsychInfo, PubMed, Svemed+ and Web of Science from January 2000 to June 2017 was conducted. The cut-off date of January 2000 was chosen to ensure relevance of the findings for current occupational and diagnostic practices and policies. The searches were limited to peer-reviewed English-language publications and either randomised controlled trials or controlled trials. Reference lists of identified literature and newer publications citing identified literature were reviewed. The search terms were established using the PICO model (see online supplementary appendix 1).

Study selection

For inclusion, the studies had to be peer-reviewed, randomised or controlled studies assessing employment-related outcomes of interventions aimed at sick-listed workers with anxiety disorders, depressive disorders, adjustment disorders, stress-related disorders, personality disorders and/or somatoform disorders. When studies were aimed at more than one of these disorders, they were classified as targeting sick-listed workers with CMDs.

Employment-related outcomes were defined broadly as (1) time until RTW, (2) proportion of participants achieving RTW, (3) number of sick leave days and (4) self-reported work-readiness. Previous systematic reviews have been used as a foundation for this review, but were not formally included. Grey literature, single case studies and qualitative studies were excluded.

The selection process consisted of three stages. First, the two authors independently screened the titles and abstracts of retrieved studies to determine eligibility. Second, the two authors independently read the full text articles of identified studies to assess whether studies should be included. Third, the authors reviewed reference lists and newer publications citing identified literature. Interobserver agreement was calculated at each stage and disagreements were resolved by consensus.

Quality appraisal

To establish a reliable rating system, the two authors jointly reviewed two studies and developed a quality assessment checklist based on The National Institutes of Health Quality Assessment Tool for Controlled Intervention Studies (see online supplementary appendix 2). The methodological quality of the remaining studies was assessed independently by the two authors according to this quality assessment checklist. Interobserver agreement was assessed by calculating the kappa index (κ) with 95% CI. Disagreements were resolved through discussion. The summary score for each study was calculated (minimum: 1, maximum: 10) and categorised into three categories. Studies with a score of ≥9 were considered of high quality, studies with a score of 6–8 were considered of fair quality and studies with a score of 5 were considered of poor quality. These categories were used to evaluate whether outcomes significantly varied according to study quality and to determine which weight studies should be given in the synthesis of the findings.

Data extraction and coding

The two authors independently used a prespecified data-extraction sheet to extract data from the included studies (see online supplementary appendix 3). Accordingly, data were extracted at five levels: study, participants and controls, design and method, measure of interest and outcome and effect. In addition, intervention types were coded according to four components: (1) organisational change, that is, enhanced collaboration or integration of central partakers, (2) graded RTW, (3) therapeutic elements, for example, therapy or therapeutic support and (4) work place contact before RTW, for example, meetings with the sick-listed worker and a representative of the employer at the workplace. When studies evaluated more than one intervention with no overlap in participants, each treatment group were included separately and contrasted with the control group.

Statistical procedure

The primary outcome measure used in the meta-analysis was time until RTW. When time until RTW was not available, the proportion of participants who had achieved RTW measured as close to the end of the intervention as possible was used. Studies using alternative outcome measures were included in the meta-analysis if the outcomes could be converted to standardised effect sizes for mean difference between the intervention group and the control group. Effect sizes were calculated as Glass' delta (Δ), where the mean difference between the intervention-group (1) and the control group (2) is divided by the SD of the control group: $\triangle = \frac{M_a - M_b}{\sigma_b}$. According to Kline,[17] this is an appropriate method when interventions affect both the central tendency and variability in the population distribution. The I^2 statistic was calculated to assess heterogeneity between studies. A random effects meta-analysis was applied, as it allows for heterogeneity in the analysis of the overall effectiveness of the interventions. Meta-regression analyses were performed to investigate prespecified moderators of effectiveness (ie, target

population, intervention content, quality and country of origin). Risk of publication bias was assessed by funnel plot analysis and the Egger's test.

RESULTS

A PRISMA flow diagram of the search results and reasons for study exclusion can be found in supplementary material (see online supplementary figure 1). The literature search yielded 4104 potentially relevant publications (3777 after removal of duplicates), while the review of reference lists and newer publications citing the identified literature yielded an additional 4 potentially relevant publications. After review of titles and abstracts, 118 full-text articles were retrieved for further consideration. Following review of the full-text articles, 76 articles were excluded, leaving 42 articles (n=38 938) to be included in the present systematic review (see table 1). Agreement about inclusions and exclusion was high. The two authors were in 97.5% agreement about inclusion and exclusion following the preliminary screening of titles and abstracts and in 95% agreement of inclusion and exclusion following review of full-text articles.

Of the 42 articles that met the criteria for inclusion and exclusion, 3 articles described studies using the same data as other included articles. For these, data were extracted from the most

Table 1 Quality ratings of included studies

Study	Randomised trial	Acceptable randomisation /control procedure	<20% dropout	Insignificant difference in dropout between groups	Good fidelity	Definition of counterfactual treatment is clear	Valid and reliable measurement of outcomes	Power calculations	Protocol (statistical strategy outlined a priori)	Recognised statistical analyses	Summarised score
Bakker *et al*[25]	+	+	+	+	0	+	+	+	+	+	9
Beck *et al*[46]	+	+	+	+	+	+	+	0	0	+	8
Blonk *et al*[29]	+	+	+	+	0	+	+	0	+	+	8
Brouwers *et al*[23]	+	+	+	+	+	+	+	+	0	+	9
De Vente *et al*[44]	+	+	+	0	+	+	+	0	+	+	8
de Weerd *et al*[47]	+	+	0	+	+	+	+	+	0	0	7
Fleten *et al*[18]	+	+	+	+	+	+	+	0	+	+	9
Folke *et al*[45]	+	0	+	+	+	+	+	+	0	+	8
Hees *et al*[24]	+	+	+	+	+	+	+	+	+	+	10
Hellström *et al*[22]	+	+	+	+	+	+	+	+	+	+	10
Kröger *et al*[34]	+	0	+	+	+	+	+	0	0	+	7
Lammerts *et al*[40]	+	+	+	+	0	+	+	0	+	+	8
Lytsy *et al*[42]	+	+	+	+	+	+	+	0	0	+	8
Martin *et al*[38 39]	+	0	+	+	0	+	+	0	0	+	6
Momsen *et al*[41]	+	+	0	+	+	+	+	0	+	+	8
Netterstrøm *et al*[32]	+	+	+	+	+	+	+	0	0	0	7
Netterstrøm *et al*[33]	+	0	+	+	+	+	+	0	0	+	7
Noordik *et al*[48]	+	+	0	+	0	+	+	+	+	+	8
Nystuen *et al*[43]	+	+	0	0	0	+	+	0	+	+	6
Rebergen *et al*[49]	+	+	+	+	+	0	+	0	+	+	8
Reme *et al*[20]	+	+	+	+	+	+	+	+	+	+	10
Schene *et al*[30]	+	+	+	+	+	+	+	0	0	+	8
Skouen *et al*[37]	+	+	+	+	0	+	+	0	0	+	7
Stenlund *et al*[50]	+	+	+	+	+	+	+	+	0	0	8
van Beurden *et al*[35 36]	+	0	+	+	0	+	0	0	+	+	6
van der Feltz-Cornelis *et al*[19]	+	+	+	+	0	+	+	+	+	+	9
van der Klink *et al*[28]	+	+	+	+	+	+	+	0	0	+	8
van Oostrom *et al*[26]	+	+	+	+	+	+	+	+	+	+	10
Vlasveld *et al*[27]	+	+	+	+	0	+	+	+	+	+	9
Volker *et al*[21]	+	+	+	+	0	+	+	+	+	+	9
Willert *et al*[31]	+	+	+	+	0	+	+	+	0	+	8
Eklund *et al*[8]	0	+	+	+	+	+	+	+	0	+	8
Grossi *et al*[53]	0	0	+	+	0	+	+	+	0	0	5
Karlson *et al*[55]	0	0	+	0	0	+	+	0	+	0	4
Lagerveld *et al*[57]	0	0	+	+	+	+	+	0	0	0	5
Netterstrøm *et al*[51]	0	+	+	+	+	+	+	0	+	0	7
Schneider *et al*[59]	0	+	+	+	0	0	+	0	0	+	5
Suoyrjö *et al*[54]	0	+	+	+	0	+	+	0	0	0	5
Wåhlin *et al*[58]	0	0	0	0	0	0	0	0	0	0	0

recent article with relevant data. Thus, the final sample consisted of 39 studies comprising 31 randomised controlled trials (RCTs) and 8 controlled trials. The studies were published in scientific journals between 2003 and 2017.

Systematic review

The quality assessment revealed that 10 of the included studies could be characterised as high-quality studies, 23 studies could be characterised as fair quality studies and 6 could be characterised as low-quality studies. All RCTs were evaluated to be of fair or high quality. Two controlled studies were assessed to be of fair quality, while the remaining controlled studies were evaluated to be of poor quality. The two authors were in 97.5% agreement about the classification of studies into high quality, fair quality and low quality categories. The intercoder agreement for exact scores on the quality checklist was $\kappa=0.5$, indicating moderate agreement. Table 1 provides an overview of included studies and specific quality ratings of these studies. The majority of the studies were conducted with participants with CMDs and stress-related disorders, while a few studies were conducted exclusively with participants with depression and somatoform disorders. None of the included studies were on interventions aimed at sick-listed workers with personality disorders.

To provide structure for the systematic review, the included studies are reviewed according to study quality and design. Thus, high-quality RCT studies, fair-quality RCT studies and controlled studies are reviewed in turn.

Summary of high quality RCT-studies

Ten RCT studies were characterised as being of high quality. Table 2 provides an overview of included studies including intervention characteristics and effectiveness. Three of the high-quality studies found a positive effect of the studied intervention,[18–20] while seven high-quality studies report no effect.[21–27]

The content and methods employed in these high quality interventions are very different, and no obvious conclusions can be drawn based on these studies alone. However, an interesting observation can be made regarding the target group. No diagnosis-specific intervention were found to have an effect, while three interventions aimed at workers with CMDs were found to be effective.

Summary of fair quality RCT studies

Twenty-one RCT studies were characterised as fair quality (see table 2). Seven fair-quality studies found a positive effect of the examined intervention,[28–34] while 14 fair quality studies showed no effect.[35–50]

As with the high-quality RCTs, the fair-quality RCTs comprise very different interventions. However, a few common characteristics are apparent: the majority of the effective interventions were aimed at newly or short-term sick-listed workers (<10 weeks at the time of inclusion; 5/7 studies), were disorder specific (7/7 studies), included contact to the work place (6/7 studies), often in combination with therapy), were delivered by a multidisciplinary team (4/7 studies) and included two or more components (5/7 studies).

Characteristics of the fair-quality RCTs that did not show effect can be used to nuance the highlighted characteristics for effective studies. About half of the ineffective studies were aimed at newly or short-term sick-listed workers (7/14 studies) and included a multidisciplinary team (6/14). The majority of the ineffective studies were aimed at workers with CMDs (9/14), did not include contact to the work place (12/14) and included only 0 or 1 of the four identified components (13/14 studies).

Overall, the findings from the fair quality RCTs suggest that disorder-specific interventions, interventions including contact to the work place as a component and interventions with more than one component are more likely to be effective.

Summary of controlled studies

Eight controlled studies were included in the present review (see table 2). Two controlled studies were characterised as fair quality,[51 52] while the remaining six studies were of poor quality.[53–59] Five controlled studies found a positive effect of the examined intervention,[51 52 57–59] while three controlled studies showed no effect.[53–56] Study characteristics varied greatly across controlled studies. No convincing patterns of characteristics emerge from the overview of effective and ineffective controlled studies.

Meta-analysis

For the meta-analysis, primary authors were contacted in order to obtain missing data for 10 studies.[18 26 30 33 35–37 46 50 59] We received data from authors of four studies,[18 33 35 36 46] while two authors were not able to comply with the request.[37 50] The remaining authors could not be reached. Thus, appropriate data were available from 33 studies. One of these studies[52] was excluded, as the reported results shifted from significantly negative to significantly positive at different points in time during follow-up. Three of the included studies[29 41 42] tested the effects of more than one intervention or estimated the effect of the intervention on more than two groups. Thus, the final sample included in the meta-analysis consisted of 32 studies with 35 effect sizes.

Overall effect

The result of the random effects meta-analysis is summarised in figure 1.

The pooled effect size (95% CI) was 0.14 (0.07 to 0.22) with considerable heterogeneity ($I^2=67.8\%$). This result was highly significant ($p<0.001$), implying that the interventions generally shortened time until RTW and increased the fraction of participants who had achieved RTW at follow-up. The test of heterogeneity was significant, indicating that two-thirds of the variation in effect sizes across studies was likely due to other sources than sampling error alone (eg, study design, intervention content, target population). These findings remained unaltered when the meta-analysis was rerun without studies of poor quality (effect size=0.12, $p<0.001$).

Meta-regressions were performed for the meta-analysis with all 32 studies (35 effect sizes) to assess potential sources of heterogeneity. Results from the meta-regressions are presented in the following section.

Nineteen of the included studies found positive effects of the tested interventions, but only 11 of these were significant. Six studies found negative effects, but only two of these effects were significant. Ten studies found no effect. The most effective interventions were presented by Netterstrøm *et al*,[32 33] who found an increase in proportion of participants achieving RTW in the intervention group (66% and 67%) compared with the control group (36% in both studies). These effects are substantial, corresponding to almost a doubling of the proportion of participants achieving RTW in the intervention group compared with the control group.

Table 2 Overview of study characteristics and effectiveness

Publication	Target group	Intervention content	Duration of intervention	Fidelity>75%	Intervention given by	Contains: Org. change	Graded return to work	Therapy	Work place contact	Outcome	Effective
High-quality RCTs											
Brouwers *et al*[23] (n=194)	CMD (depressive disorders, anxiety disorders and emotional distress)	Early intervention focused on problem solving and coping	Five sessions (50 min) over the course of 10 weeks	Yes	Social workers	–	–	X	–	Time until RTW	No
Fleten *et al*[18] (n=169)	CMD (depressive disorders and other mental disorders)	Minimal intervention: letters containing generic information about sick leave and a questionnaire	–	Yes	–	–				Time until RTW	Yes
Reme *et al*[20] (n=1193)	CMD (depression and anxiety symptoms)	Integrated CBT and Individual Placement and Support (IPS)	Up to 15 sessions	Yes	Therapists and caseworkers	X	X	X	X	Full RTW at 12 months	Yes
van der Feltz-Cornelis *et al*[19] (n=60)	CMD (depressive disorders, anxiety disorders and somatoform disorders)	Training of occupational physicians in diagnosing and treating CMDs. Training of psychiatrists in facilitating RTW	–	–	Occupational physicians and psychiatrists	–	–	–	–	Time until RTW	Yes
Volker *et al*[21] (n=216)	CMD (depressive disorders, anxiety disorders and somatoform disorders)	Online intervention consisting of psychoeducation and with a focus on addressing RTW	6–17 online sessions, that could be completed at any time	No	–	–	–	X	–	Time until RTW	No
Bakker *et al*[25] (n=433)	Stress	Brief training of primary care physicians in giving advice on achieving RTW	Up to t consultations	No	Primary care physicians	–	–	–	–	Time until RTW	No
van Oostrom *et al*[26] (n=145)	Stress	Referral to an RTW-coordinator, who facilitated contact to the work place and aided in problem solving	~1 month	Yes	RTW coordinators (social worker or labour expert)	X	–	–	–	Time until RTW	No
Hees *et al*[24] (n=117)	Depression	Individual and group sessions with an occupational therapist. Intervention focused on facilitating contact to the work place and engaging in simulated work situations	18 sessions	Yes	Occupational therapists	–	–	X	X	Full RTW at 18 months	No
Vlasveld *et al*[27] (n=126)	Depression	Collaborative care provided by occupation care manager. Focus on problem solving, guided self-help and interventions at the work place	6–12 sessions	No	Occupational physician care managers	–	–	X	X	Time until RTW and full RTW at 12 months	No
Hellström *et al*[22] (n=326)	Depression and anxiety	Individual Placement and Support (IPS) modified to fit workers with depression and anxiety disorders		Yes	Mentors (nurses, social workers or occupational therapists)	X	–	X	X	Full RTW at 12 months	No
Fair-quality RCTs											
de Weerd *et al*[47] (n=60)	CMD (depressive disorders, anxiety disorders, stress-related disorders and somatoform disorders)	A meeting focused on problem solving (convergence dialogue meeting) between employee, therapist and employer in addition to treatment as usual (CBT)	–	Yes	Therapists and caseworkers	–	–	–	X	Time until RTW	No
Lammerts *et al*[40] (n=186)	CMD (depressive disorders, anxiety disorders and stress-related disorders)	Early coordinated intervention focused on problem solving and fast, supported return to work	~6 weeks	No	RTW-coordinators, insurance physicians and labour experts	X	–	–	–	Time until RTW	No
Lytsy *et al*[42] (n=308)	CMD (mental disorders) and pain	TEAM: Multidisciplinary team develop individualised rehabilitation plan focused on problem solving	–	Yes	TEAM: physicians, psychologists, occupational therapists and social workers	X	–	–	–	Number of sick-leave days in following 12 months	No
		ACT: Acceptance and commitment therapy. Focused on enhancing level of functioning and quality of life			ACT: Therapists	–	–	X	–		

continued

Table 2 continued

Publication	Target group	Intervention content	Duration of intervention	Fidelity>75%	Intervention given by	Contains: Org. change	Graded return to work	Therapy	Work place contact	Outcome	Effective
Martin *et al*[38] (n=168)	CMD (anxiety disorders, depressive disorders and related mental health problems)	Multidisciplinary team is appointed to develop rehabilitation plan with a focus on problem solving	Max 12 weeks	No	Multidisciplinary teams (not specified)	X	–	–	–	Full RTW at 12 months	No
Momsen *et al* [41] (n=443)	CMD (CMD not specified and stress-related disorders)	Multidisciplinary team is appointed to develop an individualised RTW plan	–	Yes	RTW coordinators and health professionals	X	–	–	–	Time until RTW	No
Noordik *et al*[48] (n=160)	CMD (depressive disorders, anxiety disorders, stress-related disorders and adjustment disorders)	Gradual exposure to increasing work load (not partial return to work)	–	No	Occupational physicians	–	–	X	–	Time until RTW	No
Nystuen *et al* [43] (n=40)	CMD (non-severe psychological problems)	Solution focused therapy (individually or in groups)	8 weeks (8 sessions of 3–4 hours)	–	Psychologists	–	–	X	–	Number of sick-leave days in following 12 months	No
Rebergen *et al*[49] (n=240)	CMD (depressive disorders, anxiety disorders and adjustment disorders)	Training of occupational physicians in facilitating RTW through problem solving, gradual return to work and contact to the work place. Based on CBT principles	2–20 weeks	Yes	Occupational physicians	–	–	–	–	Time until RTW	No
van Beurden *et al*[35] (n=3228)	CMD (depressive disorders, anxiety disorders, stress-related disorders and other mental disorders)	Training of occupational physicians in following guidelines: see patient, evaluate treatment, prevent recurrences and evaluate process	8 sessions over the course of 12 months	–	Occupational physicians	–	–	–	–	Time until RTW	No*
Beck *et al*[46] (n=20)	Stress	Psychotherapy using music to reduce stress	6 session over the course of 9 weeks	Yes	Therapist	–	–	X	–	Self-reported work readiness	No
Blonk *et al*[29] (n=128)	Stress	Traditional CBT	11 sessions (45 min) over the course of ~6 weeks	–	Psychologists	–	–	X	–	Time until RTW	No
		CBT combined with advice from labour experts on work processes, stress management and RTW	5–6 sessions (1 hour) over the course of ~3 weeks		Psychologists and labour experts				X		Yes
De Vente *et al*[44] (n=82)	Stress	Stress-management intervention based on CBT (individual)	–	Yes	Psychologists	–	–	X	–	Number of sick-leave days in following 4 months	No
		Stress-management intervention based on CBT (group)									
Netterstrøm *et al*[51] (n=140)	Stress	Stress-inoculation intervention and mindfulness-based training combined with contact to the work place	Stress treatment (3 months) and mindfulness-based stress intervention (8 weeks)	Yes	Occupational physicians and psychologists	X	–	X	X	Full RTW at 3 months	Yes
Netterstrøm *et al*[33] (n=117)	Stress	Stress therapy concept of Kalmia and mindfulness-based training combined with work place dialogue	10 weeks	Yes	Therapists	–	–	X	X	Full RTW at 3 months	Yes
Stenlund *et al*[50] (n=136)	Stress	Cognitive behavioural rehabilitation (CBR) in addition to treatment as usual (Qigong; mind-body training)	CBR and one weekly Qigong session (1 hour) for a year	Yes	Physiotherapist trained in Qigong	–	–	X	–	Proportion sick-listed at 12 months	No
Van der Klink *et al*[28] (n=192)	Stress	Training of occupational physicians in giving CBT-intervention focused on problem solving and contact to the work place	4–5 consultations (90 min) within the first 6 weeks of sick leave	Yes	Occupational physicians	–	–	X	X	Time until RTW and full RTW at 3 months	Yes
Willert *et al*[31] (n=87)	Stress	Stress-inoculation intervention	8 sessions over the course of ~3 months	No	Psychologists	–	–	X	–	Number of sick-leave days in following 4 months	Yes
Folke *et al*[45] (n=34)	Depression	Acceptance and commitment therapy (group)	6 sessions	–	Psychologists	–	–	X	–	Work readiness	No

continued

Table 2 continued

Publication	Target group	Intervention content	Duration of intervention	Fidelity>75%	Intervention given by	Contains: Org. change	Graded return to work	Therapy	Work place contact	Outcome	Effective
Kröger *et al*[34] (n=26)	Depression	Training of therapists in giving an intervention aimed at problem solving, facilitating gradual RTW and viewing the work place as a resource. Inclusion of employer and occupational physician if possible	24 weekly work-related CBT-sessions	Yes	Therapists experienced in treating depression and occupational physicians	X	X	X	X	Sick-leave days /100	Yes
Schene *et al*[30] (n=50)	Depression	Intervention focused on problem solving, preparation for RTW, contact to the work place and early return to work (if possible)	48 weeks	Yes	Occupational physicians and occupational therapists	–	–	X	X	Time until RTW	Yes
Skouen *et al*[37] (n=208)	Chronic pain	Multidisciplinary programme consisting of psychoeducation and feedback from multidisciplinary team and follow-up meetings	1 hour meeting and three follow-up meetings	–	Multidisciplinary teams (not specified)	X	–	–	–	Number of sick-leave days in following 54 months	No
		Multidisciplinary programme consisting of CBT, physical training and interventions at the work place	4 weeks (6 hour every day, 5 days a week)			X	–	X	–		
Controlled studies											
Lagerveld *et al*[57] (n=168)	CMD (adjustment disorders, anxiety disorders, depressive disorders and other mental disorders)	Work-related CBT. Focus on the work place as a resource and on facilitating gradual RTW	12 sessions over the course of ~5,5 months	Yes	Psychologists	–	X	X	–	Time until RTW	Yes
Schneider *et al*[59] (n=28 856)	CMD (mental disorders)	Gradual RTW		–	Physicians	–	X	–	–	Time until RTW	Yes
Wåhlin *et al*[58] (n=311)	CMD (depressive disorders, anxiety disorders, adjustment disorders and stress-related disorders)	Medical, rehabilitating and/or work related intervention-modules (content not specified)		–		?	?	?	?	Self-reported work ability	Yes
Eklund *et al*[52] (n=84)	Stress	Rehabilitation involving analysis of the participant's situation, goal setting and RTW	16 weeks	Yes	Social insurance officers	–	–	X	X	RTW at 12 months	Yes
Grossi *et al*[53] (n=24)	Stress	Rehabilitation programme consisting of consultations with the course leader, group meetings focused on enhancing coping skills and training in relaxation techniques	3 months (½ day of training and ½ day meetings weekly)	–	Social workers	–	–	X	–	Sickness absence at 12 months	No
Karlson *et al*[55 56] (n=148)	Stress	A dialogue-meeting focused on problem solving between worker, team worker and employer and a group seminar on stress	Meeting (1,5 hour) and seminar attendance (½ day)	–	Team workers (not specified)	–	–	–	X	RTW at 80 weeks	No
Netterstrøm *et al*[32] (n=97)	Stress	Anamnesis, clinical examination, stress management programme, physical training, training in relaxation techniques, a book on stress and facilitation of contact to the work place (in agreement with participant)	4 months	Yes	Labour experts	–	–	X	X	Full RTW at 4 months	Yes
Suoyrjö *et al*[54] (n=218)	Fibromyalgia	Course for in-patients. Individualised interventions providing psychoeducation about fibromyalgia and aimed at enhancing coping skills	15 days over the course of 6 months	–	Physicians, psychologists, physiotherapists, social workers etc	–	–	X	–	Time until RTW	No

*Not for RTW, but for self-reported belief in RTW.
CBT, Cognitive Behavioral Therapy; CBR, cognitive behavioural rehabilitation; CMD, common mental disorder; IPS, Individual Placement and Support; RCT, randomised controlled trial; RTW, return to work.

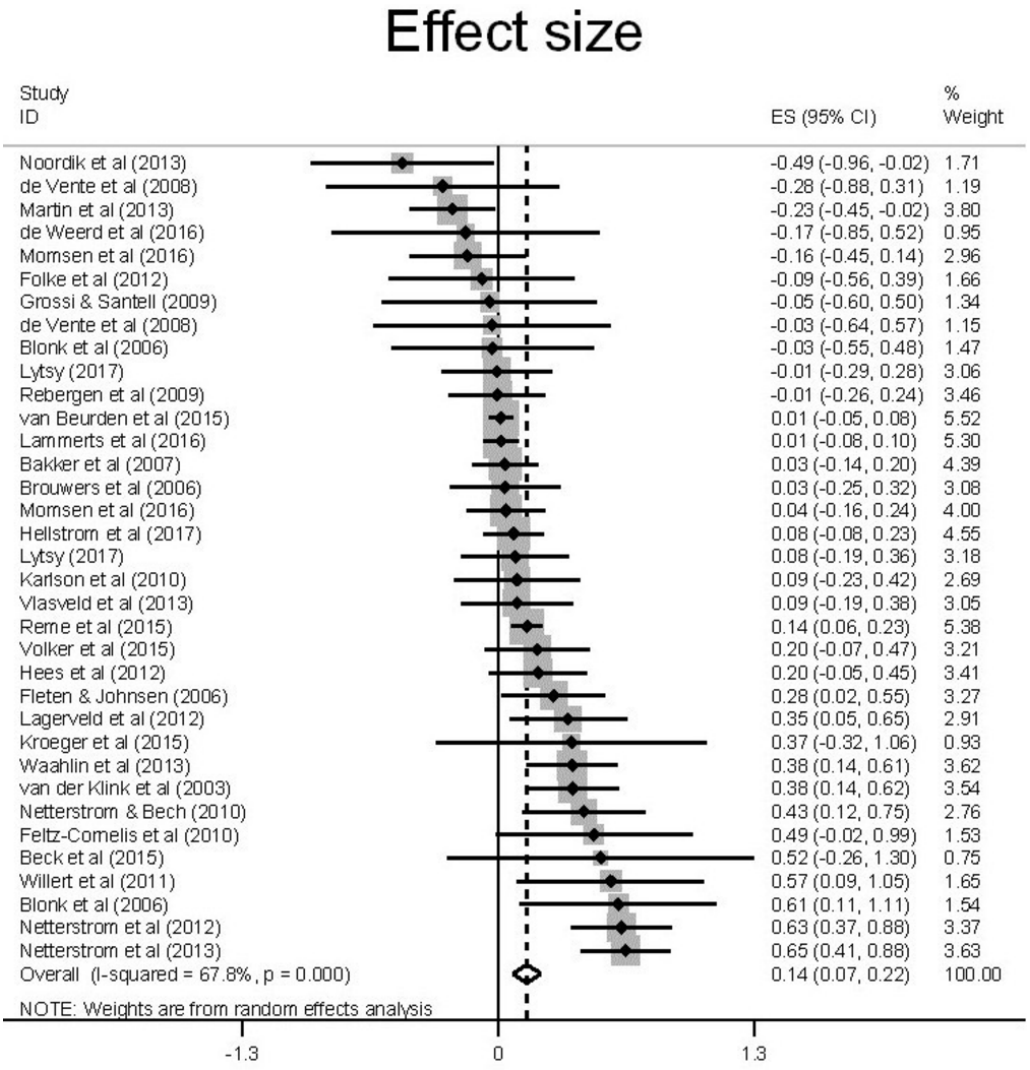

Figure 1 Results of the meta-analysis. Note: Test for heterogeneity, $\chi^2 = 105.72$ (df=34), p=0.000. Proportion of variation in effect sizes that can be attributed to heterogeneity, I-squared: 67.8 %. Test of effect size=0: Z=3.88, p=0.000. The overall effect size of 0.14 can be considered small according to the classification of Cohen.[60] An effect size of 0.14 corresponds to an increase in return to work at three month follow-up from, for example, 36% to 43%.

Meta-regression estimates of moderators of effect sizes

Meta-regressions were performed to assess the moderating influence of study and population characteristics on effect sizes. In addition, the meta-regressions provide an opportunity to test the robustness of the findings from the systematic review, where effect size and sample size were not taken into consideration. Table 3 provides results from meta-regressions estimating the moderating effect of diagnosis (reference category: CMD), country of origin (reference category: Netherlands), number of components included in an intervention (reference category: 1), specific components included in an intervention (reference category: no specific components) and study quality (reference category: fair).

As evident from table 3, interventions aimed at workers sick-listed due to stress showed the largest effects. Effect sizes from studies aimed at workers with the remaining diagnoses did not appear to be significantly different from the effect sizes from studies aimed at workers with CMD. Regarding country of origin, the effectiveness of interventions did not appear to vary systematically across countries. There was a non-significant tendency for the most effective studies to have originated from Denmark and other countries (Norway and Germany) as opposed to Sweden and the Netherlands. As for other population characteristics, meta-regressions were performed to estimate the moderating effect of age and the proportion of women. These variables had no significant moderating impacts on effect sizes.

Table 3 further shows that effect sizes varied according to number of components in the interventions. Interventions with 0 components did not significantly differ from interventions with 1 component (which had an effect size of 0.00). However, interventions with 2 and 3 or more components were associated with significantly larger effect sizes (0.36 and 0.25, respectively) compared with interventions with 1 component. In addition, interventions that included contact to the work place showed significantly larger effect sizes compared with interventions including none of the identified components. Interventions including the remaining components did not significantly differ from interventions including no components. Regarding other intervention characteristics, meta-regressions were conducted to estimate the moderating effect of timing of the intervention, the length of intervention and the study quality rating, but these variables were not associated with significant moderating impacts on effect sizes.

Table 3 Meta-regression estimates of effect size moderated by diagnosis, country of origin, number of components in interventions, type of components in interventions and study quality

	Regression coefficient	SE	95% lower CI	95% upper CI	Z-value	P value
Meta-regression estimates of effect size moderated by diagnosis						
Depression	0.04	0.14	−0.25	0.34	0.30	0.77
Stress	0.22	0.09	0.03	0.42	20.37	0.02†
Other*	−0.07	0.11	−0.299	0.16	−0.06	0.52
Constant	0.09	0.06	−0.04	0.21	1.44	0.16
Meta-regression estimates of effect size moderated by country of origin						
Denmark	0.14	0.11	−0.08	0.35	1.28	0.21
Sweden	0.00	0.13	−0.26	0.26	0.00	0.99
Other countries	0.13	0.16	−0.20	0.45	0.79	0.43
Constant	0.10	0.06	−0.03	0.23	1.51	0.23
Meta-regression estimates of effect size moderated by number of components						
0 components	0.10	0.09	−0.09	0.29	1.05	0.30
2 components	0.36	0.08	0.19	0.53	4.37	0.00‡
3 or more	0.25	0.12	0.01	0.49	2.12	0.04†
Constant	−0.00	0.05	−0.11	0.10	−0.09	0.93
Meta-regression estimates of effect size moderated by specific components						
Org. change	−0.15	0.11	−0.37	0.07	−1.41	0.17
Graded return to work	0.10	0.15	−0.21	0.40	0.66	0.51
Therapy	0.01	0.10	−0.19	0.22	0.13	0.90
Contact to work place	0.21	0.09	0.03	0.39	2.31	0.02†
Constant	0.08	0.08	−0.08	0.24	1.05	0.30
Meta-regression estimates of effect size moderated by study quality						
High quality	0.05	0.10	−0.15	0.26	0.53	0.60
Poor quality	0.17	0.13	−0.09	0.43	1.31	0.20
Constant	0.11	0.06	−0.01	0.22	1.92	0.06

*Anxiety, somatoform disorders and personality disorders.
†Significant at p=0.05.
‡Significant at p=0.01.

Results from the overall analysis and the meta-regressions remained robust when the analyses were rerun omitting studies of poor quality and omitting interventions aimed at sick-listed workers with stress-related disorders. Omitting studies aimed at sick-listed workers with stress-related disorders reduced the effect size to 0.07 (p=0.03), but the qualitative results from the meta-regressions remained with the exception that the component graded RTW became significant and contact to the work place became insignificant.

Publication bias

Publication bias was assessed by a funnel plot (see online supplementary figure 2). A visual inspection of the plot revealed no clear asymmetry indicating no publication bias and Egger's test for asymmetry in small study effects revealed no asymmetry (p=0.13).

Levels of evidence based on systematic review and meta-analysis

In this section, a summary and integration of the evidence from the meta-analysis and the systematic review is provided.

The estimation of level of evidence is based on the following classification:

- Strong evidence (++/−−): The meta-analysis and the majority (more than 50%) of the included studies of fair and high quality studies found a significant effect.
- Moderate evidence (+/–): The meta-analysis or the majority of the included studies of fair and high quality found a significant effect.
- Limited or contradictory evidence (?): None of the above criteria were met. No definite conclusions can be made.

Table 4 provides a summary of the evidence based on the meta-analysis and the systematic review.

DISCUSSION

In the present review and meta-analysis, we evaluated the effectiveness of employment related interventions for sick-listed workers with mental disorders. Overall, the results revealed a significant, but relatively small, positive effect of the included interventions. The effect size is similar to the effect size reported by Nigatu *et al*[15] in their review of 16 studies testing CBT-interventions aimed at RTW for sick-listed workers with CMDs. However, other disease-specific reviews report diverging findings. Niewenhuijsen *et al*[14] reviewed 23 studies of work-related interventions for workers with depression and found moderate effects across studies, while Arends *et al*[13] reviewed nine studies and found no effect of CBT and problem solving therapy on time until full RTW for sick-listed workers with adjustment disorders.

The average effect size of 0.14 can be considered small according to the classification of Cohen,[60] but effect sizes of this order still carry considerable economic value. A couple of examples may illustrate this; in the two intervention studies by Netterstrøm *et al*.,[32 33] 36% of the control group had returned to work

Table 4 Summary of evidence from the meta-analysis and the systematic review

	Evidence level	Main conclusions and comments
Organisational change	?	Organisational change did not appear to have an impact on RTW in the meta-analysis. The systematic review indicated no consistent evidence for an effect of including organisational change in interventions.
Therapy	?	Therapy did not appear to have an impact on RTW in the meta-analysis. The systematic review indicated no consistent evidence for an effect of including therapy in interventions. This conclusion remained valid when examining the evidence for the most prevalent therapy (CBT) by itself.
Graded return to work	+	Graded return to work did not appear to have an impact on RTW in the meta-analysis. In contrast, the systematic review indicated that all studies incorporating graded return to work were effective. This conclusion is, however, only based on three studies of fair to high quality.
Contact to the work place	++	Contact to the work place was associated with significantly larger effect sizes in the meta-analysis. This finding is mirrored in the systematic review, were the majority of studies including contact to the work place found a positive effect.
Two or more components	++	The use of more than one component was associated with significantly larger effect sizes in the meta-analysis. This finding was mirrored in the systematic review, were the majority of studies that included two or more components found a positive effect.
Diagnosis		Interventions targeting workers with stress were found to be more effective in the meta-analysis than interventions targeting CMD's. The systematic review mirrored this finding, as the majority of interventions targeting this population was found to be effective. A supplementary meta-analysis showed an effect of targeting workers with CMD, depression and other disorders. However, the systematic review indicated no consistent evidence for an effect of targeting these populations.
CMD	+	
Stress	++	
Depression	+	
Other disorders	+	
Country	?	The country of origin did not appear to have an impact on RTW in the meta-analysis. This finding was mirrored in the systematic review.

CBT, Cognitive Behavioral Therapy; CMD, common mental disorder; RTW, return to work.

at 3 month follow-up. An effect size of 0.14 implies an increase by 7 percentage points to 43% (0.36+0.14×sqrt(0.36×(1–0.36))) in this case. That is, at a given point in time, 20% more workers in the intervention group have returned to work compared with the control group. Assuming for this example, a constant increase in the exit rate from sick-listing to work of 20% implies a 17% reduction in the average time until RTW (the average time until RTW is proportional to the inverse of the exit rate), suggesting a considerable impact on the public budget. Turning to interventions studying time until RWT, the SD in the control group varies, but an effect size of 0.14 in most cases implies a reduction in time until RTW by 15–30 days on average. Effects of this magnitude have large implications for the sick-listed individual, and they lead to large budget savings for government and/or employers, depending on who finance sickness insurance payments. Hence, employment-related interventions aimed at sick-listed workers with mental disorders are of considerable economic value to society.

Regarding intervention characteristics, we found strong evidence for including contact to the work place and for including more than one of the identified components. In addition, we found moderate evidence for including graded RTW, which by definition also implies contact to the work place. These results are robust and emphasise the need to focus on incorporating contact to the work place as well as one or more additional component(s) in intervention designs.

Research on the specific content of successful RTW-interventions for mental disorders is lacking, and only one other study has addressed intervention content.[14] Consistent with the findings in the present review, Niewenhuijsen *et al*[14] found moderate evidence for including several components in RTW-interventions aimed at sick-listed workers with depression and reported that adding a work-related intervention to a clinical intervention significantly reduced the number of sick-leave days. Common to graded RTW and contact to the work place is that they allow sick-listed workers to refamiliarise themselves with their work place and their work activities. By doing so, the worker is effectively practicing management of their work situation and work functions in situ. This may contribute to the relative effectiveness of these components compared with therapy and organisational change, which by themselves include no contact to the work place.

For population characteristics, we found strong evidence for targeting stress, compared with other mental disorders or groups of disorders (ie, CMDs, depression, somatoform disorders, anxiety and personality disorders). This finding may reflect the small number of identified studies targeting other specific mental disorders (depression: 6, somatoform disorders: 2, anxiety: 1, personality disorders: 0), but it may also be attributed to the nature of stress. Stress can be considered a fundamentally different disorder compared with the other included disorders. Stress is intrinsically tied to perceived external stressors. When these stressors are removed, the stress symptoms often dissipate. The same cannot be said for depression, anxiety, somatoform disorders or personality disorders. In addition, although some overlap is apparent, every mental disorder is associated with unique symptoms and unique impairment.[2 3] This further speaks to the challenge of designing an intervention flexible enough to address the needs associated with several different disorders. However, this is exactly the type of intervention requested by local government or other institutions interacting with the sick-listed worker to help them back to work. In local labour markets, they typically do not have sufficient scale to train case workers and/or therapists in interventions aimed at small groups.

The present review and meta-analysis provide new insights for researchers and policymakers alike, attempting to conceive employment related interventions aimed at broader groups of sick-listed workers with mental disorders, and they represent a much needed starting point for planning future research and policy. The results provide convincing evidence for the effectiveness of work related interventions for sick-listed workers with mental disorders and point to key ingredients in successful interventions that may boost effect sizes considerably beyond the average, namely contact to the work place and using more than one active component.

The overall quality of the present review and meta-analysis might be affected by the following limitations. First, despite the aim to include interventions targeting a broad spectrum of mental disorders, only two studies pertaining exclusively to somatoform disorders, one study pertaining to anxiety and no

studies targeting personality disorders were obtained. Second, the majority of the included studies were conducted with small samples (27 out of 42 studies had sample sizes<200). Third, due to missing data, the foundations for the meta-analysis and the systematic review differ slightly and results should be interpreted in the light of this discrepancy.

CONCLUSION

In the present review and meta-analysis, we assessed the effectiveness of interventions aimed at enhancing RTW for sick-listed workers with mental disorders. The results revealed an overall significantly positive and economically important effect of interventions aimed at enhancing RTW for sick-listed workers with mental disorders. We demonstrated the importance of contact to the work place, graded RTW and the use of multicomponent interventions as key ingredients in successful interventions. These findings may inform design of future interventions and may thus represent a step towards establishing systematic guidelines for employment related interventions aimed at sick-listed workers with mental disorders.

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