Title: Interventions to alleviate burnout symptoms and to support return to work among employees with burnout: systematic review and meta-analysis

Authors: Kirsi Ahola, Salla Toppinen-Tanner, Johanna Seppänen

PII: S2213-0586(16)30059-6
DOI: http://dx.doi.org/doi:10.1016/j.burn.2017.02.001
Reference: BURN 43

To appear in:

Received date: 14-10-2016
Revised date: 5-2-2017
Accepted date: 7-2-2017

Please cite this article as: Kirsi Ahola, Salla Toppinen-Tanner, Johanna Seppänen, Interventions to alleviate burnout symptoms and to support return to work among employees with burnout: systematic review and meta-analysis, http://dx.doi.org/10.1016/j.burn.2017.02.001

Highlights:

- Interventions to tackle burnout vary considerably in content and the results are mixed.
- Few interventions to support recovery from burnout and subsequent return to work have been conducted and evaluated in a coherent way.
- Individual-focused interventions are not consistently sufficient to tackle severe burnout.

Interventions to alleviate burnout symptoms and to support return to work among employees with burnout: systematic review and meta-analysis

Running title: Burnout interventions: review and meta-analysis

Kirsi Ahola[a], Salla Toppinen-Tanner[a], and Johanna Seppänen[b]

[a]Finnish Institute of Occupational Health, PO BOX 40, 00251 Helsinki, Finland

[b]National Institute for Health and Welfare, PO BOX 30, 00271 Helsinki, Finland

Corresponding author:

Dr Kirsi Ahola, Finnish Institute of Occupational Health, PO BOX 40, 00251 Helsinki; Finland; email kirsi.ahola@ttl.fi; mobile +358405615692, fax +358304742779

Keywords: Burnout, Intervention, Meta-analysis, RCT, Return to Work, Symptoms.

Conflicts of Interest and Source of Funding

The authors declare that there are no conflicts of interest. This study was financially supported by the Finnish Work Environment Fund (project number 114396). The funding source had no involvement in study design, in collection, analysis, or interpretation of the data, in writing of the report, and in decision to submit the article to publication.

Interventions to alleviate burnout symptoms and to support return to work among employees with burnout: systematic review and meta-analysis

Running title: Burnout interventions: review and meta-analysis

Keywords: Burnout, Intervention, Meta-analysis, RCT, Return to Work, Symptoms.

Conflicts of Interest and Source of Funding

The authors declare that there are no conflicts of interest. This study was financially supported by the Finnish Work Environment Fund (project number 114396). The funding source had no involvement in study design, in collection, analysis, or interpretation of the data, in writing of the report, and in decision to submit the article to publication.

ABSTRACT

Burnout has adverse health and work-related outcomes but there is no consensus how to treat it. We systematically reviewed controlled studies evaluating the effects of individually- and occupationally-focused interventions on burnout symptoms or work status among workers suffering from burnout. Of 4430 potential abstracts, 14 studies reporting the effects of 18 interventions fulfilled the pre-set criteria. Fourteen interventions were individually-focused and four had combined individual and occupational approaches. The specific contents of the interventions varied considerably and the results were mixed. Meta-analysis of four individually-focused RCT interventions did not present effects on exhaustion and cynicism. Meta-analysis on the effect of combined interventions or on return to work could not be conducted. Tackling burnout needs more systematic intervention development and evaluation. The evaluation of interventions would benefit from consensus on definition and assessment of burnout.

1. Introduction

Burnout refers to a psychological reaction to chronic work stress (Maslach et al., 2001). The estimated prevalence of severe burnout has ranged from two to thirteen per cent in representative working populations (Ahola et al., 2005; Hallsten, Josephson, & Torgén, 2005; Norlund et al., 2015). The resulting cost is mainly due to burnout's association with ill-health and work ability (Ahola & Hakanen, 2014). Prospective studies have shown, that burnout predisposes workers to coronary heart disease, type 2 diabetes, common infections, musculoskeletal pain, and depressive symptoms (Armon, Melamed, Shirom, & Shapira, 2010; Hakanen & Schaufeli, 2012; Melamed, Shirom, Toker, & Shapira, 2006; Mohren et al., 2003; Toker, Melamed, Berliner, Zeltser, & Sparira, 2012). In addition, burnout may increase the risk of severe injuries (Ahola, Salminen, Toppinen-Tanner, Koskinen, & Väänänen, 2013), sickness absence (Toppinen-Tanner, Ojajärvi, Väänänen, Kalimo, & Jäppinen, 2005), disability pension (Ahola et al., 2009; Ahola, Toppinen-Tanner, Huuhtanen, Koskinen, & Väänänen, 2009), and even premature death (Ahola, Koskinen, Kouvonen, Shirom, & Väänänen, 2010). Despite abundant research on predisposing factors and consequences, there is no consensus on how to treat burnout (Shirom, 2011).

According to the most widely used conceptualization, burnout manifests itself through symptoms of exhaustion, cynicism, and diminished professional efficacy (Schaufeli, Leiter, Maslach, & Jackson, 1996). The concept of burnout originated from human service professionals among whom contacts with other people constitute the majority of their tasks and can become a source of stress (Maslach, 1976). In human service sector, the symptoms of burnout relate to interaction with clients (emotional exhaustion, depersonalization, and diminished personal accomplishment).

Generally, predisposing work characteristics include, for example, high workload, role conflict and ambiguity, low predictability, lack of participation and social support, and experienced unfairness (Borritz, et al., 2005; Halbesleben, 2006; Häusser, Mojzich, Niesel, & Schultz-Hardt, 2010; Kay-Eccles, 2012; Maslach & Leiter, 2008; Schaufeli & Bakker, 2004; Seidler et al., 2014). Individual traits may also increase vulnerability to burnout (Alarcon, Eschleman, & Bowling, 2009). Studies have shown that a low sense of coherence, alexithymia, neuroticism, low extraversion, agreeableness, and conscientiousness are related to higher odds of suffering from burnout (Armon, Shirom, & Melamed, 2012; Kalimo, Pahkin, Mutanen, & Toppinen-Tanner, 2003; Mattila et al., 2007; Swider & Zimmerman, 2010).

Interventions targeted at decreasing stress-related problems are usually classified as primary, secondary, or tertiary, according to their aim (Schaufeli & Enzmann, 1998). Primary interventions aim at reducing known risk factors among all employees, in order to prevent, for example, burnout from developing. Secondary interventions aim at a selected group of people, evaluated to be at a high risk, in order to prevent burnout from actualizing. Tertiary interventions aim at employees already suffering from the condition, in order to prevent adverse consequences, for example, loss of work ability. In addition, interventions to treat burnout can be classified according to the target of their content. Burnout interventions may focus on the individual and attempt to increase employees' psychological resources and enhance coping with stressors at work; on the environment, attempting to change the occupational context and reduce the sources of stress; or on both (combination of these perspectives) (Schaufeli & Enzmann, 1998).

Systematic reviews have evaluated the effectiveness of primary and secondary burnout interventions (Awa, Plaumann, & Walter, 2010; Westermann, Kozak, Harling, & Nienhaus, 2014). However, a corresponding summary regarding the success of tertiary burnout interventions is missing. Single studies have observed mixed intervention effects (de Vente, Kamphuis, Emmelkamp, & Blonk, 2008; Gorter, Eijman, & Hoogstraten, 2001; Petterson et al., 2008). Therefore, a summarizing analysis of tertiary interventions and their effectivity regarding burnout and its consequences is needed.

The aim of this study was first to describe, using a systematic review, tertiary interventions that have been conducted and evaluated among employees suffering from burnout. We then intended to analyze, using a meta-analysis, whether individually or occupationally-focused interventions have succeeded in alleviating burnout symptoms or in promoting subsequent return to work when compared to treatment as usual, other interventions, or no treatment at all. Summarizing the results of high-quality studies could help develop recommendations for treatment of burnout in health care and for tackling it at workplaces.

2. Materials and methods

2.1 Literature search

In accordance with the PRISMA Statement for reporting systematic reviews and meta-analyses (Liberati et al., 2009), we conducted a systematic search of articles published before 24th February, 2015 in PubMed and PsychINFO, limited to research on humans. We used the following search terms: (burnout OR “burn out” OR exhaustion) AND (employ* OR occupat* OR job* OR work* OR vocation* OR profession*) AND (intervention OR

prevent* OR treat* OR rehabilitat* OR therapy OR recover* OR manage* OR educat* OR program* OR train* OR alleviat* OR decreas* OR "work shop" OR trial) NOT review in Title/Abstract. We also hand-searched the reference lists of selected articles and key publications on burnout to identify papers we may have missed in the systematic search.

2.2 Inclusion criteria

We decided to include studies that met the following criteria: 1) Abstract published in English and tables in the Latin alphabet; 2) Original empirical study and results published in a peer-reviewed journal; 3) Participants were employees; 4) Burnout was assessed with a specific measure at baseline; 5) Prospective study design; 6) Intervention conducted; 7) Outcome, either level of burnout symptoms, sickness absence days, or work status, assessed similarly at baseline and at follow-up; 8) Control group, either with no treatment, waiting list, care as usual, or another intervention, included; and 9) Every participant a burnout case in the beginning (i.e., had a diagnosis, had sought help due to symptoms, was doctor-diagnosed, or received benefits accordingly).

Two researchers (KA, ST-T, assisted by SV) independently reviewed all titles and abstracts in order to retrieve potentially relevant studies according to the pre-agreed inclusion criteria. In cases of disagreement, a third opinion (JS) was sought. Two researchers then independently reviewed the full text articles of the selected studies (in English: KA, ST-T; in German: KA, IK; in Dutch: JS, MJ; and in Spanish: KA, AV), to determine whether they fully met the inclusion criteria. In cases of disagreement, a third opinion (JS) regarding the articles in English was sought. Consensus regarding articles in other languages was reached through discussion among the researchers.

2.3 Data extraction

We extracted the following information from each eligible article (Table 1): Name of the first author, year of publication, study location, setting, number of participants and control subjects, burnout measure used, exclusion criteria, type and content of the intervention, number of methods used in intervention (single or multiple), theoretical background of the intervention, duration of the intervention and follow-up, outcome variables, results regarding the changes in the outcome variables after the intervention, and the rate of participation during both the intervention and follow-up. We also registered whether information on the level of participation in intervention elements and other measures during the intervention was mentioned.

2.4 Statistical analyses

A meta-analysis (Borenstein, Hedges, Higgins, & Rothstein, 2009) was conducted for exhaustion and cynicism (depersonalization) on those RCT interventions which were similar enough according to the measure to assess burnout, the focus in the intervention, and the control situation. We did not include the professional efficacy score (personal accomplishment) in the meta-analysis because it had been reported in two different ways in the included studies (either as is or reversed, as diminished professional efficacy or diminished personal accomplishment).

The meta-analysis included four interventions. We were unable to take into account the baseline measurements due to incomplete or non-existent information regarding the

correlation between baseline and post-treatment measurements; only from the study by Günüsen and Üstün (2009) would it have been possible to derive commensurate correlations from F-values.

The effect size for each study was defined as the standardized mean difference between the intervention group and the control group after the intervention. To avoid potential small-study effect, a small sample size bias adjustment was applied for the effect sizes (Lipsey & Wilson, 2001). Reported raw mean values, standard deviations, and sample sizes were used to calculate the study weights and 95% confidence intervals for the effects. The approach used was a fixed-effect analysis. In order to account for excess variability in effect sizes between studies due to unmeasured extraneous sources, we also performed an analysis using a random effects model (Lipsey & Wilson, 2001). However, the between study variances in random effects models are based only on 4 sample means which makes them unreliable. To enable comparison, both results are showed in the forest plots. Comprehensive meta-analysis (CMA) software was used to perform the meta-analyses and create the forest plots. In all analyses, the significance level was set to $p<0.05$.

3. Results

3.1 Search results

In the systematic review, we identified 4430 potential studies. We assessed eligibility of 71 full-text articles and finally included 14 eligible studies (Figure 1). Of these, five originated from Sweden, four from the Netherlands, two from Finland, and one study each from Cuba,

Portugal, and Turkey (Table 1). Eight studies had a randomized controlled design (RCT) and six had a controlled before and after design (CBA).

Insert Figure 1 about here

3.2 Study population and sample size

In six studies, the participants were on sick-leave due to burnout or work-related psychological problems and had therefore been offered the opportunity to participate in an intervention (Table 1). In five studies, workers had participated in a survey and had been offered the intervention due to their high burnout or exhaustion score. In the remaining three studies, the participants had either contacted an occupational health care unit, applied for rehabilitation, or been recruited from referrals and through the media. For eight studies, the final inclusion was due to a set diagnosis or clinical evaluation, and in six, it was due to the level of burnout symptom scores (Table 1).

In all studies, participants were able to decline the intervention invitation or quit the study at any point. The rate of agreement to participate in the offered intervention among those fulfilling the set criteria ranged from 20% to 100% (Table 1). Two of the studies did not report the rate of agreement to participate. The rate of participation in the first post-intervention measurement ranged mainly from 77% to 100%, with one exception of 39%.

In a total of five studies (Table 1), the control group consisted of participants on a waiting list, in four the controls received no treatment, in three studies other interventions were used

as the control situation (e.g., traditional rehabilitation), and in two the controls received care as usual (e.g., they were able to visit a physician).

In nine studies, the participants were a professionally heterogeneous group of employees, and in two of these they were all women (Table 1). In four studies, the intervention was only offered to health care workers (nurses, dentists, physiotherapists), and in one of them all nurses were women. In one study, the intervention was conducted among self-employed individuals. The number of participants in the intervention groups varied between 8 and 74, and in the control groups between 8 and 80.

3.3 Measures to assess burnout

The Maslach Burnout Inventory (MBI) (Maslach & Jackson, 1996; Schaufeli et al., 2001) and the Maslach Burnout Inventory-General Survey (MBI-GS) (Schaufeli, Leiter, Maslach, & Jackson, 1996; Roelofs et al., 2005) were most often used for assessing burnout; these validated measures were both used in four studies. Two studies had used the Shirom-Melamed Burnout Questionnaire (SMBQ), which has also been validated (Shirom & Melamed, 2006; Lundgren,-Nilsson, Jonsdottir, Pallant, & Ahlborg, 2012). The Bergen Burnout Indicator (BBI) (Salmela-Aro et al., 2011), the Oldenburg Burnout Inventory (OLBI) (Halbesleben & Demerouti, 2005), the Karolinska Exhaustion Scale (KES) (Saboonchi, Perski, & Grossi, 2013), and the Cuestionario Breve de Burnout (CBB) (Roger et al., 2006) were each used in one study. To our knowledge, the CBB has not been validated.

3.4 Contents and effects of interventions

The 14 included studies examined the effects of 18 interventions. Of the interventions, 14 (78%) were individually focused and 4 (22%) had combined individually and occupationally-focused approaches.

Insert Table 1 about here

In eight interventions, the theoretical background operationalized in the developed intervention was reported (Table 1). Two interventions were built upon the transactional theory (Lazarus & Folkman 1987), two upon job-person mismatch (Maslach & Leiter, 1997), two upon Neuman Systems Model (Neuman, 2002), one upon personal goal framework (Karoly, 1993), and one upon a general problem-based learning approach (Maudsley, 1999). Regarding ten interventions, the theoretical basis was not articulated. Instead, the intervention was built practically to decrease burnout symptoms and support return to work on the basis of previous research results.

Twelve interventions had used a single method approach to alleviate burnout (Table 1). These were all individually-focused interventions. Six interventions had used a multiple method approach; four of them had combined individually and occupationally-focused methods and two had combined several individually-focused methods.

The contents of the individually-focused interventions varied considerably (Table 1). The most common procedure, used in six interventions, was based on cognitive-behavioral therapy (CBT). A group CBT program (two times three weekly hours during 10 weeks) was related to a decrease in burnout score after six months when compared to the control group receiving care as usual (Heiden et al., 2007). However, the difference between the

intervention and control groups was attenuated in 12 months' follow up. No difference was found in working status between the intervention and control groups after the follow-up. Similar results were observed after another group CBT program (30 times three hours a week during a year) which was combined with Qigong (a meditative physical exercise on posture, breathing, and mind focus) and work rehabilitation support when the control group received only Qigong and work rehabilitation support (Stenlund, Birgander, Lindahl, Nilsson, & Ahlgren, 2009). Also CBT-based stress management training (12 times during four months), provided either individually or in a group, resulted in a decrease in exhaustion and cynicism scores and the amount of sick leave hours but these effects were observed both in the intervention and control groups after three and six months' follow-up (deVente, Kamphuis, Emmelkamp, & Blonk, 2008). Similarly, structured CBT (11 times 45 minutes during 22 weeks) was related to a decrease in exhaustion and depersonalization scores in six months' follow up in the intervention as well as in the control group receiving no treatment (Blonk, Brenninkmeijer, Lagerveld, & Houtman, 2006). No difference was observed in return to work between the groups. However, a group CBT program (three days during six months) which was combined with career counselling (three sessions during six months) as well as self-initiated preventive measures were related to decreased emotional exhaustion and increased professional accomplishment in one month's follow-up compared to the control group with no treatment nor any initiative taken (Gorter, Eijkman, & Hoogstraten, 2001).

The rest of the individually-focused interventions had employed either other psychological methods or physical/physiological methods. Group therapy, either an analytic or experimental orientation, based on psycho- and sociodrama methods (16 days during nine months) was related to a decrease in burnout score in one month's follow-up when compared to control group on a waiting list (Salmela-Aro, Näätänen, & Nurmi, 2004). Also a psycho-didactic

workshop on experimental-reflective processes and skills development (16 times one to two hours) was related to a decrease in burnout symptoms in three months' follow-up when compared to the control group on a waiting list (Roger et al., 2006). Participation in cognitive coping training or a social support group (90 minutes weekly during seven weeks) were both related to a decrease in emotional exhaustion score immediately after the intervention when compared to the control group on a waiting list (Günüsen & Üstün, 2010). However, the intervention effects attenuated in six months' follow-up. After participation in a peer support group which met ten times weekly for two hours and then for two hours after four weeks (Peterson, Bergström, Samualsson, Åsberg, & Nygren, 2008) exhaustion and cynicism scores decreased in the intervention and in the "no treatment" control group

Furthermore, a meditative physical exercise (instructed 20 minutes daily during one week and then independently two times 5 minutes daily for two weeks) on posture, breathing, and mind focus (White Ball Qigong technique) was related to a decrease in emotional exhaustion and depersonalization scores immediately after the intervention when compared to the control group on a waiting list (Saganha, Doenitz, Greten, Effert, & Greten, 2012). Instead, a physical activity program (2 weekly sessions during 10 weeks) had no statistically significant effect on burnout score or working status in six or 12 months' follow-up when compared to the control group receiving care as usual (Heiden et al., 2007). Artificial bright light therapy (ten times 45 minutes during 22 days) did not result in a decrease in the level of burnout symptoms when compared to the control group on a waiting list (Meesters & Waslander, 2009). Instead, the severity of burnout complaints decreased in the intervention group.

A common component in the four combined interventions was the meetings with work place representatives in order to promote the changes that should be made in the work situation of

the burnout cases. Combined with traditional rehabilitation (Hätinen, Kinnunen, Pekkonen, & Kalimo, 2007) or with a group program for stress-related ill-health (Grossi & Santell, 2009), a decrease in burnout symptoms was observed when compared to the control group participating in a traditional rehabilitation. In addition, in the latter combination the amount of sick leave decreased in both intervention and control groups. When meetings with labor experts were combined with a brief CBT-based stress management program (Blonk, Brenninkmeijer, Lagerveld, & Houtman, 2006), no intervention effect was noticed regarding burnout symptoms but time passed to partial and full return to work was found to be shorter in six months' follow-up than in the control group of no treatment or another intervention with mere CBT. Similarly, total amount of sick leave decreased in 80 weeks' follow-up after an intervention which combined convergence dialogue meeting with a health assessment, supervisor's interview, and a group seminar when compared to those who did not want to participate in the intervention (Karlson et al., 2010).

Participant activity in or treatment adherence to the intervention elements was reported in eight interventions (de Vente, Kamphuis, Emmelkamp, & Blonk, 2008; Günüsen & Üstün, 2010; Heiden et al., 2007;Roger et al., 2006; Stenlund et al., 2009). Activity was generally quite high. Seven interventions described participation in other treatment options or activities during the intervention (de Vente, Kamphuis, Emmelkamp, & Blonk, 2008; Grossi & Santell, 2009; Heiden et al., 2007; Gorter, Eijkman, & Hoogstraten, 2001; Stenlund et al., 2009). These included, for example, the use of psychotropic medication, visits to a physician, or therapy sessions.

3.5 Meta-analysis

Of the 14 included studies, four were similar enough to be combined in a meta-analysis. They were individually-focused, had an RCT design, had used the same measure to assess burnout (the MBI or the MBI-GS), and had a similar control situation (no treatment or waiting list). Of the studies that included more than one intervention, we chose the one that was most similar to the other studies. Figures 2 and 3 show that the individually focused RCT interventions did not produce a statistically significant effect on exhaustion or cynicism. The effect size in the fixed effects model regarding exhaustion was 0.25 (Z=1.63, p=0.10) and regarding cynicism it was 0.18 (Z=1.17, p=0.24). The results were statistically insignificant also in the random effects models (Figures 2 and 3).

Insert Figures 2 and 3 about here

4. Discussion

4.1 Summary of results

In this study, we systematically reviewed the characteristics and effects of interventions aimed at alleviating burnout symptoms and supporting return to work among employees suffering from burnout. After a review of 4430 abstracts, published before 24th February in 2015 in peer-reviewed journals, only 14 studies, reporting the effects of 18 interventions, fulfilled the pre-set criteria. Of these, 14 were individually-focused and four had combined individual and occupational approaches. The interventions were different in content and their effects were mixed. The results of four individually-focused RCT interventions were combined in a meta-analysis which showed that such interventions did not succeed in alleviating burnout symptoms.

4.2 Strengths and limitations of the study

Our systematic review and meta-analysis are to our knowledge the first to summarize the existing knowledge regarding the effects of interventions on the level of burnout symptoms and subsequent work status among workers who all suffered verifiably from burnout, a topic that has been somewhat controversial, partly due to few studies with mixed results. Independent researchers conducted data selection in two phases on the basis of pre-set criteria following the PRISMA guidelines for systematic reviews and meta-analyses (Liberati et al., 2009). The few disagreements that arose were solved through acquiring a third opinion. We did not exclude studies on the basis of the time frame or publication language as long as the abstract was published in English and the tables were in the Latin alphabet. Only studies using RCT design were included in the meta-analysis.

This review is subject to some limitations. First, we may have suffered from publication bias, as studies yielding negative or null effects as results may remain unpublished in peer-reviewed journals, making it impossible for us to include them (Dickersin, 2005). Second, some relevant data outside the Western world may have been overlooked since studies published without an English abstract or with tables using an alphabet other than the Latin version were excluded. Third, the original studies have probably suffered from some selection bias because active employees are more likely to seek help and take part in interventions (Pearce, Checkoway, & Kriebel, 2007). The accumulation of potential participants in the included burnout interventions was highly dependent on the workers' activity to either seek help from the health care system or to participate in a survey. In addition, all workers who fulfilled the inclusion criteria were fully entitled to decline to participate or quit the intervention at any point. Fourth, the included studies were extremely

heterogeneous as regards, for example, the definition and assessment of burnout, the inclusion of participants, and the content of the intervention as well as in the conducting and reporting of the study. In addition, information on the rate of participation in the intervention elements or in other activities besides the intervention, and adjustment for the observed group differences were far from consistent. Furthermore, some of the included studies did not fully report the missing participants, intervention duration, and characteristics of the participants. These differences in setting, methodology, and reporting limited the comparison of the results of the included studies.

4.3 Issues to consider in future studies

So far, research on burnout has focused heavily on the process of burning out, i.e., the antecedents and consequences of burnout rather than on the process of recovering from it and the factors supporting this (Shirom, 2003). Also in the present study, we found quite few studies on interventions treating existing burnout. When interventions had been conducted in cases of burnout, they were most often individually-focused, as has been detected earlier (Ahola et al., 2007). This is an interesting observation considering the theoretical views on burnout which mainly emphasize the importance of work-related factors in its development and persistence (Maslach, Schaufeli, & Leiter, 2001). Therefore, there is a need to continue developing interventions which take theoretical views and research results regarding burnout into account. For example, burnout has been said to result from prolonged work stress (Maslach et al., 2001). Therefore, interventions should focus on tackling stress in order to prevent it from becoming chronic. After reviewing altogether 19 theories for burnout, Schaufeli and Enzmann (1998) concluded that burnout theories share three common elements, familiar from classic stress theories: strong motivation of the employee, adverse

working conditions where the aims cannot be fulfilled, and dysfunctional coping mechanisms. Further, concerning the adversity of work characteristics, Maslach and Leiter (1997) presented that burnout results from 6 mismatches between the worker and the organization. In relation to human service work, it has been proposed that especially unbalanced social exchange is the main cause for burnout (Schaufeli, 2006). These viewpoints are examples of the theoretical background burnout interventions should be built on.

The 14 included studies assessed burnout using six different instruments. Some of these instruments produced a summary score and some assessed only the separate dimensions of burnout. The study results could have been more effectively combined and compared if the studies had conceptualized and assessed burnout consistently. At the moment, the lack of consensus regarding the definition and assessment of burnout contributes to the vast heterogeneity in study details (Doulougeri et al., 2016). It in turn complicates drawing conclusions on, for example, ways in which to alleviate burnout

Research settings and study designs were very heterogeneous. Good quality research settings, using high standards and coherent practices to evaluate the contribution of interventions to recovery from burnout and the prevention of subsequent negative consequences to health and work ability (Ahola & Hakanen, 2014) are essential in order to be able to draw guidelines on treatment procedures for burnout. There is a need for large scale studies in order to be able to conclude if, or when and how, a standardized burnout intervention might facilitate the recovery process. On the basis of current evidence, such a successful approach has not yet been found. This may either point to a lack of evidence so far or the possibility that the aim is unrealistic. If pragmatic local solutions are generally more successful, the key elements

regarding success need to be pinpointed through, for example, the realist review approach. In addition, cost benefit analysis, as well as qualitative analysis, would be useful to analyze the excess benefit from participation in an intervention, in the form of savings regarding those suffering from burnout as well as their organizations and the social benefit system.

4.4 Practical implications

On the basis of the results of this systematic review and meta-analysis, it is impossible to draw guidelines regarding how to treat burnout. Single studies produced mixed results, some interventions showing success in decreasing burnout symptoms or enhancing return to work, while others finding no significant effects. These single studies ranged from small-scale experiments to mid-scale RCT studies. We can only conclude that an individually-focused intervention proved unreliable to help alleviate symptoms in the long term among employees suffering from burnout. However, it is unclear whether this was due to intervention content, study design, or a lack of statistical power.

Earlier studies on stress and burnout prevention have shown promising results on recovery from burnout when individually and occupationally focused activities have been combined (Awa, Plaumann, & Walter, 2010; LaMontagne et al., 2007; Ruotsalainen, Verbeek, Mariné, & Serra, 2015; Westermann, Kozak, Harling, & Nienhaus, 2014). In the present study there was not enough data to test such a hypothesis. In addition, it was not possible to reach a conclusion on an effective way to enhance return to work.

5. Conclusions

On the basis of this systematic review, burnout is not a stable phenomenon; it diminishes in time and the majority of sufferers continue working. Burnout symptoms were not systematically alleviated by individually-focused interventions, which are the type that have most often been evaluated. The number of studies regarding the effect of combined interventions and the effects of interventions on return to work was too modest to draw conclusions. Burnout intervention development should be continued in order to help workers recover from burnout. Research on the effects of burnout interventions would benefit from consensus guidelines of the definition and assessment of burnout.

Conflicts of Interest Statement

The authors declare that there are no conflicts of interest.

Role of the Funding Source

This study was financially supported by the Finnish Work Environment Fund (project number 114396). The funding source had no involvement in study design; in collection, analysis, or interpretation of the data; in writing of the article; and in decision to submit the article to publication.

Acknowledgements

We thank Suvi Virtanen for reviewing the abstracts, and Mari Järvinen, Irja Kandolin and Anna Vanhala for their assistance with Dutch, German, and Spanish articles, and Alice Lehtinen for linguistic editing. We are grateful to Marianna Virtanen and Aki Koskinen for their valuable guidance during this study.

References

Ahola, K., & Hakanen, J. Burnout and health. (2014). In M. P. Leiter, A. P., Bakker, & C. Maslach (Eds.), *Burnout at Work. A Psychological Perspective* (pp. 10-31). London: Psychology Press.

Ahola, K., Honkonen, T., Isometsä, E., Kalimo, R., Nykyri, E., Aromaa, A., et al. (2005). The relationship between job-related burnout and depressive disorders - results from the Finnish Health 2000 Study. *J. Affect. Disord.*, 88, 55-62.

Ahola K., Honkonen, T., Virtanen, M., Kivimäki, M., Isometsä, E., Aromaa, A., et al. (2007). Interventions in relation to occupational burnout: the population-based Health 2000 Study. *J. Occup. Environ. Med.*, 49, 943-952.

Ahola, K., Gould, R., Virtanen, M., Honkonen, T., Aromaa, A., & Lönnqvist, J. (2009). Occupational burnout as a predictor of disability pension: a population-based cohort study. *Occup. Environ. Med.*, 66, 284-290.

Ahola, K., Toppinen-Tanner, S., Huuhtanen, P., Koskinen, A., & Väänänen, A. (2009). Occupational burnout and chronic work disability: An eight-year cohort study on pensioning among Finnish forest industry workers. *J. Affect. Disord.*, 115, 150-159.

Ahola, K., Koskinen, A., Kouvonen, A., Shirom, A., & Väänänen, A. (2010). Burnout as a predictor of mortality among industrial employees: ten-year prospective register-linkage study. *J. Psychosom. Res.*, 69, 51-57.

Ahola, K., Salminen, S., Toppinen-Tanner, S., Koskinen, A., & Väänänen, A. (2013) Occupational burnout and severe injuries: An eight-year prospective cohort study among Finnish forest industry workers. *J. Occup. Health*, 55, 450-457.

Alarcon, G., Eschleman, K. J., & Bowling, N. A. (2009). Relationships between personality variables and burnout: A meta-analysis. *Work Stress*, 23, 244-263.

Armon, G., Melamed, S., Shirom, A., & Shapira, I. (2010). Elevated burnout predicts the onset of musculoskeletal pain among apparently healthy employees. *J. Occup. Health Psychol*., 15, 399-408.

Armon, G., Shirom, A., & Melamed, S. (2012). The big five personality factors as predictors of changes across time in burnout and its facets. *J. Pers*., 80, 403-427.

Awa, W. L., Plaumann, M., & Walter, U. (2010). Burnout prevention: a review of intervention programs. *Patient Educ. Couns.*, 78, 184-190.

Blonk, R. W. B., Brenninkmeijer, V., Lagerveld, S. E., & Houtman, I. L. D. (2006). Return to work: A comparison of two cognitive behavioral interventions in cases of work-related psychological complaints among the self-employed. *Work Stress*, 20, 129-144.

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to Meta-Analysis*. New York: John Wiley & Sons.

Borritz, M., Bültmann, U., Rugulies, R., Christensen, K. B., Villadsen, E., & Kristensen, T. (2005). Psychosocial work characteristics as predictors for burnout: findings from 3-year follow up of the PUMA study. *J. Occup. Environ. Med.*, 47, 1015-1025.

de Vente, W., Kamphuis, J. H., Emmelkamp, P. M., & Blonk, R. W. (2008). Individual and group cognitive-behavioral treatment for work-related stress complaints and sickness absence: a randomized controlled trial. *J. Occup. Health Psychol.*, 13, 214-231.

Dickersin, K. (2005). Publication bias: Recognizing the problem, understanding its origin and scope, and preventing harm. In H. R. Rothstein, A. J. Sutton, & M. Borenstein (Eds.), *Publication bias in meta-analysis: Prevention, assessment, and adjustments.* Chichester, UK: John Wiley & Sons.

Doulougeri, K., Georganta, K., & Montgomery, A. (2016). "Diagnosing" burnout among healthcare professionals: Can we find consensus? *Cogent Medicine*, 3, 1237605

Gorter, R. C., Eijkman, M. A., & Hoogstraten, J. (2001). A career counseling program for dentists: effects on burnout. *Patient. Educ. Couns.*, 43, 23-30.

Grossi, G., & Santell, B. (2009). Quasi-experimental evaluation of a stress management programme for female county and municipal employees on long-term sick leave due to work-related psychological complaints. *J. Rehabil. Med.* 41, 632-638.

Günüşen, N. P., & Ustün, B. (2010). An RCT of coping and support groups to reduce burnout among nurses. *Int. Nurs. Rev*., 57, 485-492.

Hakanen, J. J., & Schaufeli, W. B. (2012). Do burnout and work engagement predict depressive symptoms and life satisfaction? A three-wave seven-year prospective study. *J. Affect. Disord.*, 141, 415-424.

Halbesleben, J. R. (2006). Sources of social support and burnout: a meta-analytic test of the conservation of resources model. *J. Appl. Psychol*., 91, 1134-1145.

Halbesleben, J. R. B., & Demerouti, E. (2005). The construct validity of an alternative measure of burnout: investigating the English translation of the Oldenburg Burnout Inventory. *Work Stress*, 19, 208-220.

Hallsten, L., Josephson, M., & Torgén, M. (2005). *Performance-based Self-esteem. A Driving Force in Burnout Processes and Its Assessment.* Stockholm: National Institute for Working Life.

Heiden, M., Lyskov, E., Nakata, M., Sahlin, K., Sahlin, T., & Barnekow-Bergkvist, M. (2007). Evaluation of cognitive behavioural training and physical activity for patients with stress-related illnesses: a randomized controlled study. *J. Rehabil. Med*., 39, 366-373.

Hätinen. M., Kinnunen, U., Pekkonen, M., & Kalimo, R. (2007). Comparing two burnout interventions: Perceived job control mediates decreases in burnout. *Int. J. Stress Manage.*, 14, 227-248.

Häusser, J. A., Mojzich, A., Niesel, M., & Schulz-Hardt, S. (2010). Ten years on: A review of recnt research on the Job Demand-Control (-Support) model and psychological well-being. *Work Stress*, 24, 1-35.

Kalimo, R., Pahkin, K., Mutanen, P., Toppinen-Tanner, S. (2003). Staying well or burning out at work: work characteristics and personal resources as long-term predictors. *Work Stress*, 17, 109-122.

Karlson, B., Jönsson, P., Pålsson, B., Åbjörnsson, G., Malmberg, B., Larsson, B., et al. (2010). Return to work after a workplace-oriented intervention for patients on sick-leave for burnout--a prospective controlled study. *BMC Public Health*, 10, 301.

Karoly, P. (1993). Goal systems: An organizing framework for clinical assessment and treatment planning. *Psychol. Assess*., 5, 273-280.

Kay-Eccles, R. (2012). Meta-analysis of the relationship between co-worker social support and burnout using a two-level hierarchical linear model. *West. J. Nurs. Res.*, 34, 1062-1063.

Lamontagne, A. D., Keegel, T., Louie, A. M., Ostry, A., & Landsbergis, P. A. (2007). A systematic review of the job-stress intervention evaluation literature, 1990-2005. *Int. J. Occup. Environ. Health*, 13, 268-280.

Lazarus, R. S. & Folkman, S. (1987). Transactional theory and research on emotions and coping. *Eur. J. Pers*., 1, 141-169.

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., & Ioannidis, J. P., et al. (2009). The PRISMA Statement for reporting systematic reviews and meta-analysis of studies that evaluate health care interventions: Explanation and elaboration. *Ann. Intern. Med.* 151, W-65-W-94.

Lipsey, M. W., & Wilson, D. B. (2001). *Practical Meta-Analysis*. Thousand Oaks, CA: Sage.

Lundgren-Nilsson, Å., Jonsdottir, I. H., Pallant, J., & Ahlborg, G Jr. (2012). Internal construct validity of the Shirom-Melamed Burnout Questionnaire (SMBQ). *BMC Public Health*, 12, 1.

Maslach, C. (1976). Burned-out. *Hum. Behav.*, 5, 16-22.

Maslach, C., Jackson, S. E. (1996). Maslach Burnout Inventory - Human Services Survey (MBI-HSS). In C. Maslach, S. E. Jackson, & M. P. Leiter (Eds.), *Maslach Burnout Inventory Manual* (pp.-3.-17). *(*3rd ed.). Palo Alto (CA): Consulting Psychologists Press.

Maslach C & Leiter M. P. (1997).*The truth about burnout: How organizations cause personal stress and what to do about it.* San Francisco: Jossey-Bass.

Maslach, C., & Leiter, M. P. (2008). Early predictors of job burnout and engagement. *J. Appl. Psychol*., 93, 498-512.

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job Burnout. *Ann. Rev. Psychol*., 52, 397-422.

Mattila, A., Ahola, K., Honkonen, T., Salminen, J. K., Huhtala, H., & Joukamaa, M. (2007). Alexithymia and occupational burnout are strongly associated in working population. *J. Psychosom. Res.*, 62, 657-665.

Maudsley, G. (1999). Do we all mean the same thing by "problem-based learning"? A review of the concepts and formulation of the ground rules. *Acad. Med*., 74, 178-185.

Meesters, Y., & Waslander. M. (2009). Burnout and light treatment. *Stress Health*, 26, 13-20.

Melamed, S., Shirom, A., Toker, S., & Shapira, I. (2006). Burnout and risk of type 2 diabetes: A prospective study of apparently healthy employed persons. *Psychosom. Med*., 68, 863-839.

Mohren, D. C. L., Swaen, G. M. H., Kant, I., van Amelsvoort, L. G. P. M., Born, P. J. A., & Galama, J. M. D. (2003). Common infections and the role of burnout in a Dutch working population. *J. Psychosom. Res*., 55, 201-208.

Neuman, B. (2002). The Neuman systems model. In B. Neuman & J. Fawcett (Eds.) *The Neuman systems model*, pp. 3-33 (4th ed.). Upper Saddle River: Prentice Hall.

Norlund S, Reuterwall C, Höög J, Janlert U, Slunga Järvholm L. (2015). Work situation and self-perceived economic situation as predictors of change in burnout--a prospective general population-based cohort study. *BMC Public Health*., 15, 329.

Pearce, N., Checkoway, H., & Kriebel, D. (2007). Bias in occupational epidemiology studies. *Occup. Environ. Med*., 64, 562-568.

Petterson, U., Bergström, G., Samuelsson, M., Åsberg, M., & Nygren, Å. (2008). Reflecting peer-support groups in the prevention of stress and burnout: randomized controlled trial. *J. Adv. Nurs.,* 63, 506-516.

Roelofs, J., Verbraak, M., Keijsers, G. P. J., de Bruin, M. B. N., & Schmidt, A. J. M. (2005). Psychometric properties of a Dutch version of the Maslach Burnout Inventory General Survey (MBI-DV) in individuals with and without clinical burnout. *Stress Health,* 21, 17-25.

Roger, M. C., Abalo, J. G., Pérez, C. M., Ochoa I. I., Abalo, R. G., &Abalo, Y. (2006). El control of burnout syndrome de desgaste professional o burnout en enfermeria oncológica: Una experiencia de intervención. *Ter. Psicol.,* 24, 39-53.

Ruotsalainen, J. H., Verbeek, J. H., Mariné, A., & Serra, C. (2015). Preventing occupational stress in healthcare workers. *Cochrane Database Syst. Rev.,* 4, CD002892.

Saboonchi, F., Perski, A., & Grossi, G. (2013). Validation of Karolinska Exhaustion Scale: psychometric properties of a measure of exhaustion syndrome. *Scand. J. Caring Sci.*, 27, 1010-1017.

Saganha, J. P., Doenitz, C., Greten, T., Effert, T., & Greten, H. J. (2012). Qijong therapy for physiotherapists suffering from burnout: a preliminary study. *J. Chin. Integr. Med.,* 10, 1233-1239.

Salmela-Aro, K., Näätänen, P., & Nurmi, J. E. (2004). The role of work-related personal projects during two burnout interventions: a longitudinal study. *Work Stress,* 18, 208-230.

Salmela-Aro, K., Rantanen, J., Hyvönen, K., Tilleman, K., & Feldt, T. (2011). Bergen Burnout Inventory: reliability and validity among Finnish and Estonian managers. *Int. Arch. Occup. Environ. Health,* 84, 635-645.

Schaufeli, W. B. (2006). The balance of give and take: toward a social exchange model of burnout. *Rev. Int. Psychol. Soc.,* 19, 87-131.

Schaufeli, W., & Enzmann, D. (1998). *The burnout companion to study and practice: a critical analysis.* London: Taylor & Francis.

Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. *J. Organ. Behav,,* 25, 293-315.

Schaufeli, W. B., Leiter, M. P., Maslach, C., & Jackson, S. E. (1996). Maslach Burnout Inventory - General Survey (MBI-GS). In C. Maslach, S. E. Jackson, & M. P. Leiter (Eds.) *Maslach Burnout Inventory Manual,* pp. 19-32. *(*3rd ed.). Palo Alto (CA): Consulting Psychologists Press.

Schaufeli, W. B., Bakker, A. B., Hoogduin, K., Schaap, C., & Kladler, A. (2001). On the clinical validity of the Maslach Burnout Inventory and the Burnout Measure. *Psychol. Health*, 16, 565-582.

Seidler, A., Thinschmidt, M., Deckert. S., Then, F., Hegewald, J., Nieuwenhuijsen, K. et al. (2014). The role of psychosocial working conditions on burnout and its core component emotional exhaustion - a systematic review. *J. Occup. Med. Toxicol.,* 9, 10.

Shirom, A. (2003). Job-related burnout: A review. In J. C. Quick, & L. E. Tetrick (Eds.), *Handbook of occupational health psychology*, pp. 245-264. Washington: American Psychological Association.

Shirom A. (2011). Job-Related Burnout: A Review of Major Research Foci and Challenges. In J. C. Quick, & L. E. Tetric (Eds.), *Handbook of Occupational Health Psychology*. (2nd ed.), pp. 223-241. Washington: American Psychological Association.

Shirom, A., Melamed, S. (2006). A Comparison of the Construct Validity of Two Burnout Measures in Two Groups of Professionals. *Int. J. Stress Manage.,* 13, 176–200.

Stenlund, T., Birgander, L. S., Lindahl, B., Nilsson, L., & Ahlgren, C. (2009). Effects of Qigong in patients with burnout: a randomized controlled trial. *J. Rehabil. Med.,* 41, 761-767.

Swider, B. W., & Zimmerman, R. D. (2010). Born to burnout: A meta-analytis path model of personality, job burnout, and work outcomes. *J. Vocat. Behav.,* 76, 487-506.

Toker, S., Melamed, S., Berliner, S., Zeltser, D., & Shapira, I. (2012). Burnout and risk of coronary heart disease: a prospective study of 8838 employees. *Psychosom. Med.,* 74, 840-847.

Toppinen-Tanner, S., Ojajärvi, A., Väänänen, A., Kalimo, R., & Jäppinen, P. (2005). Burnout as a predictor of medically certified sick-leave absences and their diagnosed causes. *Behav. Med.,* 31, 18-27.

Westermann, C., Kozak, A., Harling, M., & Nienhaus, A. (2014). Burnout intervention studies for inpatient elderly care nursing staff: Systematic literature review. *Int. J. Nurs. Stud.,* 51, 63-71.

TABLE 1. Characteristics of the included studies (in ascending order of publication year).

Study	Setting	Participants	Controls	Burnout measure	Exclusion criteria	Intervention to study	Duration	Outcome	Results	Participation*
Gorter et al., 2001; NL	Dutch dentists, participated in a survey	16 dentists with high burnout score (exhaustion and depersonalization > median)	Dentists with high burnout score, did not agree to intervention; 35: other intervention (self-initiative measures) 31: no treatment	MBI	Substance abuse, in therapy, other problems	Individual: Group CBT with career counselling; multiple approach; theory basis not mentioned	3 days and 3 sessions during 6 mo., 1 mo. follow-up	EE, DEP, PA scores	EE↓, PA↑ in intervention group and self-initiative control group compared to no treatment control group; DEP↔	26%, 89%
Salmela-Aro et al., 2004; FI	Middle class workers in capital region, contacted OHS due to psychological problems; RCT	62 workers with high burnout score (>75)	28 employees with high burnout score; waiting list	BBI	Not reported	Individual: Group therapy; single approach; based on personal goal approach	16 days during 9 mo., 1 mo. follow-up	Burnout score	Burnout↓ in intervention group compared to control group	100%, 92%
Blonk et al., 2006; NL	Self-employed on sick leave, applying benefits due to psychological complaints, from insurance company register; RCT	40 + 40 self-employed, screened by physician	42 self-employed, applying benefits due to psychological complaints; no treatment	MBI	Mental disorders, in therapy	Individual: CBTM single approach; theory basis not mentioned Combined: CBT and meetings with labour experts; multiple approach; theory basis not mentioned	11 x 45 min. during 22 wks, 6 mo. follow-up 5-6 x 1 hr. twice a week with homework and meeting every 3 mo., 6 mo. follow-up	EE, DEP, PA scores Mean number of days to full and partial RTW	EE↓, DEP↓ in intervention and control groups; PA↔ Shorter time to partial and full RTW in combined intervention compared to CBT and control group	34%, 91%
Roger et al., 2006; CU	Oncology nurses from 2 hospitals, participated in a survey	31 oncology nurses with moderate or high burnout score	32 oncology nurses with burnout; waiting list	CBB	Not reported	Individual: Psychodidactic workshop; single approach; theory basis not mentioned	16 x 1-2 hrs, 3 mo. follow-up	EE, DEP, dPA scores	EE↓, DEP↓, dPA↓ in intervention group compared to control group	Not reported, 100%.
Heiden et al., 2007; SE	Workers on sick leave due to stress-related diagnosis, from illness certificates; RCT	28 + 23 employees, selected by an expert panel	24 employees on sick leave due to stress-related diagnosis; care as usual	SMBQ	Mental disorder, other illness, substance abuse	Individual: CBT; single approach; theory basis not mentioned Individual: Physical activity; single	2 x 3 hrs weekly during 10 wks, 6 and 12 mo. follow-up 2 weekly	Burnout score Working part-time or full-time (yes/no)	Burnout↓ in CBT intervention group compared to control group; no difference	100%, 89%

						approach; theory basis not mentioned	sessions during 10 wks.		btw groups after 6 mo. Working ↔	
Hätinen et al., 2007; FI	Female white collar workers, applied for rehabilitation due to job-related psychological health problems	20 female workers, diagnosed by a physician on the basis of medical report and application	32 female white collar workers; other intervention (traditional rehabilitation)	MBI-GS	Not reported	Combined: Rehabilitation including workplace meetings; multiple approach; based on job-person mismatch	12-day and 5-day periods during 1 yr.	EX, CY, dPE scores	EX↓, CY↓ in intervention group compared to control group; dPE↔	93%, 86%
de Vente et al., 2008; NL	Workers on sick leave due to work-related stress, recruited through OHS, GPs and advertisements; RCT	28 + 28 workers with work-related neurasthenia, on the basis of telephone screening and diagnostic interview	26 workers on sick leave due to work-related stress; care as usual	MBI-GS	Other illness, substance abuse	Individual: Stress management training (CBT-based); single approach; based on transactional theory Individual: Group stress management training (CBT-based); single approach; based on transactional theory	12 hrs and homework during 4 mo., 3 and 6 mo. follow-up 12 x 2 hrs and homework during 4 mo., 3 and 6 mo. follow-up	EX, CY, PE scores Number of self-reported sick-leave hrs and full RTW (yes or no; time till)	EX↓, CY↓ in intervention and control groups, PE↔ Sick leave hours↓, RTW↑ in intervention and control groups	84%, 80%
Peterson et al., 2008; SE	County council workers, participated in a survey; RCT	51 health care workers with high burnout score (exhaustion >75. percentile)	80 health care workers with high burnout score; no treatment	OLBI	Not reported	Individual: Peer-support group; single approach; based on general problem-based learning	10 x 2 hrs weekly and 2 hrs after 4 wks., 12 mo. follow-up	EX, CY scores	EX↓, CY↓ in intervention and control groups	20%, 94%
Grossi & Santell, 2009; SE	Female workers on sick leave due to work-related psychological complaints, from consecutive series of OHS patients; matched groups	12 female workers with diagnosis F43.9	12 female workers sick listed by municipal company health center due to F43.9; other intervention (traditional rehabilitation in cooperation with employers)	KES	Not able to participate in group programy	Combined: Group program for stress-related ill-health, rehabilitation meetings with supervisor, and traditional rehabilitation; multiple approach; theory basis not mentioned	12 x ½ day twice a week during 3 mo., 6 and 12 mo. follow-up (burnout); 1, 3, 5 yr. follow-up (sick leave)	Burnout score Sick leave percentage	Burnout↓ in intervention group compared to control group Sick leave↓ in intervention and control groups	100%, 96%
Meesters & Waslander 2009; NL	Workers with diagnosis of burnout (work-related neurasthenia), recruited through	16 workers with diagnosis of work-related neurasthenia and high burnout score (exhaustion >3)	14 workers with high burnout score; waiting list	MBI-GS	Other illness, shift work, in treatment	Individual: Light therapy; single approach theory basis not mentioned	10 x 45 min. during 22 days	EX, CY, dPE scores Severity of symptoms	EX↔, CY↔, dPE ↔ Severity↓ in intervention group	Not reported; 100%

	referrals and media									
Stenlund et al., 2009; SE	Workers on sick leave (>25%) for burnout, from consecutive series of stress clinic patients; RCT	58 workers with a diagnosis of burnout based on medical and psychological examination and high burnout score (>4.6)	49 workers on sick leave for burnout; other intervention (Qigong and work rehabilitation support)	SMBQ	Other illness, unemployment, substance abuse, in treatment	Individual: Group CBT (with Qigong, and work rehabilitation support); multiple approach; theory basis not mentioned	30 x (3 + 1) hrs weekly and one session during 1 yr., 6 and 12 mo. follow-up	Burnout score Sick leave percentage	Burnout↓ in intervention and control groups Sick leave↓ in intervention and control groups	86%, 77%
Günüsen & Üstun 2010; TR	Female nurses in one hospital, participated in a survey; RCT	15 + 13 nurses with high burnout score (exhaustion > median)	36 nurses with high burnout score; waiting list	MBI	Not reported	Individual: Cognitive coping training; single approach; based on Neuman Systems Model Individual: Social support group; single approach; based on Neuman Systems Model	1½-2 hrs weekly during 7 wks, 6 mo. follow-up	EE, DEP, PA scores	EE↓ in intervention and control groups, no effect after 6 mo., DEP↔, PA↔	96%, 39%
Karlsson et al., 2010; SE	Workers on sick leave for burnout, from social insurance register; matched groups	74 workers with work-related exhaustion disorder (F43), confirmed with questionnaire, interview, and medical examination	74 workers on sick leave who did not agree to intervention; no treatment	MBI-GS	Other illness	Combined: Group seminar, assessment, and convergence dialogue meeting; multiple approach; based on job-person mismatch	½ day seminar, 1½ hr meeting, 80 wk follow-up	Sick leave percentage	Total sick leave↓ in intervention group compared to control group	41%, 86%
Saganha et al., 2012; PT	Physiotherapists in 19 hospitals, participated in a survey; RCT	8 physiotherapists with high burnout score (exhaustion > 26)	8 physiotherapists with high burnout score; waiting list	MBI	Low physical ability, previous experience in qigong, in therapy or exercising	Individual: Qigong; single approach; theory basis not mentioned	20 min. daily during one wk and 2 x 5 min. daily during 2 wks	EE, DEP, PA scores	EE↓, DEP↓ in intervention group compared to control group, PA↔	70%, 100%

*In the beginning (the proportion of workers who agreed to participate in the study of those offered the opportunity) and during follow-up (the proportion of workers who participated in the first follow-up of those included in the study).

Abbreviations:
RCT=randomized controlled study
EE=emotional exhaustion
DEP=depersonalization
PA=personal accomplishment

dPA=diminished personal accomplishment
EX=exhaustion
CY=cynicism
PE=professional efficacy
dPE=diminished professional efficacy
RTW=return to work
MBI=Maslach Burnout Inventory
MBI-GS=Maslach Burnout Inventory-General Survey
BBI=Bergen Burnout Inventory
OLBI=Oldenburg Burnout Inventory
SMBQ=Shirom-Melamed Burnout Questionnaire
KES=Karolinska Exhaustion Scale
CBB=Cuestionario Breve de Burnout
↓=decreased
↔=no change
↑=increased

FIGURE CAPTIONS

Figure 1. Flowchart of study selection.

Figure 2. Intervention effects on (emotional) exhaustion in RCT studies.

Figure 3. Intervention effects on depersonalization (cynicism) in RCT studies.

Fig 1

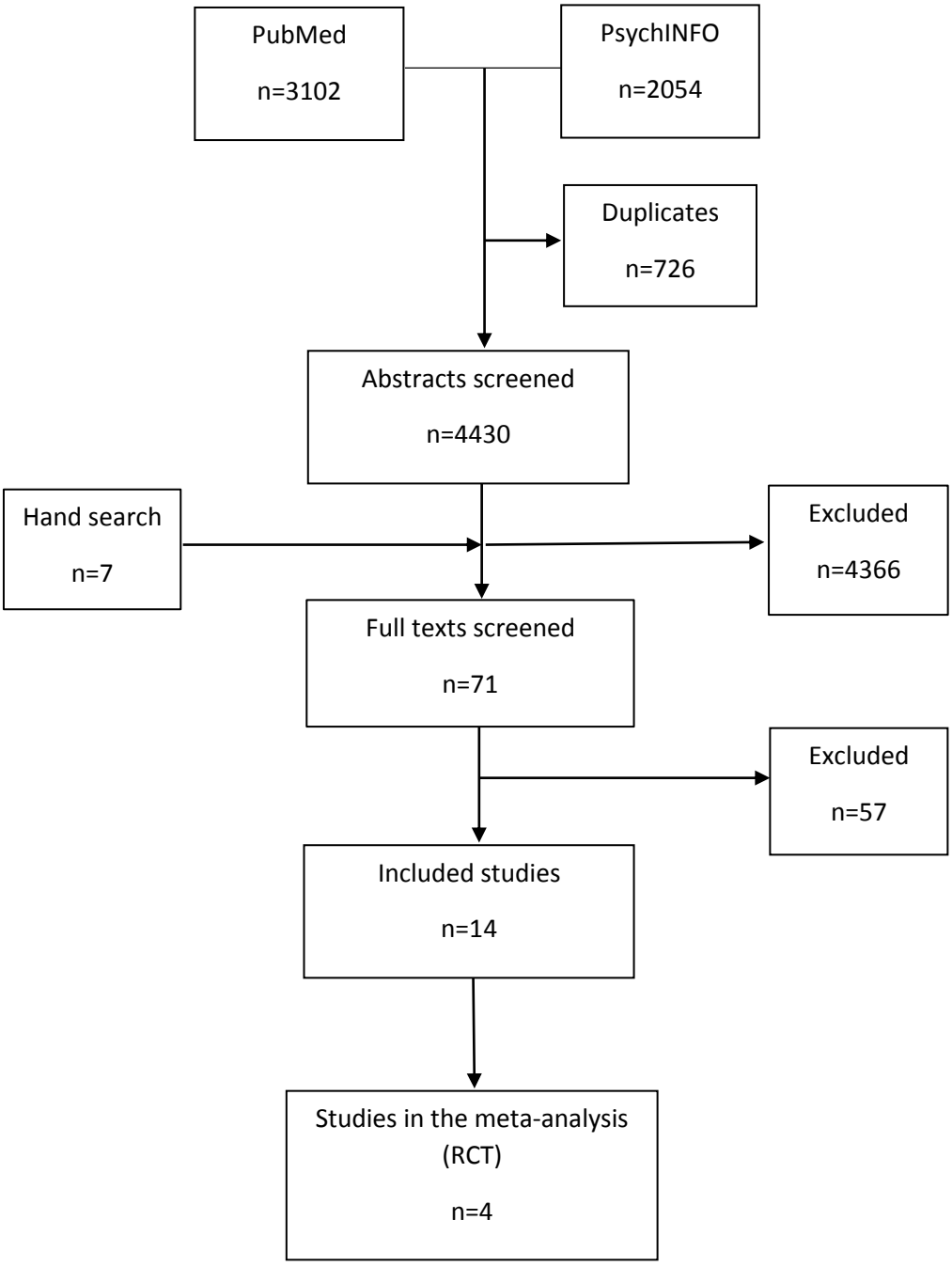


Fig 2

Model	Study name	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
	Blonk et al. (CBT vs. Cont)	-0,254	0,247	0,061	-0,739	0,230	-1,029	0,304
	de Vente et al. (SMT-I vs. CAU)	0,417	0,315	0,099	-0,200	1,035	1,324	0,186
	Saganha et al.	0,695	0,515	0,265	-0,314	1,704	1,349	0,177
	Gunusen et al. (Coping vs. Control)	0,587	0,268	0,072	0,061	1,113	2,188	0,029
Fixed		0,245	0,151	0,023	-0,050	0,540	1,628	0,103
Random		0,300	0,237	0,056	-0,165	0,765	1,264	0,206

Statistics for each study

Std diff in means and 95% CI

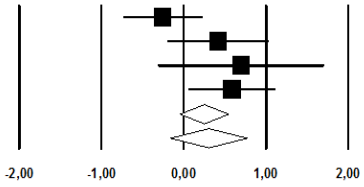
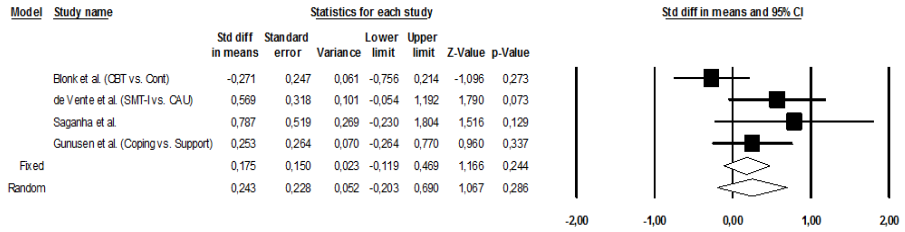


Fig 3



Model	Study name	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
	Blonk et al. (CBT vs. Cont)	-0,271	0,247	0,061	-0,756	0,214	-1,096	0,273
	de Vente et al. (SMT-I vs. CAU)	0,569	0,318	0,101	-0,054	1,192	1,790	0,073
	Saganha et al.	0,787	0,519	0,269	-0,230	1,804	1,516	0,129
	Gunusen et al. (Coping vs. Support)	0,253	0,264	0,070	-0,264	0,770	0,960	0,337
Fixed		0,175	0,150	0,023	-0,119	0,469	1,166	0,244
Random		0,243	0,228	0,052	-0,203	0,690	1,067	0,286