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The effectiveness of preventive group cognitive-behavioral interventions on enhancing work performance-related factors and mental health of workers: a systematic review

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Abstract

The promotion of mental health and well-being for the working population is crucial. Several studies have examined the effects of group cognitive-behavioral therapy (CBT)-based interventions on promoting employees' mental health, but whether their work performance-related factors also improved has not been studied thoroughly. This systematic review was conducted to summarize and synthesize the effectiveness and characteristics of group CBT-based interventions on improving mental health and enhancing work performance-related factors from previous studies. A systematic search of studies published until November 2019 was performed using the Cochrane Central Register of Controlled Trials, PsycINFO, CINAHL, and MEDLINE. Only ten studies investigated the impact of group CBT-based interventions on both mental health and work performance-related factors in a non-clinical working population using a randomized controlled trial study design. Studies on group CBT-based interventions such as psychosocial skills training and communication skills training were included. Eight studies showed that group CBT-based interventions improved aspects of mental health; ten studies demonstrated that group CBT-based interventions influenced some aspects of work performance-related factors. Overall, the reported effect sizes varied widely, from small to large. This review supports the idea that group CBT-based interventions in a non-clinical working population may partially influence mental health and work performance-related factors. All ten included articles were published after 2015. Additional research on this topic, such as through meta-analysis, is necessary to assess whether group CBT-based intervention is effective for supporting mental health and enhancing work performance-related factors in non-clinical working populations.

Keywords Group cognitive-behavioral therapy · Mental health · Work performance · Randomized controlled trial · Systematic review

Promotion of mental health and well-being for the working population is crucial in developed countries (Layard and Clark 2015). One in five people of the working population in Organisation for Economic Co-operation and Development (OECD) countries is currently suffering from a mental health problem (OECD 2015). In economically developed countries, the prevalence of taking sick leave due to mental health problems such as depression has increased in recent years (Henderson et al. 2014). Burnout is a well-known consequence of accumulated stress and it has been recently suggested that burnout syndrome could be regarded as a depressive syndrome (Schonfeld and Bianchi 2016). Stress, which is the cause of burnout, can negatively affect workers' job performance, productivity, work engagement, and communication with coworkers, which hinders smooth work progress and causes significant economic losses (Centers for Disease Control and Prevention 2018). A recent study by the World Health Organization (2019) estimates that depression and anxiety disorders cost the global economy US$ 1 trillion annually because of labor productivity losses.

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Group Cognitive-Behavioral Therapy for Preventing Mental Health Problems

A cognitive-behavioral therapy (CBT)-based intervention is considered one of the effective universal interventions to prevent employees' mental health problems (Nigatu et al. 2019). In a CBT session, the therapist may be able to understand the client/patient's problem through four factors: (1) thoughts, (2) mood/emotion, (3) biology/physical reaction, and (4) behaviors (Padesky and Mooney 1990). The CBT therapist collaborates with the client in sessions to set goals, collect information on these factors, find patterns that make up the problem, and teach new coping strategies (Beck 2011). The theoretical background of coping strategies includes various theories (Beck 2011): rational emotive behavior therapy (Ellis 1962), problem-solving therapy (D'Zurilla and Nezu 2006), and acceptance and commitment therapy (Hayes et al. 2004), among others. While traditional CBT uses individual face-to-face sessions, the delivery format has recently become more varied and can now be conducted through group, telephone, and online formats. Focusing on preventive intervention, group CBT formats are often used (Griffiths 2010). According to Sheldon (1999), "Group CBT refers to a group approach that makes use of behavioral, cognitive, relational, and group procedures to enhance the coping skills of the participants and ameliorate relational and interpersonal problems that patients may be experiencing" (p. 99). The group format is preferred in preventive intervention because it is similar to the lesson or lecture format. The advantage of structuring prevention intervention is that this might reduce the likelihood of stigmatization and fear of being stigmatized (Cardemil and Barber 2001). Additionally, group CBT is known as a more cost-effective intervention despite having the same level of effectiveness as the classic individual CBT (Cuijpers et al. 2019).

CBT and Work Performance

CBT was originally developed as psychotherapy for mental health problems such as depression and anxiety disorder, and its effectiveness has been mainly studied in clinical psychology and psychiatry. The effectiveness of CBT was mostly focused on the improvement of subjective stress, depressive symptoms, or anxiety indicators from the perspective of not only treatment but also prevention (Nigatu et al. 2019). In recent studies, preventive interventions of CBT were considered not only due to its preventive effect on mental health but also due to its improvement on work performance (Bond and Bunce 2003). Since the term "work performance" is used in various fields, it is difficult to provide only one definition (Koopmans et al. 2011). However, high performance is based on four elements: creativity, productivity, commitment, and collegiality (Amabile and Kramer 2007). These four elements can be improved through CBT techniques. For example, creative ideas can be encouraged by improving cognitive flexibility using cognitive reappraisal (Helzer and Kim 2019), productivity can be improved by training in cognitive reconstruction skills (Proudfoot et al. 2009), and well-being can be improved by learning mindfulness, goal-setting, and problem-solving skills, which can serve to improve commitment indicators (van Berkel et al. 2014). Furthermore, it is assumed that learning social skills such as assertive communications to facilitate relationships could improve relationships with colleagues (Omura et al. 2017). Therefore, a program that combines these techniques is needed to improve mental health and work performance-related factors. However, previous research mainly focused on examining what programs would be effective for improving both mental health and work performance-related factors, targeting clinical worker populations for group CBT-based interventions (Pomaki et al. 2012). Research needs to be conducted to determine which program would be the most effective intervention for non-clinical workers.

The Present Study

The aim of this systematic scoping review was to provide an overview of the existing content and evidence of group CBT-based interventions for promoting mental health and enhancing work performance-related factors. This information might help to provide recommendations for subsequent development of effective group CBT-based interventions and research.

Methods

Search Strategy and Study Selection

A literature search for studies published until November 2019 was conducted using four databases: the Cochrane Central Register of Controlled Trials, PsycINFO, CINAHL, and MEDLINE. A combination of keywords that were related to workers without current illnesses, cognitive-behavioral interventions using the face-to-face format, work performance-related factors (including direct work performance and related factors, such as creativity, productivity, commitment, and collegiality), and randomized controlled trials were used (see Appendix). Additionally, the reference lists of selected publications and publication lists of key authors were hand-searched to identify potential papers missed by the systematic search.

Studies published in English and fitting the following criteria were included: Population, Intervention, Comparison, Outcome, and Study design (PICOS) (Centre

for Reviews and Dissemination 2008). The studies were included if: (1) they were conducted on a working population without current disorders; (2) they used CBT-based techniques; (3) they were conducted using face-to-face group interventions; (4) they used outcome measures related to both mental health status and work performance-related factors; and (5) they used a randomized controlled trial (RCT) study design including pilot studies. To ensure the quality of the results, only research that employed an RCT was included in the review. Studies were excluded if they: (1) were conducted on a clinical population that had taken sick leave or non-working populations; (2) did not mention CBT-based techniques in their interventions; (3) delivered interventions as private sessions including face-to-face, online, and telephone sessions; (4) used outcome measures of either mental health status or work performance-related factors; and (5) were uncontrolled or nonrandomized and reported only the protocol.

Review Process

Three independent reviewers carried out screening for inclusion criteria before extracting characteristic and outcome data. The PRISMA diagram (Moher et al. 2009) (Fig. 1) presents the flow of articles from the initial search to the final inclusion of 1893 articles (1881 articles from the database searches and 12 articles from the non-database searches). First, the Rayyan service (Ouzzani et al. 2016) was used to remove 575 duplicate articles and exclude articles based on title and abstract through an online search. A total of 1279 articles were excluded on the agreement of the three reviewers, and a total of 39 full-text articles were screened for eligibility. In addition, 29 articles were excluded for the following reasons: 2 could not be accessed, 1 was not in English, and the remaining 26 did not meet one or more of the inclusion criteria.

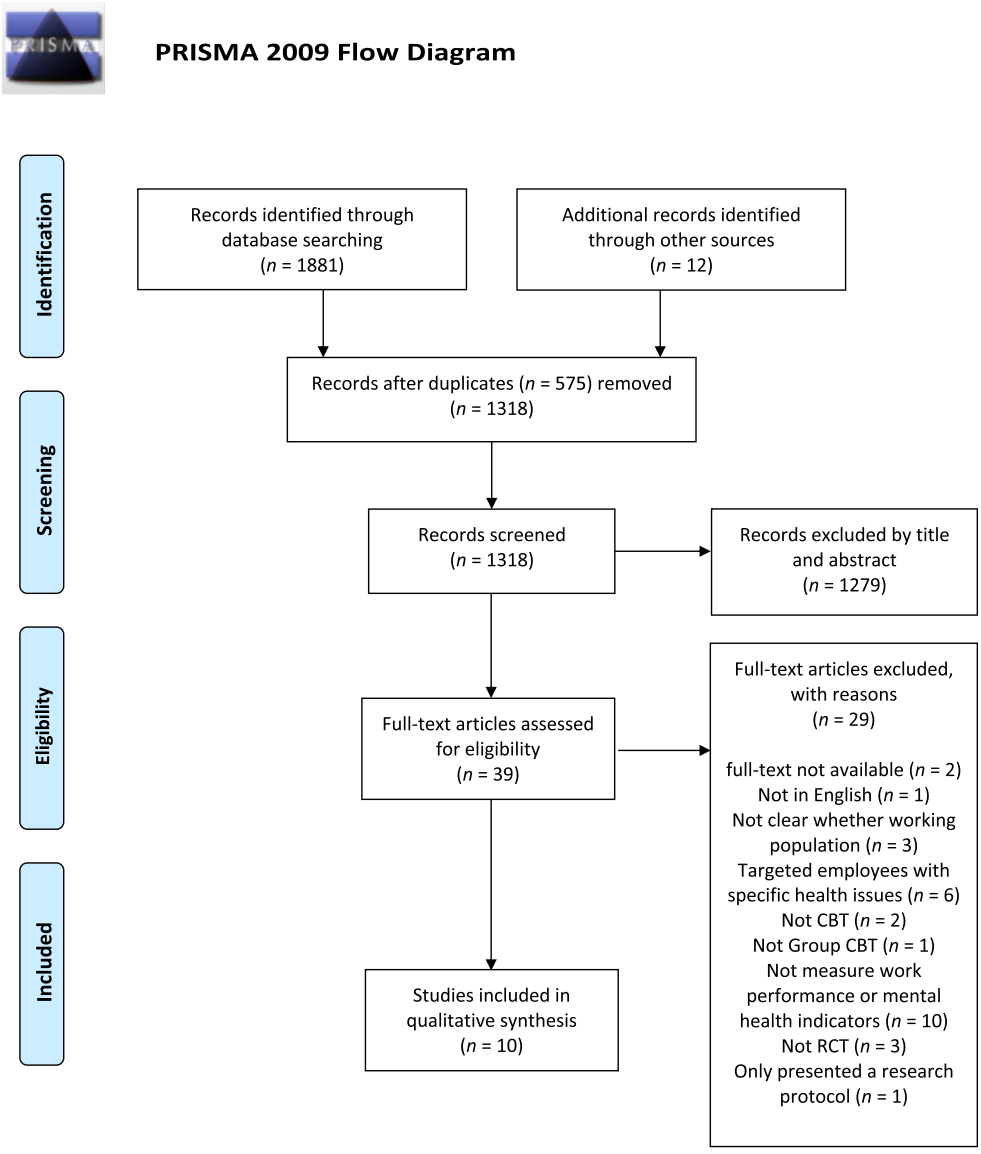

Fig. 1 PRISMA 2009 Flow Diagram. *From:* Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:https://doi.org/10.1371/journal.pmed1000097. For more information, visit www.prisma-statement.org

Data Extraction and Synthesis

This study aims to gather the maximum amount of information on the current evidence of the effectiveness of group CBT-based interventions in both preventing mental health problems and enhancing work performance-related factors in a working population. Thus, after the studies met the inclusion criteria, the information was extracted without using a quality checklist. The finalized extracted information from the articles was related to the study location, participants (occupation, sample size), method (measures and follow-up assessment timing), interventions (techniques, home assignments, number of sessions, hours per session, and frequency), and outcomes reported in each trial. A quantitative meta-analysis would not provide useful results because the results of the review demonstrated that only a small number of interventions ($n = 10$) were conducted in the studies. The studies assessed both mental health status and work performance-related factors as the outcomes, and each study used different measurements. Therefore, a narrative format was used to present the findings.

Results

Study Characteristics

Table 1 presents the characteristics of the ten included studies. All of the studies collected data pre- and post-intervention: two studies (Kimura et al. 2015; Sasaki et al. 2017) collected data at two points (pre- and post-intervention), five studies (Bernburg et al. 2016; Mache et al. 2016; Mache et al. 2015a; Mache et al. 2015b; Sampson et al. 2019a) collected data at three points (pre-intervention, post-intervention, and 3-month follow-up), and three studies (Mache et al. 2017; Mache et al. 2018; Sampson et al. 2019b) collected data at four points (pre-intervention, post-intervention, 3-month follow-up, and 6-month follow-up).

Most of the reviewed studies ($n = 8$, 80%) adopted RCTs, and a few studies ($n = 2$, 20%) adopted cluster RCTs; therefore, all of the participants were allocated at random to each intervention. Every reviewed study compared an Intervention Group (IG) with a Control Group (CG). Germany had the largest number of reviewed studies ($n = 6$), followed by the United States ($n = 2$), and Japan ($n = 2$). The total number of participants in the studies was 991, of which 499 (50.4%) participated in intervention groups and 492 (49.6%) participated in control groups. The sample size of all of the studies was greater than 50 participants, and ranged from 54 to 206. The studies recruited healthcare workers ($n = 8$), employees of an electric company ($n = 1$), and individuals from the service industry ($n = 1$).

Intervention Length

The preventive group CBT-based interventions in the workplace were widely variable, ranging from a 120-min one day workshop once a month with web-based CBT homework for the whole month (Kimura et al. 2015; Sasaki et al. 2017) to 120-min classes over 12 weeks with home assignments (Mache et al. 2015a; Mache et al. 2015b). Other programs were delivered over 8 weeks (Sampson et al. 2019a, 2019b) and 12 weeks (Bernburg et al. 2016; Mache et al. 2017; Mache et al. 2016, 2018). Four studies provided no detailed information about home assignments (Mache et al. 2017; Sampson et al. 2019a, 2019b; Sasaki et al. 2017), and one study (Kimura et al. 2015) assigned web-based CBT homework.

Intervention Content

In terms of training content, two studies (Sampson et al. 2019a, 2019b) were based on the MINDBODYSTRONG program, which provided a CBT-based approach to improve mental health, healthy lifestyle beliefs and behaviors, and job satisfaction. This program included eight sessions that focused on three areas (caring for the mind, caring for the body, and skill-building). Interventions in six studies (Bernburg et al. 2016; Mache et al. 2017; Mache et al. 2016, 2018; Mache et al. 2015a; Mache et al. 2015b) offered psychosocial skills training combined with cognitive-behavioral and solution-focused counseling. The training sessions included psycho-education such as theoretical input, watching videos, discussions, and home assignments. The topics of psycho-education included relaxation techniques, communication, conflict handling, and so on (Table 2). Kimura et al.'s (2015) study consisted of a brief training program based on CBT through group sessions. In group sessions, the participants learned about the theory and techniques of CBT. After the sessions took place, the participants filled out a column worksheet on the Internet to apply the CBT theory to real life. Sasaki et al.'s (2017) study consisted of a brief training program to improve communication skills. The educational content used in the study was based on references to the Communication Skills Training (CST) guide created by the National Center for Cognitive Behavior Therapy and Research, National Center of Neurology and Psychiatry (Horikoshi and Tajima 2013).

Outcomes on Work Performance-Related Factors

Six studies (Bernburg et al. 2016; Mache et al. 2017; Mache et al. 2016, 2018; Mache et al. 2015a; Sampson et al. 2019b) demonstrated that group CBT-based interventions improved job satisfaction. In contrast, two studies (Mache et al. 2015b; Sampson et al. 2019a) indicated that job satisfaction did not significantly differ between the intervention group and the

Table 1 Study Characteristics

Study	Subjects	Intervention	Measure (s)	Data collection	Results
Bernburg et al. (2016)	Junior physicians working in clinical departments of pediatrics *n*=54 (IG=26, CG=28)	Psychosocial skills training combined with cognitive-behavioral and solution-focused counseling	PSQ COPSOQ UWES	pre-intervention 3-month follow-up (T_1) 6-month follow-up (T_2)	Significant improvement . Job satisfaction (T_1: p=.01; T_2: p=.02) . Perceived stress (T_1: p=.01; T_2: p=.03) No significant change . Work engagement (T_1, T_2: p>.05)
Kimura et al. (2015)	Employees working in the headquarters of an electric company *n*=196 (IG=97, CG=99)	Group class on CBT and web-based CBT homework	Subjective work performance self-rating of cognitive flexibility self-evaluation of stress in the workplace	pre-intervention post-intervention (T_1)	Significant improvement . Work performance (p=.04; d=.31) No significant change . Cognitive flexibility (p>.05) . stress (p>.05)
Mache et al. (2015-a)	Junior physicians in their first year *n*=85 (IG=42, CG=43)	Psychosocial resilience training combined with cognitive behavioral and solution-focused counseling	PSQ BRCS SWOP-K9 COPSOQ	pre-intervention 3-month follow-up (T_1) 6-month follow-up (T_2)	Significant improvement . Resilience (T_1: p=.01; T_2: p=.02) . Self-efficacy (T_1: p=.02; T_2: p=.03) . Optimism (T_1: p=.001; T_2: p=.001) . Perceived stress (T_1: p=.01; T_2: p=.01) No significant change . Job satisfaction (T_1, T_2: p>.05)
Mache et al. (2015-b)	Junior surgeons in their first year *n*=68 (IG=35, CG=33)	Psychosocial skills training combined with cognitive-behavioral and solution-focused counseling	PSQ BRCS SWOP-K9 COPSOQ	pre-intervention 3-month follow-up (T_1) 6-month follow-up (T_2)	Significant improvement . Resilience (T_1: p=.01; T_2: p=.01) . Self-efficacy (T_1: p=.01; T_2: p=.02) . Optimism (T_1: p=.03; T_2: p=.001) . Perceived stress (T_1: p=.01; T_2: p=.01) . Job satisfaction (T_1: p=.01; T_2: p=.03)
Mache et al. (2016)	Psychiatrists working in a psychiatric clinic *n*=72 (IG=37, CG=35)	Psychosocial skills training combined with cognitive-behavioral and solution-focused counseling	PSQ BRCS SWOP-K9 COPSOQ QRI	pre-intervention 3-month follow-up (T_1) 6-month follow-up (T_2)	Significant improvement . Resilience (T_1: p=.02; T_2: p=.03) . Self-efficacy (T_1: p=.04; T_2: p=.04) . Perceived stress (T_1: p=.01; T_2: p=.02) . Job satisfaction (T_1: p=.02; T_2: p=.02) . Quality of physician-patient relationships support (T_1: p=.02; T_2: p=.03); conflict management (T_1: p=.02; T_2: p=.02); depth (T_1: p=.04; T_2: p=.05)
Mache et al. (2017)	Physicians working in clinical departments of gynecology and obstetrics medicine *n*=78 (IG=38, CG=40)	Problem- and emotion-focused coping skills and cognitive behavioral as well as solution-focused counseling	PSQ COPSOQ MBI ERSQ-27 BRCS	pre-intervention post-intervention (T_1) 3-month follow-up (T_2) 6-month follow-up (T_3)	Significant improvement . Perceived stress (T_1: p<.01; d=.52, T_2: p<.01; d=.49, T_3: p<.01; d=.38) . Emotional exhaustion (T_1: p<.01; d=.59, T_2: p<.01; d=n/a, T_3: p<.01; d=.43) . Resilience (T_1: p<.01; d=n/a, T_2: p<.01; d=n/a, T_3: p<.01; d=.39) . Emotion regulation (T_1: p<.01; d=n/a, T_2: p<.01; d=.49, T_3: p<.01; d=.41) . Job satisfaction (T_1: p=.01; d=n/a, T_2: p=.03; d=.23) No significant change

Table 1 (continued)

Study	Subjects	Intervention	Measure (s)	Data collection	Results
					. Job satisfaction (T_3: p=.3)
Mache et al. (2018)	Junior physicians working in emergency medicine n=70 (IG=35, WCG=35)	Mental health training applied both problem-solving and emotion-regulation strategies	PSQ COPSOQ MBI UWES ERSQ-27	pre-intervention post-intervention (T_1) 3-month follow-up (T_2) 6-month follow-up (T_3)	Significant improvement . Perceived stress (T_1: p<.01; d=.69, T_2: p<.01; d=.61, T_3: p=.01; d=.57) . Emotional exhaustion (T_1: p<.01; d=.61, T_2: p<.01; d=.50, T_3: p=.01; d=n/a) . Emotion regulation skills (T_1: p<.01; d=.41–46, T_2: p<.01; d=.37, T_3: p=.01; d=n/a) . Job satisfaction (T_1: p<.1; d=.22) . Work engagement (T_1: p<.1; d=.35) No significant change . Job satisfaction (T_2: p=.3; T_3: p=.4) . Work engagement (T_2: p=.4; T_3: p=.8)
Sampson et al. (2019-a)	Newly licensed registered nurses n=93 (IG=49, CG=44)	Cognitive behavioral skill-building program entitled MINDBODYSTRONG program	PSS GAD-7 PHQ-9 Healthy Lifestyle Beliefs Healthy Lifestyle Behaviors JSS	pre-intervention post-intervention (T_1) 3-month follow-up (T_2)	Significant improvement . Perceived stress (p=.022, η^2_p=.059) . Anxiety (p<.001, η^2_p=.167) . Depressive symptoms (p<.001, η^2_p=.152) . Healthy lifestyle behaviors (p=.015, η^2_p=.029) No significant change . Healthy lifestyle beliefs (p=.115, η^2_p=.029) . Job satisfaction (p=.854)
Sampson et al. (2019-b)	Newly licensed registered nurses n=89 (IG=39, CG=34)	Cognitive behavioral skill-building program entitled MINDBODYSTRONG program	PSS GAD-7 PHQ-9 Healthy Lifestyle Behaviors JSS	pre-intervention (Baseline) post-intervention (T_1) 3-month follow-up (T_2) 6-month follow-up (T_3)	Significant improvement Baseline-T_3 . Depressive symptoms (p=.031, d=2.55) . Job satisfaction (p=.025, d=1.05) No significant change . Stress (d=4.99) . Anxiety (d=2.37)
Sasaki et al. (2017)	Section chiefs and staff members in the service industry n=206 (IG=103, CG=103)	Brief communication skills training program	Original self-administered questionnaires about communication (1) K6 (2) Work-related stress (2) Job satisfaction (2)	pre-intervention post-intervention (T_1)	Significant improvement . "thinking together to solve problems" (p=.02)

Note. K6 = six-item Kessler psychological distress scale; PSS = Perceived Stress Scale; GAD-7 = Generalized Anxiety Disorder Scale; PHQ-9 = The nine-item Personal Health Questionnaire; JSS = Job Satisfaction Scale; PSQ = Perceived Stress Questionnaire; BRCS = Brief Resilient Coping Scale; SWOP-K9 = Self-Efficacy, Optimism and Pessimism; COPSOQ = Copenhagen Psychological Questionnaire (for job satisfaction); MBI = the Maslach Burnout Inventory; UWES = the Utrecht Work Engagement Scale; ERSQ-27 = the Emotion Regulation Skills Questionnaire-27; QRI = Quality of Relationship Inventory

1 Original self-administered questionnaires = "I am able to have an attitude of empathy and support," "I am able to talk to others while accepting their opinions," "I can skillfully ask others about problems and issues," "I am able to think together with others to solve problems and issues," and "I am able to communicate smoothly"

2 These indicators were only measured at baseline

Table 2 Intervention Contents

Study	Structure	Intervention content (topics)
Bernburg et al. (2016)	12 sessions 1.5 h/w	Psychosocial skills training combined with cognitive-behavioral and solution-focused counseling The training sessions included theoretical input, watching videos, oral group discussions, experimental exercises, and home assignments. In each session, a topic was introduced and discussed: (1) Introduction: the working life of a pediatrician (2) First work experiences in pediatrics (3) and (4) Psychosocial skills for pediatricians (mindfulness, self-awareness, and resilience) (5) Handling conflict in the work setting (6) Seeking guidance about one's own clinical performance in pediatric medicine (7) Relaxation techniques (progressive muscle relaxation) (8) Organizational culture, reporting one's own mistakes, and dealing with mistakes caused by others (9) Communication in the hospital setting (10) Dealing with difficult decisions, social support, how to speak up to supervisors and senior physicians (11) Self-care, coping with work-related stress (12) Session evaluation
Kimura et al. (2015)	1 session 120 min Three group sessions of 30 to 35 participants each were held for IG. Participants were placed in groups of 5 to 7, with groups arranged by age group.	Group CBT session Part 1. Lecture . The relationship between cognition, mood, and behavior . What is CBT? . Benefits of learning CBT as stress management skills and how to apply it to real-life with examples Part 2. Group work and discussion: cognitive restructuring skill . How to fill out the column worksheet . Recognizing automatic thoughts of their own . Group discussion about evidence that is against the participants' thoughts and adaptive thought . How to use self-help style online homework tools Personal web training (home assignment) . Fill out the column worksheet using the web-based CBT program.
Mache et al. (2015a)	12 sessions 2 h/w IG was divided into four groups. A group consisted of a maximum of 12 participants.	Psychosocial resilience training combined with cognitive behavioral and solution-focused counseling Sessions involve psycho-education (theoretical input), watching videos, discussions, experiential exercises, and home assignments. In each session, a topic was introduced and discussed: (1) Introduction: "day-to-day working life of a hospital physician" (2) Self-esteem and self-awareness (3) Resilience (4) Positive thoughts and emotions (5) Cognitive-behavioral training (6) Goal setting (7) Social support (8) Communication (9) Conflict handling (10) Dealing with difficult decisions (11) Coping with work-related stress and relaxation (12) Session evaluation

Table 2 (continued)

Study	Structure	Intervention content (topics)
Mache et al. (2015b)	12 sessions 2 h/w IG were divided into three groups. A group consisted of a maximum of 10 participants.	Psychosocial skill training combined with cognitive-behavioral and solution- focused counseling The sessions always involved theoretical input, watching videos, oral discussions, experiential exercises, and home assignments. In each session, a topic was introduced and discussed: (1) Introduction: "day-to-day working life of a surgeon" (2) First year as a surgeon (3) and (4) Psychosocial skills for surgeons, parts I and II (resilience, self-esteem, and self-awareness) (5) Conflict handling (6) Goal setting and cognitive-behavioral training (7) Relaxation techniques (progressive muscle relaxation and autogenic training) (8) Organizational culture/dealing with mistakes (9) Communication (10) Dealing with difficult decisions and social support (11) Self-care and coping with work-related stress (12) Session evaluation
Mache et al. (2016)	12 sessions 1.5 h/w IG was divided into four groups. A group consisted of a maximum of 12 participants.	Psychosocial skill training combined with cognitive-behavioral and solution- focused counseling The training sessions included psycho-education (theoretical input, watching videos, oral group discussions, self-awareness through experimental exercises, and home assignments). In each session, a topic was introduced and discussed: (1) Introduction: "theoretical input and discussion of the theme – working in psychiatry, personal and professional balance" (2) Self-care and coping with work-related stressors (3) Relationship with patients and conflict handling in the work setting (4) Communication in the hospital (5) How to speak up to supervisors and senior physicians (6) Teamwork and social support (7) Seeking guidance about one's own clinical performance (8) Organizational culture in the hospital setting, reporting one's mistakes, and dealing with mistakes (9) Dealing with difficult decisions (10) Emotion regulation (cognitive and relaxation techniques) (11) Training evaluation
Mache et al. (2017)	12 sessions 1.5 h/w	Problem- and emotion-focused coping skills training combined with cognitive behavioral and solution-focused counselling Modules of the training sessions included psycho-education, theoretical input, watching videos, oral group discussions, experiential exercises, and role-play. (1) Introduction: opening and discussion of the theme "working as a gynecologist in the clinical setting" (2) and (3) Experiencing work-related problems (4) and (5) Coping skills training (cognitive strategies, emotion regulation, and stress management techniques, self-awareness, and resilience) (6) and (7) Conflict management, analyzing conflict types, and conflict handling in daily work routines (8) Receiving and giving feedback, asking for supervision and feedback (9) Communication training (10) Learning from mistakes, reporting, dealing with consequences, organizational hospital culture (11) Handling difficult medical decisions, creating a support system, and how to speak up to supervisors and senior physicians (12) Overall training evaluation

Table 2 (continued)

Study	Structure	Intervention content (topics)
Mache et al. (2018)	12 sessions 1.5 h/w	The mental health training applied both well-established problem-solving and emotion-regulation strategies The design of the mental health training was based on Lazarus's transactional model of stress. In each session, a topic was introduced and discussed: (1) Introduction: theoretical input and discussion on the theme – working in emergency medicine (2) and (3) Physicians learn to solve problems systematically (4) and (5) Psychosocial skills in emotion regulation (cognitive and relaxation techniques), self-awareness, and resilience (6) and (7) Conflict handling in the work setting (8) Seeking guidance on one's own clinical performance (9) Communication in the hospital (10) Organizational culture, reporting one's mistakes, dealing with mistakes (11) Dealing with difficult decisions, social support, how to speak up to supervisors and senior physicians (12) Training evaluation
Sampson et al. (2019a, 2019b)	8 sessions 45 min/w	Cognitive behavioral skills–building training The program focuses on 3 areas: caring for the mind, caring for the body, and skills building (1) Thinking, feeling, and behaving, the ABCs of CBT, mindfulness, nutrition: health and energy, positive self-talk (2) Self-esteem and positive self-talk, thankfulness, managing change (3) Stress, healthy coping, abdominal breathing, physical activity, healthy eating on the go, managing stress (4) Problem-solving, setting goals, steps to problem-solving, strength training, strategies to overcoming barriers (5) Sleep, wellness Wonder Foods, sleep diary (6) Dealing with emotions in healthy ways, using guided imagery, coping strategies, effective communication, flexibility training, dealing with emotions (7) Coping with stressful situations, self-determined nutrition and physical activity goals, coping with stressful situations (8) Pulling it all together—review, establishing long-term goals
Sasaki et al. (2017)	1 session 120 min	Communication skills training In each session, three topics were introduced. (1) Communication model in psychotherapy necessity of communication skills, the significance and progression of communication items (2) Empathy and support that starts relationships Establishing relationships where no conflict occurs, making the relationship work with empathy (3) Guiding problem-solving through questions Defining guided discovery, how to use the Socratic method

control group. The interventions in two studies also demonstrated improvements in work-related measures such as direct work performance (Kimura et al. 2015) and work engagement (Mache et al. 2018). Three studies (Mache et al. 2017; Mache et al. 2018; Sampson et al. 2019b) that collected data at four points (pre-intervention, post-intervention, 3-month follow-up, and 6-month follow-up) demonstrated that indicators of work performance-related factors, such as job satisfaction and work engagement, did not significantly differ pre- and post-intervention at the 6-month follow-up. These studies implied that significant improvements in work performance-related factors were not sustained without booster sessions.

Risk of Bias within Studies

Personal bias was common due to difficulties in the standardization of training. In most cases, the data were self-reported, indicating the presence of measurement bias. There is a potential for positive bias within the study samples: the participants were highly motivated to learn and practice new psychosocial skills. In line with this, the retention rate was very high (Mache et al. 2017; Mache et al. 2016; Mache et al. 2015a; Mache et al. 2015b). The follow-up assessments were only held for a short duration or not at all. Therefore, assessing the long-term effect of the intervention was difficult. Lastly, in many cases, the sample sizes were relatively small.

Discussion

The findings of this review indicate that group CBT-based interventions for a non-clinical working population may have valuable effects on preventing mental health problems and enhancing work performance-related factors. Ten included studies met the inclusion criteria: (1) the population of the study target are workers without current disorders; (2) the intervention used CBT-based techniques; (3) the CBT delivery formats were group and face-to-face; (4) the effectiveness was measured by both mental health and work performance-related indicators; and (5) the study design was an RCT, including pilot studies. Six studies by a German group studied physicians in various departments (Bernburg et al. 2016; Mache et al. 2017; Mache et al. 2016, 2018; Mache et al. 2015a; Mache et al. 2015b). Two studies conducted by a U.S. group used an additional survey in the same study, and research participants were newly licensed registered nurses (Sampson et al. 2019a, 2019b). Two studies recruited employees working in a Japanese company as their participants (Kimura et al. 2015; Sasaki et al. 2017). All ten studies were published after 2015, thus evaluation studies of the effectiveness of group CBT-based universal intervention on both mental health and work performance-related factors is a field that can be expected to develop in the future. On assessing the eligibility of the full-texts, three-quarters of the articles (n = 29, 74.4%) were excluded, mainly because mental health or work performance-related factors was not used as an outcome or the participants of the study included workers with specific health issues. One study completely matched the inclusion criteria but it was excluded due to the fact that it was a protocol report about their ongoing study (Strauss et al. 2018). A further accumulation of research on this topic is necessary for meta-analysis and will also be needed for answering the question of whether group CBT-based intervention is effective in preventing mental health problems and enhancing work performance-related factors in non-clinical working populations.

In this section, first, the results are summarized regarding the group intervention effectiveness for non-clinical working populations on both preventing mental health problems and enhancing work performance-related factors. Then, the suggestions regarding the effectiveness of intervention based on the included review articles are provided. Finally, the limitations of this study are described and further suggestions for future research are given.

The Effectiveness of a Group CBT Intervention on Mental Health and Work Performance-Related Factors

The implications of the term "work performance" are extensive and this term has not been given a specific definition (Koopmans et al. 2011); thus, this study regarded not only work performance itself, but also several work performance-related factors, such as creativity, productivity, commitment, and collegiality (Amabile and Kramer 2007). In the included review articles, direct work performance (subjective evaluation of one's work performance), job satisfaction, work engagement, relationships, and communication skills were assessed as indicators of work performance-related factors. Several studies from a German research team showed that their interventions were effective on both mental health and work performance-related factors at the same assessment periods (Bernburg et al. 2016; Mache et al. 2017; Mache et al. 2016, 2018; Mache et al. 2015a). Bernburg et al. (2016) showed that there was a significant improvement in job satisfaction and perceived stress throughout 6 months after the intervention. A study by Mache et al. (2015b) showed that their psychological resilience training was significantly effective throughout six months on resilience, self-efficacy, optimism, perceived stress, and job satisfaction. Mache et al. (2016) also showed that their interventions were effective on mental health-related indicators, job satisfaction, and quality of relationship support (between physician and patient), even during the follow-up assessment after six months. Both studies by Mache et al. (2017) and Mache et al. (2018) showed that there was significant improvement immediately after intervention assessment, but there were no significant changes

on work performance-related factors (job satisfaction, work engagement) in the assessment 6 months after the intervention. The U.S. study (Sampson et al. 2019a, 2019b) indicated that there were significant changes in mental health indicators, such as perceived stress, anxiety, and depressive symptoms at the three-month follow-up assessment, but no significant change in job satisfaction. However, at the six-month follow-up, there was significant change in job satisfaction, but there were no significant changes on perceived stress and anxiety. The results of the Japanese study (Kimura et al. 2015) indicated that there were significant changes in work performance-related factors, but not in mental health.

The results obtained from the included articles were inconsistent. However, the CBT-based intervention effect on both preventing mental health problems and enhancing work performance-related factors has been postulated from previous research (Hyland et al. 2015), and some of the included articles supported the effectiveness of CBT. Significant changes in mental health indicators apparently disappear with each follow-up period; this might indicate that the preventive interventions delay the onset of mental health disorders rather than preventing them altogether (Cuijpers et al. 2008). Concerning work performance-related indicators, when psychological workplace factors were measured by self-report, the scores reflected on both characteristics of the work environment and individual characteristics. Thus, psychological exercise interventions, such as group CBT-based intervention, may hardly influence work environment functions (Roessler et al. 2013). Group CBT-based intervention has several merits such as being cost-effective and having the ability to reduce stigmatization (Cardemil and Barber 2001; Morrison 2001). With all this being said, it is necessary to conduct further research on the effectiveness of preventing mental health problems and enhancing work performance-related factors.

Suggestions Regarding Effectiveness of Interventions on Mental Health and Work Performance-Related Factors

There were only ten included articles, and each study evaluated different outcomes as indicators of mental health and work performance-related factors with varying results. However, there are some common frames between the studies that showed effectiveness.

First, the attributes of study participants were very limited. For example, the participants of the study by five German research teams are mostly very specific in the occupation, job position, and working place (Bernburg et al. 2016; Mache et al. 2017; Mache et al. 2016, 2018; Mache et al. 2015a). These investigators targeted junior physicians or physicians who work at the same clinical departments and have the same practice scales. However, the results of the other four studies (Kimura et al. 2015; Mache et al. 2015b; Sampson et al. 2019a; Sasaki et al. 2017) show that there was no significant improvement on mental health or work performance-related factors. Furthermore, the occupation and workplace of their participants were relatively diverse; for instance, they targeted mixed occupations and positions in the same company (Kimura et al. 2015; Sasaki et al. 2017), or junior physicians in the first year and newly licensed registered nurses from various clinical departments (Mache et al. 2015a; Sampson et al. 2019a). Thus, the intervention might be effective on both mental health and work performance-related factors when occupation, job position, and working place are very specific; when these factors are the same, the intervention contents could provide suitable introduction and discussion for each participants' reality (Morrison 2001). For example, Mache et al. (2016) studied specific themes, such as working in the fields of psychiatry and personal and professional balance.

Second, more than one session was conducted. In the included articles, the number of group CBT sessions were widely variable, ranging from 1 session to 12 sessions. Work performance-related factors outcomes improved regardless of the number of sessions. Eight to 12 sessions such as those adopted by the U.S. and German research team improved both mental health and work performance-related factors; however, one-session studies such as those adopted by Kimura et al. (2015) only improved work performance-related factors, with no significant improvement on mental health. Therefore, more than one session might be ideal to simultaneously improve both mental health and work performance-related factors. By attending several intervention sessions, the participants might learn multiple techniques and find their own suitable scheme to deal with daily stress events (Wan Mohd Yunus et al. 2018). This might be especially important in universal preventive intervention because participants do not have common problems. However, there is also evidence that no significant relationship was found between incidence rate ratio and the number of sessions used in the preventive intervention (Cuijpers et al. 2008); thus, further research is needed to identify the ideal number of sessions.

Finally, six studies which improved work performance-related factors specified that they contained group discussions (Bernburg et al. 2016; Kimura et al. 2015; Mache et al. 2017; Mache et al. 2016, 2018; Mache et al. 2015b). The interaction within the group is an advantage of group CBT. These interactions may have a positive effect on work performance-related factors in terms of relationships, such as commitment and collegiality.

Limitations and Future Implications

This systematic review was optimal for understanding the effectiveness of the current literature on group CBT-based

interventions targeting a working population in both preventing mental health problems and enhancing work performance-related factors. However, this study presents some limitations. The major limitation of this study is the small number of studies ($n = 10$) evaluating both mental health and work performance-related factors indicators in a non-clinical working population using an RCT design. Although the participants were different in each study except for Sampson et al. (2019a, 2019b), most of the included articles in this systematic review have been published by one German research team (Bernburg et al. 2016; Mache et al. 2017; Mache et al. 2016, 2018; Mache et al. 2015a; Mache et al. 2015b). Publication bias might also exist because studies on non-clinical populations face difficulties in reaching significant results.

The definition of work performance in this review was set using a broad definition. When searching databases, keywords included not only direct work performance indicators, such as subjective performance and presenteeism, but also factors related to enhancing work performance such as creativity, productivity, commitment, and collegiality. However, the results demonstrated that the evaluation of work performance-related indicators was limited to subjective evaluation of one's direct work performance, job satisfaction, work engagement, relationships, and communication skills. Thus, business-related indicators, such as creativity and productivity, might be necessary to adopt as outcomes of psychological intervention research for evaluating the effectiveness on work performance-related factors. The focus in this review was limited to enhancing work performance-related factors, but future reviews might also need to focus on work addiction, which is considered to be linked with work engagement and burnout (Schaufeli et al. 2008). Further research is required to assess the effectiveness of group CBT-based universal interventions for workers using business and work addiction outcomes.

In this review, group interventions that used CBT-based techniques were featured, but the detailed contents of the interventions were varied, and a generalization of results was difficult. Additionally, as a quality checklist was not set in the review process, the included articles may have methodological weaknesses. Further, as the search was limited to an RCT study design, articles that did not mention this term may have been missed (e.g., Proudfoot et al. 2009).

Conclusions

This systematic review indicates that group CBT-based interventions might influence improvement in work performance-related factors and mental health when the number of intervention sessions is greater than one. Additionally, especially when the intervention targets were limited to the same occupation, job position, or workplace, and participants could share their work-related problems, group CBT-based interventions might be more effective. A further accumulation of research on this topic is necessary for meta-analysis and answering the question of whether group CBT-based interventions are effective in preventing mental health problems and enhancing work performance-related factors in non-clinical working populations.

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Declarations

Conflict of Interest None.

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Informed Consent As this is a systematic review study, informed consent for research participant is not required.

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