From the
Institute for Medical Information Processing, Biometry and Epidemiology (IBE)
of the Ludwig-Maximilians-Universität München
Director: Univ. Prof. Dr. Ulrich Mansmann

Mental health and Well-being in the Workplace: Informing Policy and Practice

Dissertation
zum Erwerb des Doctor of Philosophy (Ph.D.)
an der Medizinischen Fakultät der
Ludwig-Maximilians-Universität München

submitted by

Ivana Ivandic

from

Zagreb, Croatia

on

March 7, 2018

Supervisor: Prof. Dr. med. Dennis Nowak

Second evaluator: PD Dr. rer. biol. hum. Carla Sabariego, MPH

Dean: Prof. Dr. Reinhard Hickel

Date of oral defence: July 17, 2018

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Dean's Office
Medical Faculty

Affidavit

Ivandic, Ivana

Surname, first name

Street

Zip code, town

Country

I hereby declare, that the submitted thesis entitled

Mental Health and Well-being in the Workplace: Informing Policy and Practice

is my own work. I have only used the sources indicated and have not made unauthorised use of services of a third party. Where the work of others has been quoted or reproduced, the source is always given.

I further declare that the submitted thesis or parts thereof have not been presented as part of an examination degree to any other university.

Munich, 07.03.2018.

Place, date

Ivana Ivandic

Signature doctoral candidate

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Dean's Office
Medical Faculty

Confirmation of congruency between printed and electronic version of the doctoral thesis

Ivandic, Ivana

Surname, first name

Street

Zip code, town

Country

I hereby declare that the electronic version of the submitted thesis, entitled

Mental health and well-being in the workplace: informing policy and practice

is congruent with the printed version both in content and format.

Munich, 07.03.2018.

Place, date

Ivana Ivandic

Signature doctoral candidate

Table of Contents

Abbreviations

CRPD – Convention on the Rights of Persons with Disabilities

CI – Confidence Intervals

EAP – Employee Assistance Program

EF – Environmental Factors

EU – European Union

ILO – International Labor Organization

MDS – Model Disability Survey

OECD – Organization for Economic Cooperation and Development

OR – Odds Ratios

PwD – Persons with Disabilities

RCT – Randomized Controlled Trial

SDG – Sustainable Development Goals

UN – United Nations

WHO – World Health Organization

WP – Work Performance

Publication list

1. Filatova S, Koivumaa-Honkanen H, Hirvonen N, Freeman A, Ivandic I, Hurtig T, Khandaker GM, Jones PB, Moilanen K, Miettunen J. Early motor developmental milestones and schizophrenia: A systematic review and meta-analysis. Schizophr Res 2017; 188:13-20.

2. Ivandic I, Freeman A, Birner U, Nowak D, Sabariego C. A systematic review of brief mental health and well-being interventions in organizational settings. Scand J Work Environ Health 2017; 43(2):99-108.

3. Ivandic I, Kamenov K, Rojas D, Ceron G, Nowak D, Sabariego C. Determinants of work performance in workers with depression and anxiety: a cross-sectional study. Int J Environ Res Public Health 2017; 14(5).

4. Pinheiro M, Ivandic I, Razzouk D. The Economic Impact of Mental Disorders and Mental Health Problems in the Workplace. Global Mental Health: Costs, Poverty, Violence, and Socioeconomic Determinants of Health. In: Razzouk D (Ed.): Mental Health Economics: The Costs and Benefits of Psychiatric Care. Springer 2017, p. 415-430. ISBN: 978-3-319-55265-1.

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Dean's Office
Medical Faculty

Cumulative Dissertation

Confirmation pursuant to § 4a Paras. 3 and 5 Doctoral Degree Regulations for Dr. med., Dr. med. dent. and Dr. rer. boil. hum.
and
pursuant to § 7 Para. 4 Doctoral Degree Regulations for Dr. rer. nat. at the Medical Faculty
Please note: for each published article, a separate "Cumulative Dissertation" form has to be submitted!

Ivana Ivandic
Name of doctoral candidate

A systematic review of brief mental health and well-being interventions in organizational settings
Title of publication

Scand J Work Environ Health 2017; 43(2):99-108
Journal (Name, issue, year, etc.)

I hereby confirm that none of the articles submitted for this doctoral degree have been the subject of another (current or completed) dissertation.

Signature of doctoral candidate

By signing, the following **co-authors** confirm that:

- the extent of their contributions (content-related and volume) in the publications submitted,
- their agreement to the submission of the publications, and
- the article in question is not the subject of another (current or completed) dissertation.

Name of co-author	Extent of contribution (content-related and volume)	Signature of co-author
1. Aislinne Freeman	Reviewing the abstracts Methodology check Literature search	Aislinne Freeman
2. Ulrich Birner	Study design Data interpretation	Ulrich Birner
3. Dennis Nowak	Study design Data interpretation	Dennis Nowak
4. Carla Sabariego	Study design Data interpretation Data synthesis	Carla Sabariego
5.		

Please list further authors on a separate page

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Dean's Office
Medical Faculty

Cumulative Dissertation

Confirmation pursuant to § 4a Paras. 3 and 5 Doctoral Degree Regulations for Dr. med., Dr. med. dent. and Dr. rer. boil. hum.
and
pursuant to § 7 Para. 4 Doctoral Degree Regulations for Dr. rer. nat. at the Medical Faculty
Please note: for each published article, a separate "Cumulative Dissertation" form has to be submitted!

Ivana Ivandic
Name of doctoral candidate

Determinants of work performance in workers with depression and anxiety: a cross-sectional study
Title of publication

Int J Environ Res Public Health 2017; 14(5)
Journal (Name, issue, year, etc.)

I hereby confirm that none of the articles submitted for this doctoral degree have been the subject of another (current or completed) dissertation.

Signature of doctoral candidate

By signing, the following **co-authors** confirm that:

- the extent of their contributions (content-related and volume) in the publications submitted,
- their agreement to the submission of the publications, and
- the article in question is not the subject of another (current or completed) dissertation.

Name of co-author	Extent of contribution (content-related and volume)	Signature of co-author
1. Kaloyan Kamenov	Data analysis Result interpretation	Kaloyan Kamenov
2. Diego Rojas	Collection of original data Data analysis	Diego Rojas
3. Gloria Ceron	Collection of original data Data analysis	Gloria Ceron
4. Dennis Nowak	Study design	Dennis Nowak
5. Carla Sabariego	Study design Data interpretation	Carla Sabariego

Please list further authors on a separate page

1. Introductory Summary

1.1 Mental Health and Work

Work plays a major role in people's lives, and the workplace is a key environment that can promote mental health and well-being. Along with the economic value demonstrated by income for individuals and their families, work has a great personal and social value (1). It provides protective aspects of psychological experience, such as structure and regular activity. Additionally, it positively affects people's self-esteem and enhances their quality of life (2). The social value of work is reflected in the social contact and support outside the family, as well as collective effort and purpose (2). Environmental aspects, such as a positive work climate, good interpersonal relationships, opportunities to develop skills, success and recognition, inclusion in planning and executing work activities, physical security and equitable pay are all protective factors in our mental health and well-being (1).

Despite these positive effects of work, workers are often exposed to risk factors that can hinder their mental health and well-being. Numerous environmental factors, such as poor communication, bullying, violence, poor work organisation, organisational culture and job design present risk factors for a wide range of mental disorders, including depressive and anxiety disorders (5, 6). Therefore, to have a mentally healthy and productive workforce, efforts should be made by employers and policymakers to ensure a safe and healthy work environment.

1.2 Mental Disorders and Work

Employment and workplace can play particular protective roles for persons with mental disorders. Returning to or maintaining work can play a crucial part in recovery, helping individuals build self-esteem and confidence and creating a socially inclusive environment (3, 4). Providing a safe, healthy and inclusive workplace can prevent or reduce mental health problems and improve employment and retention rates of persons with mental disorders (4, 5).

Persons with mental disorders, however, often face various work-related barriers. Evidence shows that they have an increased risk of living in poverty and experience difficulties in obtaining and maintaining employment (6). In the workplace, they may experience problems with work performance and conflicts at work that are either caused by or related to their illness (6). However, the most common barriers are stigma and discrimination (6, 7), which often prevent workers from disclosing their condition. This consequently decreases the likelihood of implementing appropriate modifications and adjustments that would ensure they work to their full ability. Hence, strategies and policies ensuring stigma-free and inclusive work environments are necessary to provide equal treatment for workers with mental disorders.

1.3 Burden of Poor Mental Health and Mental Disorders

Mental disorders are highly prevalent and significant contributors to the global burden of disease. Globally, one in two people will be affected by a period of poor mental health during his or her lifetime (6). According to the World Health Organization (WHO, 2000), mental health problems comprise five of the ten leading causes of disability worldwide (2). A recent study estimated that the global burden of mental illness accounts for 32.4% of years lived with disability and 13.0% of disability-adjusted life-years (8). In Europe, mental disorders affect 20% of the working-age population (6). The Eurobarometer study (2010) carried out on the European level found that 15% of the population seeks help for psychological problems from mental health professionals every year, and 72% of people report having taken anti-depressants (9). Leka et al. (2015) report on the estimates of the European workforce population experiencing a mental health problem, ranging across studies from one in five to two in five, with a lifetime risk of at least two in five (4).

Poor mental health and mental disorders are associated with high indirect and direct costs on an individual and organisational level. Generally, workers with mental disorders face costs in terms of health care, lost wages and the health and social impacts (10). According to the Organization for Economic Cooperation and Development (OECD, 2015), compared to mentally healthy individuals, workers with mental disorders are absent more often from work and for longer periods of time than other workers. Workers with mental disorders who do not take sick leave have lower productivity rates compared to other workers (6). Consequently, there are costs for the employers resulting from an increased absenteeism and presenteeism

rate, low work performance and productivity (11). Furthermore, employers face issues about how to mitigate psychosocial risks and promote mental health and well-being as well as how to manage the return-to-work process and recruitment for persons with mental disorders (10).

Negative consequences and costs related to poor mental health and mental disorders go beyond the workplace. For instance, workplace health and compensation authorities face rising job stress-related claims, and the social welfare system encounters an increase of working age disability pensions related to mental disorders (12). In broader terms, there are negative consequences and costs for the entire society. Although an adequate estimate of these costs is complex and difficult to undertake, the obtained estimates provide a good idea about the magnitude of the economic impact of mental disorders (13). The OECD (2015) reports that the total economic cost of mental disorders is estimated at around 3.5% of the gross domestic product (GDP) in European countries, with similar results in Australia and the United States (6). By including additional expenditures generated by mental disorders, such as benefit systems other than health-related or impacts on colleagues' productivity, the total cost would be even higher (6). In 2010, the global cost of mental disorders was estimated at $2.5 trillion, of which two-thirds is indirect costs and the remainder comes in direct costs (14). Costs of depression and anxiety in the European Economic Area in 2007 were estimated at €136.3 billion, of which €99.3 billion was due to productivity losses in employment (15). Considering the burden and various socioeconomic costs related to mental health, there is both a strong business case and societal interest to address various aspects of work-related mental health and well-being to make a sustainable investment in preventing and treating mental disorders.

1.4 Legal Framework and Policy Context for Work-related Mental Health and Well-being

There is a mandate and legal responsibility for countries to protect workers' safety and health, both physical and mental. Numerous legal instruments have been developed on the international, European and national level to ensure safety at work and to protect workers' health. These instruments include legally binding international conventions ratified by member states, such as the C155 Occupational Safety and Health Convention and the Convention on the Rights of Persons with Disabilities (CRPD), Directives on the European

Union (EU) level such as the Framework Directive 89/391/EEC on Safety and Health of Workers at Work and various national laws.

In addition to the obligatory legislation, there are various legally non-binding instruments and policies in the form of recommendations, resolutions, opinions and proposals developed by recognised international, European and national organisations that address both promotion of mental health and well-being and prevention of mental disorders in the workplace, as well as protection of workers with mental disorders.

1.4.1 Legally Binding Instruments

The United Nations' (UN) agency International Labor Organization (ILO) developed a series of international labour standards - legal instruments composed by constituents, i.e. governments, employers and workers, which lay out basic principles and rights at work (16). These standards include both conventions and supporting recommendations. Specific conventions developed to ensure and promote a safe and healthy work environment for all workers include C155 Occupational Safety and Health Convention (1981) and C187 Promotional Framework for Occupational Safety and Health Convention (2006) (16).

In addition to legal framework ensuring a healthy and safe working environment for all workers, there is an obligation under the equality legislation to ensure persons with mental disorders have equal access to the labour market and exercise their worker rights on an equal basis as others. The C159 Vocational Rehabilitation and Employment (Disabled Persons) Convention (1983) establishes the principle of equal treatment and employment for workers with disabilities, including those with mental disorders (16). The C111 Discrimination (Employment and Occupation) Convention (1958) provides a framework for the equality of opportunity and treatment with respect to employment and occupation (16). Finally, the Convention on the Rights of Persons with Disabilities (CRPD) provides a legal framework that protects the rights of persons with disabilities, including those with mental disorders (defined as 'psychosocial disabilities') (16).

Apart from international conventions, there are directives at the European level that address mental health and well-being. Framework Directive 89/391/EEC on Safety and Health of Workers at Work, which presents the key EU legislation on occupational safety and health,

requires employers to ensure workers' health and safety in all aspects (16). The Directive 93/104/EC on Organization of Working Time sets out standards on working hours that must meet minimum standards to protect workers' health and safety (16). Although these directives do not specifically include terms related to mental health, they provide an indirect reference to, and provision for, risks related to mental health at work (4, 16). More specifically, the Framework Directive emphasises that employers should ensure workers' health and safety in every aspect related to work and address all types of risks at the source by identifying, assessing, preventing and managing them (16, 17). Therefore, the Framework and other directives refer to the duty of care that employers have toward workers, which may be interpreted as ensuring a safe and healthy work environment for all workers as well as those recovering from an illness, such as returning to work after being absent due to a mental disorder (17).

Unlike the few regulatory policies at the EU level that specifically refer to mental health issues, psychosocial risks and other relevant concepts, specific countries have regulatory policies requiring employers to implement the prevention and promotion of mental health strategies in the workplace. Furthermore, the great majority of EU member states have non-discrimination legislation in place that contains a duty to provide reasonable accommodations for persons with disabilities, including those with mental disorders (18).

1.4.2 Non-legally Binding Instruments

On the international level, organisations have established various legally non-binding initiatives that address mental health and well-being. To name a few, the ILO has developed the R194 List of Occupational Diseases Recommendation, designed to assist countries in the prevention, identification and, where applicable, compensation of diseases caused by work, which recognises mental disorders as occupational diseases for the first time (16). The ILO SOLVE programme, developed for employers, trade unions and other relevant stakeholders, focuses on the prevention of psychosocial risks and the promotion of health and well-being through policy design and interventions to improve working conditions and reduce work-related stress (16). The WHO has also developed several guidelines and documents about how to address psychosocial risks at work, work-related stress, violence and psychological harassment. Furthermore, it has launched the Global Framework for Healthy Workplaces, which is built on existing best practice tools and methodologies. Finally, a number of other

international organisations, such as the OECD and World Bank, have been active in addressing mental health in the workplace through research, advocacy, development and implementation of specific initiatives (16).

Non-binding approaches at the EU level include the Framework Agreement on Work-Related Stress, which places the responsibility of determining the appropriate organisational and/or individual measures for reduction of work-related stress on the employer, as well as the Framework Agreement on Harassment and Violence at Work, the European framework for psychosocial risk management (PRIMA-EF), European Pact for Mental Health and Wellbeing and European Parliament Resolution T6-0063/2009 on Mental Health, among others (16).

All of the aforementioned instruments provide not only a legal framework but also a guideline for employers and other relevant stakeholders to develop and implement appropriate and effective strategies and interventions to enhance the mental health of the employees, prevent the occurrence of mental disorders and manage ongoing conditions.

1.5 Mental Health and Well-being Interventions in the Workplace

The workplace is a good place to implement various strategies to address the mental health and well-being of all workers. Generally, there are three types of interventions that address mental health and well-being in the workplace. Primary, preventive interventions are proactive and aim to prevent exposure to stressors and the occurrence of illnesses among healthy individuals (19). They address sources of stress, i.e. psychosocial risks in the workplace, by altering the work environment or making organisational changes (19), for instance, by improving the communication process, redesigning job tasks or involving employees in the decision-making process. Primary prevention strategies can be driven by various stakeholders, including employers, workers or their unions or by mandatory or voluntary policy directives (19). Secondary interventions aim to reduce the impact of stress by altering how individuals perceive or respond to stressors (19); therefore, they address individual change. They include stress management programmes, such as coping skills training, meditation, muscle relaxation or multidimensional interventions (20). Tertiary interventions are reactive; they aim to reduce the impact of an ongoing condition through

treatment or management of symptoms or disease. This is usually done through Employee Assistance Programs (EAP) and rehabilitation and/or return-to-work programmes (21).

Workplace mental health and well-being interventions can target different levels within an organisation: individual, organisational or a combination of both. Individual interventions are person-directed and target individual characteristics as opposed to psychosocial risks and environmental stressors. Generally, they use secondary and tertiary strategies and focus on providing employees with coping skills through interventions such as relaxation or meditation, biofeedback, cognitive-behavioural therapy (CBT), exercise, time management or EAP (22). Organisational-level interventions target policies and practices to prevent poor mental health and the occurrence of mental disorders by implementing primary prevention strategies. Organisation-focused approaches include selection and placement strategies, training and education programmes, physical and environmental characteristics, communication within the organisation and job redesign or restructuring, among others (22). Interventions that target both the individual and organisational levels mainly focus on changing the fit between the person and the organisation (e.g. clarifying an individual's role in an organisation) and building resilience to specific stressors. The specific aim of these interventions is to improve work performance.

Given the various types and levels of interventions, the challenge remains which approach to choose and apply appropriate interventions. Current literature suggests that a comprehensive and integrated approach to mental health in the workplace is needed to achieve optimal societal health (20). According to LaMontagne et al. (2014), the integrated approach includes prevention of risks by providing a safe and healthy environment, promotion of positive capacities that can strengthen individual and organisational health and lead to high levels of well-being, and management of the illness by addressing mental health problems among workers regardless of cause (20). Therefore, efforts should be made by policymakers to take a broad perspective on mental health and well-being and consider the interplay of factors both inside and outside the workplace to implement effective strategies to achieve a healthier and more productive workforce.

1.6 Work Performance and Mental Health

Work performance, defined as a multidimensional construct that includes a worker's experience fulfilling work tasks and 'results from the relationship between an individual's health resources and the expectations and structural conditions that operate within social settings such as the workplace' (23), has been associated with mental health. Good mental health and high levels of well-being have been related to increased productivity and work performance (10). In contrast, poor mental health affects work performance by a reduction in productivity and output, an increase in error rates, an increased number of accidents, poor decision-making as well as deterioration in planning and control of work (2), all of which cause productivity losses (6). This makes a strong case to put work performance in the forefront when implementing strategies that address mental health and well-being.

Strategies and interventions addressing mental health and well-being can have various aims and target different determinants in and outside of the workplace. To protect the organisation from the effects of poor mental health, a number of employers implement individual-level interventions that focus on stress prevention and reduction as well as managing symptoms among workers with mental disorders (24), while the evidence of the impact of interventions on improving occupational outcomes, such as work performance or absenteeism, is scarce (25). A recent systematic review of reviews found that no individual-level intervention could be recommended as effective in terms of occupational outcomes, i.e. sickness absence or work performance (25). This underlines the need for research that is informed directly by the evidence and needs of employers, employees and other relevant stakeholders (24). Given that interventions should be based on a systematic identification of risk factors and risk groups, it is crucial to identify environmental determinants of work performance to develop and implement effective strategies.

1.7 Rationale of the PhD project

In recent years, mental health and well-being in the workplace have been internationally recognised. They present one of the building blocks of the 2009 European Parliament Resolution T6-0063/2009 on Mental Health (26). The resolution sets out recommendations for a comprehensive and integrated mental health strategy for Europe. More specifically, it emphasises the crucial role of the workplace with regard to a person's mental health and the

social integration of persons with mental disorders. The resolution calls for member states to encourage research on working conditions, development of programmes, promotion of a healthy work climate, studying work-related stress as an underlying cause of mental disorders, as well as support of the recruitment, retention and rehabilitation of persons with mental disorders.

As an intergovernmental international organisation, the OECD promotes policies that will improve the economic and social well-being of people around the world. Their recent report on mental health and work (2015) calls for policy changes involving a large number of institutions and stakeholders to address the interplay between mental health and work (6). The report identifies key elements of policy transformation essential to build a more mentally resilient workforce and improve labour market inclusion of persons with mental disorders. The OECD highlights the relevance of developing mental health competence by understanding work and performance implications in relation to poor mental health and mental disorders. It emphasises the importance of early intervention and recommends policy to focus on prevention, early identification and calls for development and implementation of innovative and effective interventions (6).

This PhD project addresses the aforementioned calls with an integrated and multi-dimensional approach to work-related mental health and well-being. Its core focus are the emerging trends of not only promotion of mental health and well-being, but prevention and management of mental disorders in the workplace. Firstly, it addresses the need for healthy, safe and mentally resilient workplace for all workers, regardless of their health condition, by complementing knowledge gaps on existing prevention and promotion strategies. Secondly, it addresses the interplay between mental health and work performance among workers affected by common mental disorders. Altogether, this project informs policy and practice on effective workplace mental health and well-being strategies and determinants of work performance to establish further best practices and provide recommendations for relevant stakeholders.

Study 1 is a systematic review that addresses the call for prevention and promotion as well as early action on workplace mental health and well-being. It was designed taking into account the demands of fast-paced life and changing nature of future of work, with the aim to identify effective yet simple and easy-to-implement strategies that could help employers and policymakers to enhance workers' mental health and well-being. Due to their short duration

and simplicity, these strategies, defined as brief interventions, could assist in overcoming structural challenges and barriers in organizations related to implementation of mental health interventions, hence be more appealing to employers. In addition, they can be implemented either individually or in scope of a broader organizational health and safety program. In order to complement current gaps on workplace mental health-related strategies, Study 1 provides an overview of the effectiveness of brief mental health and well-being prevention and promotion interventions carried out in organisational settings and compares their effectiveness with the effectiveness of common interventions. The review identifies 11 studies evaluating individual-level brief interventions and 9 studies evaluating corresponding interventions of common duration. Identified types of interventions include stress management, relaxation, massage, mindfulness meditation, positive psychology and multimodal interventions. Results show limited evidence on the effectiveness of brief positive psychology interventions and no evidence on the effectiveness of other types brief interventions. These findings are discussed in light of methodological quality of included studies. Conclusively, study 1 emphasizes the need for further high-quality research with rigorous study designs and improved reporting of methods, in order to provide evidence not only for the effectiveness of brief interventions but sustainability of their effects.

Study 2 is a cross-sectional study which addresses calls for understanding the interplay between work performance and mental disorders and the improvement of labour market inclusion of persons with mental disorders. It was designed taking into account the burden of common mental disorders, its association with work performance and the Article 27 of the CRPD, which serves as a safeguard for persons with disability to work on an equal basis with others. Study 2 addresses the gaps on the effectiveness of organizational strategies aiming at work environment, adaptations and accommodations for persons with mental disorders, by identifying environmental factors that negatively influence their work performance. Considering that workplace psychosocial risk factors are well-known, Study 2 surpasses the workplace and identifies the built, social, attitudinal and health system-related environmental determinants of work performance in persons with common mental disorders. This study was carried out on large, representative sample of workers with depression and anxiety, providing both general results and desegregating them by disability level. Results show that determinants of work performance go beyond the workplace and vary with regard to disability levels. Identified determinants of work performance for all workers with anxiety and depression are hindering aspects of means of transportation and workplace, and the use of

personal assistance. In workers with mild to moderate disability, determinants of work performance are hindering aspects of means of transportation and workplace, and discrimination. Finally, hindering aspects of the workplace and dwelling, and the use of personal assistance are determinants of work performance for workers with severe disability. These findings highlight the need to approach mental health and work performance from a broader perspective and acknowledge that general factors, not only organisational ones, affect workers' performances. Moreover, considering that workers with anxiety and depression experience either different barriers or different extents of the same barrier, the integrative approach in developing both universal and specific strategies needs to be applied. Conclusively, this study provides valuable information for policymakers on how to design appropriate strategies to improve work performance in workers with common mental disorders.

This PhD project contributes to the field of public health by complementing gaps in knowledge and addressing the emerging trends in work-related mental health research, policy and practice. By providing evidence-based information, this PhD is intended to help policymakers and practitioners in developing new evidence-based strategies, optimising existing ones, as well as evaluating them in order to successfully meet the demands related to promotion of mental health and well-being, prevention and management of poor mental health and associated disorders among workers.

2. Study 1

A systematic review of brief mental health and well-being interventions in organizational settings

Ivana Ivandic

Aislinne Freeman

Ulrich Birner

Dennis Nowak

Carla Sabariego

Scandinavian Journal of Work, Environment and Health 2017; 43(2):99-108

Review

Scand J Work Environ Health 2017;43(2):99-108

doi:10.5271/sjweh.3616

A systematic review of brief mental health and well-being interventions in organizational settings

by Ivandic I, Freeman A, Birner U, Nowak D, Sabariego C

The present study offers an overview of the evidence on the effectiveness of brief mental health and well-being interventions in organizational settings and comparison of their effects with corresponding interventions of common (ie, longer) duration. It discusses the findings in the light of quality appraisal of included studies and emphasizes the need for further research with methodologically rigorous study designs and enhanced reporting of methods.

Affiliation: Department of Medical Informatics, Biometry and Epidemiology, Research Unit for Biopsychosocial Health, Ludwig-Maximilians-Universität (LMU), Marchioninistr. 17, 81377 Munich, Germany. ivana.ivandic@med.uni-muenchen.de

Refers to the following text of the Journal: 2010;36(3):185-268

Key terms: brief intervention; intervention; mental health; occupational health; organization; prevention; promotion; systematic review; well-being; workplace; workplace intervention

This article in PubMed: www.ncbi.nlm.nih.gov/pubmed/28042963

Additional material

Please note that there is additional material available belonging to this article on the *Scandinavian Journal of Work, Environment & Health* -website.

Review

Scand J Work Environ Health. 2017;43(2):99–108. doi:10.5271/sjweh.3616

A systematic review of brief mental health and well-being interventions in organizational settings

by Ivana Ivandic, MSc,[1] Aislinne Freeman, MSc,[2] Ulrich Birner, PhD,[3] Dennis Nowak, PhD,[4] Carla Sabariego, PhD [1]

Ivandic I, Freeman A, Birner U, Nowak D, Sabariego C. A systematic review of brief mental health and well-being interventions in organizational settings. *Scand J Work Environ Health.* 2017;43(2):99–108. doi:10.5271/sjweh.3616

Objectives The aim of the systematic review was to provide an overview of the evidence on the effectiveness of brief interventions targeting mental health and well-being in organizational settings and compare their effects with corresponding interventions of common (ie, longer) duration.

Methods An extensive systematic search was conducted using the Medline and PsycINFO databases for the period of 2000–2016. Randomized-controlled trials (RCT) and quasi-experimental studies evaluating primary or secondary brief interventions carried out in the workplace settings were included. Subsequently, common interventions matching brief interventions by type and assessed outcomes were included. The methodological quality of included studies was appraised using NICE guidelines, and the best evidence synthesis approach was applied.

Results The review identified 11 brief interventions and 9 corresponding common interventions. Included studies varied substantially in sample size and characteristics, methodological quality, duration of follow-up, types of intervention, and assessed outcomes. All but one study evaluating brief interventions had high risk of bias. No evidence was found on the effectiveness of brief stress management, relaxation, massage, mindfulness meditation, or multimodal interventions. We found limited evidence on the effectiveness of brief positive psychology interventions.

Conclusions Our review highlights the need for high-quality studies evaluating brief mental health and well-being interventions in organizational settings. Future studies should use methodologically rigorous designs and improved reporting of methods and results to provide conclusive evidence on the effectiveness and sustainability of the intervention effects.

Key terms brief intervention; mental health; occupational health; organization; prevention; promotion; workplace; workplace intervention.

The majority of people spend a great part of their lives at work, therefore it is very important to address determinants of workplace-related mental health and develop effective strategies to preserve it. One of the major risk factors leading to poor mental health and well-being is work-related stress, affecting more than 40 million individuals across the European Union (1). Long-term exposure to work-related stress is associated with an increased risk of depression and may contribute to a range of other debilitating diseases, work injuries, and illnesses (2). Additionally, work-related stress and associated mental health problems lead to a number of major socioeconomic consequences such as absenteeism, increased turnover, loss of productivity, and high disability pension costs (3). Evidence shows that nurturing employee mental health and well-being is cost-effective for organizations and leads to higher job satisfaction, improves productivity, and contributes to lower absenteeism, resulting in increased profits for the corporation (4, 5). Thus, it is essential to develop,

1 Department of Medical Informatics, Biometry and Epidemiology – IBE, Chair for Public Health and Health Services Research, Research Unit for Biopsychosocial Health, Ludwig-Maximilians-Universität (LMU), Munich, Germany.
2 Klinik und Poliklinik für Psychiatrie und Psychotherapie der Universität, Leipzig, Germany.
3 Siemens AG, Corporate Human Resources Environmental Protection, Health Management and Safety (CHR EHS), Munich, Germany.
4 Institute and Outpatient Clinic for Occupational, Social and Environmental Medicine, Ludwig-Maximilian-University, Munich, Germany.

Correspondence to: Ivana Ivandic, Department of Medical Informatics, Biometry and Epidemiology – IBE, Chair for Public Health and Health Services Research, Research Unit for Biopsychosocial Health, Ludwig-Maximilians-Universität (LMU), Marchioninistr. 17, 81377 Munich, Germany. [E-Mail: ivana.ivandic@med.uni-muenchen.de]

implement, and evaluate mental health promotion and disease prevention strategies in the workplace.

In order to implement appropriate interventions, it is necessary first to identify occupational hazards and assess both physical and psychosocial risks. This can be achieved by adopting the "systematic hierarchy of control" approach, which provides a structure for employers to select the most effective control measures (interventions) with the aim of removing or reducing the identified risk of certain hazards (6). This approach includes the following steps: (i) identifying the hazards – finding them and understanding the potential harm they can cause; (ii) assessing the risks – understanding their nature, the impact and likelihood of their occurrence; (iii) controlling hazards and risks – determining the control (ie, intervention) to eliminate or reduce the risk and selecting the best way to implement it; and (iv) checking the control – reviewing the implemented intervention(s) to ensure they are effective.

This approach does not need to include comprehensive and complex interventions, and the choice of interventions will depend on the complexity of hazards, the nature of the organization, and the way business is conducted. Different ways of controlling the risks can be ranked from the highest level of protection and reliability to the lowest. The most effective protection measure is to eliminate hazards or the associated risks, followed by efforts to reduce the remaining risks. The remaining measure involves influencing individual behavior and changing how they interact to reduce the risks (6). Since recent literature recognizes brief interventions as simple and time-efficient strategies that focus on changing behavior (7), they could be an appropriate solution for reducing the risk by influencing employee behavior.

Taking into account the fast-paced demands of modern life, it would be valuable to develop and implement appropriate and effective promotion and prevention strategies in organizational settings that do not interfere much with everyday tasks. Although there are no quick fixes in enhancing employee mental health and reducing their stress level, brief interventions could be part of the solution as a strategy for stress relief, implemented on their own or as a part of a more comprehensive organizational strategy. Additionally, their short duration and simplicity are potentially appealing characteristics for the employer, that could have a positive influence in overcoming common structural challenges and barriers of implementing mental health interventions in the workplace, such as stigma related to mental health and lack of commitment and interest on the part of employer (8).

Brief interventions are usually defined as being limited in time and focused on changing behavior (9). They emerged from addiction treatment research (10) and cover a broad range of strategies used to support people to create change over a short timeframe (11). Brief interventions can vary in session duration and frequency, usually consisting of one or multiple sessions lasting 5–60 minutes (11, 12, 13). They are often referred to as a heterogeneous entity (14) that can be delivered in various forms, such as psychoeducation, skills training, goal-setting, lifestyle changes, exercise, guided self-help, among others (11). There is substantial evidence that alcohol and tobacco-related brief interventions are effective in organizational settings (15, 16, 17). Moreover, previous studies have reported that brief interventions are practical and possibly sustainable, potentially producing beneficial results (18) at a low cost to the organization (19).

Although it would be essential for organizations interested in improving mental health and well-being of their employees to have an overview of corresponding effective brief interventions for their specific setting, no synthesis of the evidence is available so far. Previous reviews on mental health and well-being interventions conducted in organizations have mainly focused on prevention and promotion strategies (regardless of the length) (20, 21, 22), interventions for people with common mental health problems (2, 23), crisis interventions (24), and prevention of work disability (25).

The present systematic review focuses on brief interventions and includes both mental health and well-being prevention and promotion strategies. The main goal was to provide an overview of the effectiveness of brief workplace interventions carried out in organizational settings that addressed employee mental health and well-being. A relevant issue is whether brief interventions are as effective as corresponding interventions of usual length. Therefore, the additional goal is to compare the effectiveness between brief and corresponding common (ie, longer) interventions. This review will provide information about the current state of the art of brief mental health and well-being interventions in organizational settings and inform both policy and practice about the short- and long-term effects of these strategies on mental health and well-being outcomes.

Methods

A systematic review was carried out and reported following PRISMA guidelines (26).

Search strategy

The literature search was conducted in March 2016 on Medline and PsychINFO databases. The search strategy was built upon common strategies identified from relevant published articles (2, 20, 21) and was based on a combination of search terms related to workplace, mental health and well-being, interventions, and study design, both as

freetext/keywords and MeSH terms. The search was not restricted to brief interventions since we aimed to include studies evaluating interventions of usual length (ie, longer, "common" duration) that matched the included brief interventions. The complete search string is presented in Appendix 1 (www.sjweh.fi/index.php?page=data-repository). The search included studies in English and German, published between 2000–2016. To identify further studies missed by the electronic search, the reference list of included articles was manually searched along with "grey literature" databases (SIGLE, NITS, reports of the Mental Health Commission of Canada/Australia/UK, MH AID New Zealand and Australia, SpringerLink database, and Google Scholar).

Selection criteria

Randomized-controlled trials (RCT) and quasi-experimental studies evaluating workplace interventions assessing mental health and well-being outcomes, such as perceived stress, resilience, job satisfaction, depressive and anxiety symptoms, positive and negative affect, and other related measures were eligible for inclusion. Primary and secondary interventions, targeting both individual and organizational levels, as well as individual and group interventions delivered face-to-face or through information technology (computer-based, smartphone applications) fit the inclusion criteria. Studies carried out among workers were considered and interventions conducted among the unemployed population or persons with diagnosed mental health conditions were excluded. Studies were included if they evaluated a brief intervention – consisting of up to five sessions with each session lasting up to an hour (12). Studies evaluating interventions of usual length – referred to as "common interventions" – were included post-hoc if they evaluated longer counterparts of included brief interventions and matched brief interventions by intervention type and assessed outcomes.

Eligibility assessment

Four researchers screened the retrieved abstracts of all studies fitting the criteria, regardless of the intervention's duration, for relevance. In order to improve the quality and reliability of this process, an independent reviewer double checked 20% of abstracts. The fulltexts of relevant studies were retrieved and checked in two consecutive phases: (i) inclusion of studies evaluating brief interventions and (ii) inclusion of studies evaluating matched common (ie, longer) interventions. The second phase was carried out after data extraction of studies evaluating brief interventions. A second reviewer double checked all included studies regarding their eligibility and disagreements were resolved by consensus.

Data extraction and data synthesis

Extracted information about study characteristics included: aim of the study, design and study population, intervention, outcomes and assessment instruments, and findings. Additionally, data on the rationale of implementing the intervention in a particular setting were extracted. Extracted information about interventions included: name, number of sessions, duration and frequency, intervention level (individual or organizational), delivery mode (face-to-face, computer-based, online), and content. Where possible, effect sizes (Cohen's d) of brief and common interventions were calculated and reported. Given the heterogeneity of included studies, an overall quantitative meta-analysis was not feasible. Data was synthesized by categorizing studies according to the type of intervention.

Methodological assessment

Two reviewers assessed the methodological quality of the studies using adapted checklists for RCT and quasi-experiments recommended by NICE guidelines (27). Since NICE guidelines do not provide clear cut-off criteria for methodological quality, we adapted it to the Groeneveld et al approach (28) and assessed each study as having high or low risk of bias, depending on how many relevant methodological quality criteria were fulfilled (table 1). When fulfilled and described properly, a criterion was rated as positive (+), otherwise criteria

Table 1. List of criteria used for assessing the methodological quality of studies, adapted from checklists for randomized controlled trials and quasi-experiments recommended by NICE guidelines.

	Criterion	Definition
Selection bias	a) Randomization and allocation procedure	Positive if a clear description of the procedure was present and if randomization was adequately performed
	b) Comparison of groups at baseline	Positive if groups were similar at the baseline with regard to gender, age and all relevant outcome measures
Performance bias	a) Comparison of groups other than intervention	Positive if there were no differences between the groups apart from the intervention received
	b) Blinding procedure	Positive if participants had no knowledge of the group allocation
Attrition bias	a) Dropout rate	Positive if dropout rate was <20%
	b) Differences in dropouts between groups	Positive if there was no significant differences in attrition rate between groups
	c) Differences between dropouts and completers	Positive if there were no systematic differences between those who completed the study and those who did not
Detection bias	a) Follow up	Positive if follow up was ≥3 months
	b) Outcome measures	Positive if valid and reliable method was used to determine the outcome

were rated as negative (-). Studies that rated positive on >50% of criteria (ie, ≥5) were considered to have low risk of bias. After independent assessment, existing disagreements between reviewers were resolved by consensus.

Strength of evidence

In order to draw conclusions about the effectiveness of identified intervention types, we followed the best-evidence synthesis approach adapted from Groeneveld et al (28). Four levels of evidence were distinguished depending on the methodological quality of studies and consistency of results: (i) level 1 (strong evidence) multiple RCT with low risk of bias with consistent outcomes; (ii) level 2 (moderate evidence) 1 RCT with low risk of bias and ≥1 RCT with high risk of bias, all with consistent outcomes; (iii) Level 3 (limited evidence) 1 RCT with low risk of bias or >1 RCT with high risk of bias, all with consistent outcomes; and (iv) Level 4 (no evidence) 1 RCT with high risk of bias, quasi-experimental designs or contradictory outcomes of the studies.

Consistency of results for a certain outcome measure would be reached when ≥75% of relevant studies reported significant improvement in the intervention group and no difference in the control group. In case of ≥2 high quality RCT, the conclusion was based on these RCT only. Otherwise, results of low quality RCT were taken into account.

Results

This systematic review comprised 11 studies evaluating brief workplace mental health and well-being interventions and 9 studies evaluating matched common (ie, longer) interventions. However, it is important to note that 10 studies evaluating brief interventions and 7 evaluating matching common ones had high risk of bias. The PRISMA flow diagram is presented in figure 1. A detailed description of included studies and their findings is presented in Appendix 2 (www.sjweh.fi/index.php?page=data-repository).

Summary of studies evaluating brief interventions

The sample size of the included studies ranged from 30–278 participants. All studies evaluated individual-level interventions carried out among a healthy, working population and none addressed working conditions or job stressors. Five studies included high-stress professions, such as police, healthcare staff or education professionals (29, 30, 31, 32, 33), four were carried out among office workers (34, 35, 36, 37) and two included manufacturing workers (38, 39). Studies were carried out mostly in high and middle-income countries.

Seven studies were RCT whereas the remaining had quasi-experimental designs (N=4). Four studies used pre-post-test measurements (30, 31, 32, 35) and six had follow-up ranging mainly from one week to one month (29, 33, 34, 36, 38, 39). One study implemented a 3-month follow-up (37). One study included two intervention groups (33) and the remaining studies included non-active (29, 34, 37), waiting-list (31, 39) or active (31, 32, 36, 39) control groups. One study did not involve a control group (35). Reported attrition rates ranged between 6.1–88%. Most brief interventions were delivered in weekly intervals (29, 30, 31, 33, 35, 38, 39), one was conducted daily (36), one on alternate days (32) and one every four weeks (34). One intervention was a single session (37). With regard to session duration, six interventions lasted ≤30 minutes (29, 30, 33, 35, 36, 37) and five between 30–60 minutes (31, 32, 34, 38, 39). Seven interventions involved face-to-face training (29, 31, 32, 33, 34, 37, 39), one was delivered online (35) and one was self-administered (36). Two interventions used mixed methods: face-to-face and computer-based (38), and participants receiving a CD of guided exercise after face-to-face training (30).

Types of brief interventions also varied substantially. Most studies reported on relaxation techniques (31, 33, 39) and stress management interventions (34, 35, 38), followed by positive psychology interventions (36, 37), mindfulness meditation (30), massage (29), and multi-dimensional intervention (32) which included relaxation, self-management and mood-management techniques. The assessed outcomes were mainly stress (N=5), anxiety symptoms (N=4), burnout symptoms (N=2), and well-being (N=2) (Appendix 2). Three studies included physiological outcomes, such as heart rate (31, 39), blood pressure, and cortisol level (29). No study applied clinical instruments in outcome assessment.

Summary of studies evaluating matched common (ie, longer) interventions

Based on the matching criteria, studies evaluating the following intervention types were included: meditation (40, 41, 42, 43), stress management (44, 45, 46), and positive psychology (47, 48). Their sample size varied between 40–296 participants. Four studies were carried out among office workers (40, 46, 47, 48), three included high stress professions (41, 42, 43), and two included manufacturing workers (44, 45). Similar to studies evaluating brief interventions, these studies were conducted predominantly in high and middle-income countries. Six studies were RCT (40, 41, 42, 45, 46, 48) and the remaining had quasi-experimental designs (43, 44, 47). One study included two intervention groups

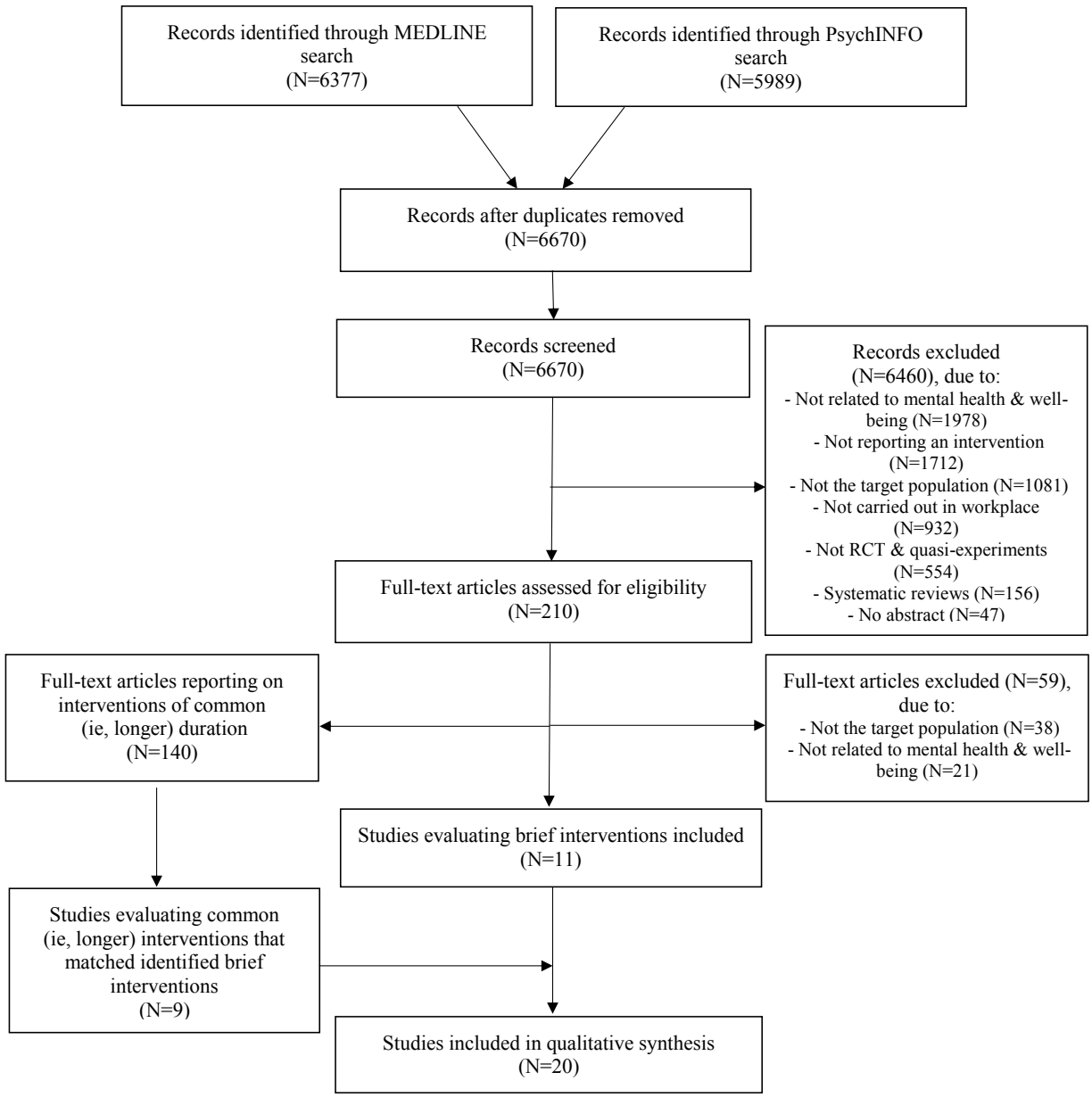

Figure 1. Flow chart of the study selection process.

(40). Unlike the brief interventions, six studies had longer follow-ups of between 1–6 months (40, 41, 43, 45, 47, 48), and three studies used pre/post-test assessments (42, 44, 46). Common interventions were mainly delivered face-to-face (40, 41, 42, 44, 43, 46, 48), and two were computer-based (45, 47).

Strength of evidence

An important result of this systematic review is the high risk of bias found in 17 of the 20 included studies (table 2). Several studies were rated negatively on particular criterion due to lack of or unclear description of methodology, such as randomization and allocation procedure. Additionally, only five studies applied intention-to-treat analysis. Brief stress management (34, 35, 37), relaxation (31, 33, 39), massage (29), and one intervention with a multidimensional approach (32) were evaluated solely in studies with high risk of bias and no matched common interventions have been identified (Appendix 2). Therefore, the evidence on the effectiveness of brief interventions is considerably limited.

Limited evidence, based on a single RCT (37), was found for brief positive psychology interventions. This

Table 2. Methodological quality checklist. When fulfilled and described properly, a criterion was scored as positive (+) or negative (-). Studies that rated positive for >50% of criteria (ie, ≥5) were considered to have low risk of bias; otherwise they were assessed as having high risk of bias.

	Selection bias		Performance bias		Attrition bias			Detection bias		Number of + scores	Risk of bias
	Randomization & allocation procedure	Comparison of groups at baseline	Comparison of groups other than intervention	Blinding procedure	Dropout rate	Differences in dropouts between groups	Difference (drop-outs vs completers)	Follow-up	Outcome		
Studies evaluating brief interventions											
Bost & Wallis, 2006 (29)	+	+	-	-	+	-	-	-	+	4	High
Kawaharada et al, 2009 (34)	-	-	-	-	+	-	-	-	+	2	High
Kawai et al, 2010 (35)	-	-	-	-	-	-	-	-	+	1	High
Kirk et al, 2011 (36)	-	+	+	-	+	-	-	-	+	4	High
Mackenzie et al, 2006 (30)	-	-	-	-	-	-	-	-	+	1	High
McElligot et al, 2003 (31)	-	-	-	-	-	-	-	-	+	1	High
Pollak Eisen et al, 2008 (38)	-	-	-	-	-	-	-	-	+	1	High
Ranta & Sud, 2008 (32)	-	-	-	-	-	-	-	-	+	1	High
Sutarto et al, 2012 (39)	-	+	+	-	+	-	-	-	+	4	High
Yung et al, 2004 (33)	-	-	+	-	-	-	-	-	+	2	High
Zhang et al, 2014 (37)	-	+	+	+	+	-	-	-	+	5	Low
Studies evaluating matched common (ie, longer) interventions											
Bond & Bunce, 2000 (40)	-	-	+	-	-	+	+	+	+	5	Low
Elder et al, 2014 (41)	+	-	-	-	+	-	-	+	+	4	High
Jennings et al, 2013 (42)	-	+	-	-	+	-	-	-	+	3	High
Kaplan et al, 2014 (47)	-	+	-	-	-	-	-	-	+	2	High
Page & Vella-Brodrick, 2012 (48)	+	+	-	-	-	+	+	+	+	6	Low
Shimazu et al 2006 (44)	-	-	-	-	+	-	-	-	+	2	High
Stafford-Brown & Paenham, 2012 (43)	-	-	-	-	+	-	-	-	+	2	High
Umanodan et al, 2014 (45)	-	-	-	-	+	-	-	-	+	2	High
Zolnierczyk-Zreda, 2002 (46)	-	-	-	-	+	-	-	-	+	2	high

RCT applied a blinding procedure, had comparable groups, analyzed if systematic differences in dropout rates were present, and had a low attrition rate and 3-months follow-up. The main aim of the study was to increase employee psychological capital, one of the core concepts of positive organizational behavior, defined as a "state-like psychological resource that comprises four components: optimism, hope, efficacy, and resilience" (37). The study consisted of a structured reading material-based brief intervention delivered in a single session. Results showed increased hope, optimism, efficacy, resilience, and job performance, but only the effect on hope remained in the 3-month follow-up. Effect sizes were small on hope and medium on overall psychological capital, resilience, and optimism. When reporting on the evidence of positive psychology, it is important to note that there is no standard definition of positive psychology interventions. The working definition applied in the present review was: "Positive psychology intervention may be understood as any intentional activity or method (training, coaching, etc.) based on (a) the cultivation of valued subjective experiences, (b) the building of positive individual traits, or (c) the building of civic virtue and positive institutions." (49)

A relevant question in this systematic review was whether brief interventions are as effective as their common (ie, longer) versions. However, the evidence on the effectiveness of the matched common versions is limited as well. Two RCT evaluating common positive interventions were identified (47, 48), but only one had low risk of bias. This RCT evaluated the "Working for Wellness Program" (48) and showed long-term effectiveness by increasing participants' subjective, psychological, and work-related well-being throughout a 6-month period. The study had small effects on positive and negative affect and a very large effect on affective well-being (Appendix 3, www.sjweh.fi/index.php?page=data-repository). Although both brief and common positive psychology interventions were effective, their effect sizes are hardly comparable due to the

use of different outcome measures. Although we found no evidence that brief meditation interventions are effective, limited evidence based on one RCT was found on the effectiveness of common mindfulness interventions. This RCT with low risk of bias (40), carried out among media employees, showed significant improvements in general mental health and depressive symptoms but no change in job satisfaction and motivation.

Discussion

The current systematic review 11 studies evaluating brief workplace mental health and well-being interventions and 9 studies evaluating corresponding common (ie, longer) interventions. Based on these studies, there is no evidence on the effectiveness of brief stress management techniques, relaxation, mindfulness meditation, massage, or multidimensional interventions on employee mental health and well-being. We found limited evidence on the effectiveness of brief positive psychology interventions. A relevant question in this systematic review was whether brief interventions are as effective as their common (ie, longer) versions but the evidence on the effectiveness of matched common interventions is limited as well. Two RCT demonstrated the effectiveness of matched common positive psychology and mindfulness interventions. Although there is some evidence that both brief and common positive psychology interventions are effective, due to very different outcome measures, their effect sizes were largely incomparable.

An important finding of this systematic review is the high risk of bias in the vast majority of studies included. Studies were mainly assessed as having high risk of selection, performance, attrition, and detection bias, not only because of poor methodology but often due to insufficient and unclear description of methods, such as randomization, allocation, and blinding procedures. By not reporting information relevant for methodological quality assessment, studies were rated negative on particular criterion, which led to high risk of bias and hampered drawing conclusions regarding the effects of interventions on employee mental health and well-being. Therefore, there is the need for further, high-quality research with well-reported methodology to avoid potential bias and provide transparent evidence on the effectiveness of these interventions.

Based on two RCT, our review provides limited evidence on the effectiveness of brief and matched common positive psychology interventions in organizational settings. A previous systematic review and a meta-analysis, both focusing on positive psychology interventions regardless of their length, evaluated their effects on the individual's well-being (49, 50). However, the narrative systematic review published in 2012 focused on the added value of the positive interventions in an organizational context "in the wide sense" (49) and neither appraised nor reported on the methodological quality of the 15 included studies. The meta-analysis (50) published in 2013, included 39 studies that evaluated the effectiveness of positive psychology interventions on well-being and depressive outcomes of the general public or people with specific psychosocial problems. The authors applied the Cochrane criteria in methodological appraisal of included studies. Similarly to our findings, the methodological quality of studies was rather poor, limiting the generalizability of results and leading authors to call for additional high-quality studies (50). Since positive psychology interventions are designed to build positive qualities and not treat decrements in mental functions, they are suitable for implementation in organizational settings – individually, embedded in wider programs and/or combined with other approaches. By focusing on positive aspects of an individual's mental health, they may help reduce stigma related to mental health and could serve as a useful tool to enhance individual well-being and potentially improve individual and organizational performance (49). We further reinforce, therefore, the call of the aforementioned meta-analysis for future methodologically sound research that follows available reporting standards.

The overall number of studies evaluating brief interventions identified in our review covering scientific articles published between 2000–2016 was rather small. There might be several reasons for this scarcity. Companies are often under legal obligation to address working conditions, physical health, and safety but not specifically mental health and well-being. This could be one reason why research is aimed more towards physical health and risky behavior and less towards mental health. Additionally, employers might be concerned that addressing workers' mental health could disclose potential mental health-related issues, such as high levels of stress, and lead to a negative impact on the company's image. Another reason might be publication bias, understood as the increased likelihood of publishing studies reporting positive effects. However, in the present review, 50% of all included studies reported non-significant results and one study even reported on adverse effects of a common length intervention (44). Therefore, although the risk of publication bias is possible, it seems not to be a major issue in this area. Finally, one could argue that the few studies could reflect a new and perhaps growing area of research. Nevertheless, only 3 of the 11 included articles evaluating brief interventions have been published in the past five years, which speaks against this argument.

A striking finding of our review is that all identified

studies evaluated individual-level interventions. According to the "systematic hierarchy of control" model, a stepped approach is required in protecting employee health and safety. The model considers elimination of risks and hazards as the most effective occupational health and safety measure, followed by efforts to reduce remaining risks and ultimately influencing individual behavior (6). Although elimination or management of hazards and risk is considered the most effective protection measure, employers tend to be more receptive to individual-level programs. A potential reason could be that organizational-level interventions, aiming to reduce psychosocial risks and hazards, are often more challenging in their implementation than individual interventions. It seems worthwhile to invest resources to further develop and evaluate individual-level brief interventions as these strategies could open the door for more comprehensive programs targeting psychosocial risks in the workplace. However, policy-makers should establish appropriate legislation to ensure that employers indeed invest more efforts in the implementation and evaluation of organizational-level interventions.

Although mental health problems at work are rising at a concerning speed, effective and feasible interventions targeting mental health and well-being are scarce. A recent OECD report (51) shows that up to 40% of workers experience high levels of job strain leading to long and frequent sickness absence. Moreover, mental health problems are linked to poor performance and high productivity losses (51). Brief interventions meet the challenge of the fast-paced modern life and are promising in organizational settings since they do not interfere much with everyday work tasks. However, evidence on their effectiveness remains inconclusive. The evidence, albeit limited, that positive psychology brief interventions are effective combined with the increasing extent of mental health problems at work point out that more attention should be given to the development and implementation of appropriate interventions as well as sound evaluation strategies that can indeed inform policy-makers about their effectiveness.

Limitations

The literature search was conducted using two databases and limited to publications in English and German. However, in order to complement the search, a very broad timeframe was considered and reference lists of included papers and additional databases were checked. Due to the high number of retrieved abstracts in this review covering a time-frame of 15 years, a second reviewer double-checked only 20% of abstracts. However, the agreement among reviewers was very high and indicates a high reliability of the abstract check process.

Implications for practice and future research

The present review provides limited evidence on the effectiveness of positive psychology interventions in organizational settings and no evidence for other types of brief interventions. We recommend further high quality research in this area for conclusive evidence on their effectiveness. Furthermore, although positive psychology is relatively new and an alternative approach in the field of workplace mental health, we recommend that employers remain open towards the implementation of such interventions.

Methodologically rigorous study designs, with greater sample size, control groups, longer follow-ups, standardized outcome measures and clear reporting of methods are needed to ensure comparison of the studies and stronger conclusions on their effectiveness. Researchers are encouraged to follow available guidelines, such as the CONSORT statement (51) for RCT, for complete and transparent reporting of their studies that would ensure a valid and comparable interpretation of obtained results. In addition, authors of future studies might pre-register their protocols containing clear descriptions of the study rationale, the need for specific interventions, and planned methodology.

Concluding remarks

In summary, the current literature review provides no evidence on the effectiveness of brief stress management, relaxation, massage, mindfulness meditation and multimodal interventions and limited evidence for brief positive psychology interventions.

Acknowledgments

The authors wish to thank Izabela Nowak and Marie Fallon-Kund for their support with the abstract check, Conal Twomey and Kaloyan Kamenov for their insights, Dr. Marita Stier-Jarmer, Dr. Matthias Weigl and Renaldo Bernard for revising and Ade Lee for proofreading the manuscript.

This project was funded by the People Programme (Marie Curie Actions) of the European Union's Seventh Framework Programme FP7/2007 – 2013 under REA grant agreement n° 316795.

The authors declare no conflict of interest.

References

1. Parent-Thirion A. Fourth European working conditions survey: European Foundation for the Improvement of Living and Working Conditions; 2007.
2. Seymour L, Grove B. Workplace interventions for people with common mental health problems: evidence review and recommendations: British Occupational Health Research Foundation; 2005.
3. Palmer S, Dryden W. Stress management: Approaches and interventions. Br J Guid Counc. 1994;22(1):5–12. https://doi.org/10.1080/03069889408253661.
4. NICE. PH22: Promoting well-being at work. London: National Institute for Clinical Excellence; 2009.
5. Pfeffer J. The human equation: Building profits by putting people first: Harvard Business Press; 1998.
6. Victoria W. Controlling OHS hazards and risks: a handbook for workplaces. Controlling OHS hazards and risks: a handbook for workplaces: Worksafe; 2007.
7. Harris J, Mason J, Spalding J, Knuckley S, Jones L, Perkins C, et al. A review of the cost-effectiveness of individual level behavior change interventions. Liverpool: North West Public Health Observatory; 2011.
8. Nobrega S, Champagne NJ, Azaroff LS, Shetty K, Punnett L. Barriers to workplace stress interventions in employee assistance practice: EAP perspectives. Journal of Workplace Behavioral Health. 2010 Oct 28;25(4):282–95. https://doi.org/10.1080/15555240.2010.518491.
9. Cavill N, Hillsdon M, Anstiss T. Brief interventions for weight management. London: National Obesity Observatory; 2011.
10. Kaner EF, Dickinson HO, Beyer F, Pienaar E, Schlesinger C, Campbell F, et al. The effectiveness of brief alcohol interventions in primary care settings: a systematic review. Drug Alcohol Rev. 2009;28(3):301–23. https://doi.org/10.1111/j.1465-3362.2009.00071.x.
11. Taylor B, Irving HM, Baliunas D, Roerecke M, Patra J, Mohapatra S, et al. Alcohol and hypertension: gender differences in dose–response relationships determined through systematic review and meta-analysis. Addiction. 2009;104(12):1981–90. https://doi.org/10.1111/j.1360-0443.2009.02694.x.
12. Kaner E, Beyer F, Dickinson H, Pienaar E, Campbell F, Schlesinger C, et al. Effectiveness of brief alcohol interventions in primary care populations. Cochrane Database Syst Rev. 2007;2. https://doi.org/10.1002/14651858.cd004148.pub3.
13. National Collaborating Centre for Mental Health (UK). Drug Misuse: Psychosocial Interventions. Leicester (UK): British Psychological Society; 2008. (NICE Clinical Guidelines, No. 51.) Available from: http://www.ncbi.nlm.nih.gov/books/NBK53227/.
14. Nilsen P, Kaner E, Babor T. Brief intervention, three decades on. Nord Stud Alcohol Drugs. 2008;25:453–67.
15. Anderson BK, Larimer ME. Problem drinking and the workplace: an individualized approach to prevention. Psychol Addict Behav. 2002;16(3):243. https://doi.org/10.1037/0893-164X.16.3.243.
16. Doumas DM, Hannah E. Preventing high-risk drinking in youth in the workplace: a web-based normative feedback program. J Subst Abuse Treat. 2008;34(3):263–71. https://doi.org/10.1016/j.jsat.2007.04.006.
17. Walters ST, Woodall WG. Mailed feedback reduces consumption among moderate drinkers who are employed. Prevention Science. 2003;4(4):287–94. https://doi.org/10.1023/A:1026024400450.
18. Webb G, Shakeshaft A, Sanson-Fisher R, Havard A. A systematic review of work-place interventions for alcohol-related problems. Addiction. 2009;104(3):365–77. https://doi.org/10.1111/j.1360-0443.2008.02472.x.
19. Kreis J, Bödeker W. Health-related and economic benefits of workplace health promotion and prevention: Summary of the scientific evidence: BKK Bundesverband; 2004.
20. Corbière M, Shen J, Rouleau M, Dewa CS. A systematic review of preventive interventions regarding mental health issues in organizations. Work. 2009;33(1):81–116.
21. Czabała C, Charzyńska K, Mroziak B. Psychosocial interventions in workplace mental health promotion: an overview. Health Promot Int. 2011;26(suppl 1):i70–i84. https://doi.org/10.1093/heapro/dar050.
22. Graveling R, Crawford J, Cowie H, Amati C, Vohra S. A review of workplace interventions that promote mental wellbeing in the workplace. Edinburgh: Institute of Occupational Medicine; 2008.
23. Furlan AD, Gnam WH, Carnide N, Irvin E, Amick III BC, DeRango K, et al. Systematic review of intervention practices for depression in the workplace. J Occup Rehabil. 2012;22(3):312–21. https://doi.org/10.1007/s10926-011-9340-2.
24. Everly Jr GS, Sherman MF, Stapleton A, Barnett DJ, Hiremath GS, Links JM. Workplace crisis intervention: A systematic review of effect sizes. J Workplace Behav Health. 2006;21(3-4):153–70. https://doi.org/10.1300/J490v21n03_09.
25. van Oostrom SH, Driessen MT, de Vet HC, Franche RL, Schonstein E, Loisel P, et al. Workplace interventions for preventing work disability. The Cochrane Library; 2009. https://doi.org/10.1002/14651858.cd006955.pub2.
26. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. Ann Intern Med. 2009;151(4):264–9. https://doi.org/10.7326/0003-4819-151-4-200908180-00135.
27. NICE. The guidelines manual. Process and methods guides. London: National Institute for Clinical Excellence; 2012.
28. Groeneveld IF, Proper KI, van der Beek AJ, Hildebrandt VH, van Mechelen W. Lifestyle-focused interventions at the workplace to reduce the risk of cardiovascular disease-a systematic review. Scand J Work Environ Health. 2010;36(3):202–15. https://doi.org/10.5271/sjweh.2891.
29. Bost N, Wallis M. The effectiveness of a 15 minute weekly massage in reducing physical and psychological stress in

nurses. Australian Journal of Advanced Nursing, The. 2006 Jun;23(4):28.

30. Mackenzie CS, Poulin PA, Seidman-Carlson R. A brief mindfulness-based stress reduction intervention for nurses and nurse aides. Appl Nurs Res. 2006;19(2):105–9. https://doi.org/10.1016/j.apnr.2005.08.002.

31. McElligott D, Holz MB, Carollo L, Somerville S, Baggett M, Juzniewski S, Shi Q. A pilot feasibility study of the effects of touch therapy on nurses. J N Y State Nurses Assoc. 2003;34(1):16–24.

32. Ranta RS. Management of stress and coping behavior of police personnel through Indian psychological techniques. J Indian Acad Appl Psychol. 2009 Jan;35(1):47–53.

33. Yung P, Fung MY, Chan TM, Lau BW. Relaxation training methods for nurse managers in Hong Kong: a controlled study. Int J Ment Health Nurs. 2004;13(4):255–61. https://doi.org/10.1111/j.1445-8330.2004.00342.x.

34. Kawaharada M, Yoshioka E, Saijo Y, Fukui T, Ueno T, Kishi R. The effects of a stress inoculation training program for civil servants in Japan: a pilot study of a non-randomized controlled trial. Ind Health. 2009;47(2):173–82. https://doi.org/10.2486/indhealth.47.173.

35. Kawai K, Yamazaki Y, Nakayama K. Process evaluation of a web-based stress management program to promote psychological well-being in a sample of white-collar workers in Japan. Ind Health. 2010;48(3):265–74. https://doi.org/10.2486/indhealth.48.265.

36. Kirk BA, Schutte NS, Hine DW. The effect of an expressive-writing intervention for employees on emotional self-efficacy, emotional intelligence, affect, and workplace incivility. J Appl Soc Psychol. 2011;41(1):179–95. https://doi.org/10.1111/j.1559-1816.2010.00708.x.

37. Zhang X, Li Y-L, Ma S, Hu J, Jiang L. A structured reading materials-based intervention program to develop the psychological capital of Chinese employees. SPB Journal. 2014;42(3):503–15. https://doi.org/10.2224/sbp.2014.42.3.503.

38. Eisen KP, Allen GJ, Bollash M, Pescatello LS. Stress management in the workplace: A comparison of a computer-based and an in-person stress-management intervention. Comput Human Behav. 2008;24(2):486–96. https://doi.org/10.1016/j.chb.2007.02.003.

39. Purwandini Sutarto A, Abdul Wahab MN, Mat Zin N. Resonant breathing biofeedback training for stress reduction among manufacturing operators. Int J Occup Saf Ergon. 2012;18(4):549–61. https://doi.org/10.1080/10803548.2012.11076959.

40. Bond FW, Bunce D. Mediators of change in emotion-focused and problem-focused worksite stress management interventions. J Occup Health Psychol. 2000;5(1):156. https://doi.org/10.1037/1076-8998.5.1.156.

41. Elder C, Nidich S, Moriarty F, Nidich R. Effect of transcendental meditation on employee stress, depression, and burnout: a randomized controlled study. The Permanente Journal. 2014 Jan 1;18(1):19–23. https://doi.org/10.7812/TPP/13-102.

42. Jennings PA, Frank JL, Snowberg KE, Coccia MA, Greenberg MT. Improving classroom learning environments by Cultivating Awareness and Resilience in Education (CARE): Results of a randomized controlled trial. Sch Psychol Q. 2013;28(4):374. https://doi.org/10.1037/spq0000035.

43. Stafford-Brown J, Pakenham KI. The effectiveness of an ACT informed intervention for managing stress and improving therapist qualities in clinical psychology trainees. J Clin Psychol. 2012;68(6):592–513. https://doi.org/10.1002/jclp.21844.

44. Shimazu A, Umanodan R, Schaufeli WB. Effects of a brief worksite stress management program on coping skills, psychological distress and physical complaints: a controlled trial. Int Arch Occup Environ Health. 2006;80(1):60–9. https://doi.org/10.1007/s00420-006-0104-9.

45. Umanodan R, Shimazu A, Minami M, Kawakami N. Effects of Computer-based Stress Management Training on Psychological Well-being and Work Performance in Japanese Employees: A Cluster Randomized Controlled Trial. Ind Health. 2014;52(6):480. https://doi.org/10.2486/indhealth.2013-0209.

46. Żołnierczyk-Zreda D. The effects of worksite stress management intervention on changes in coping styles. Int J Occup Saf Ergon. 2002;8(4):465–82. https://doi.org/10.1080/10803548.2002.11076548.

47. Kaplan S, Bradley-Geist JC, Ahmad A, Anderson A, Hargrove AK, Lindsey A. A test of two positive psychology interventions to increase employee well-being. J Bus Psychol. 2014;29(3):367–80. https://doi.org/10.1007/s10869-013-9319-4.

48. Page KM, Vella-Brodrick DA. The working for wellness program: RCT of an employee well-being intervention. J Happiness Stud. 2013;14(3):1007–31. https://doi.org/10.1007/s10902-012-9366-y.

49. Meyers MC, van Woerkom M, Bakker AB. The added value of the positive: A literature review of positive psychology interventions in organizations. Eur J Work Organ Psy. 2013;22(5):618–32. https://doi.org/10.1080/1359432X.2012.694689.

50. Bolier L, Haverman M, Westerhof GJ, Riper H, Smit F, Bohlmeijer E. Positive psychology interventions: a meta-analysis of randomized controlled studies. BMC Public Health. 2013;13(1):1. https://doi.org/10.1186/1471-2458-13-119.

51. OECD. Fit Mind, Fit Job: From Evidence to Practice in Mental Health and Work. Paris: OECD Publishing; 2015. https://doi.org/10.1787/9789264228283-en .

Received for publication: 8 June 2015

3. Study 2

Determinants of Work Performance in Workers with Depression and Anxiety: A Cross-Sectional Study

Ivana Ivandic

Kaloyan Kamenov

Diego Rojas

Gloria Cerón

Dennis Nowak

Carla Sabariego

International Journal of Environmental Research and Public Health 2017; 14(5)

International Journal of
Environmental Research and Public Health

MDPI

Article

Determinants of Work Performance in Workers with Depression and Anxiety: A Cross-Sectional Study

Ivana Ivandic [1,*], Kaloyan Kamenov [2], Diego Rojas [3], Gloria Cerón [3], Dennis Nowak [4] and Carla Sabariego [1]

1 Department of Medical Informatics, Biometry and Epidemiology–IBE, Chair for Public Health and Health Services Research, Research Unit for Biopsychosocial Health, Ludwig-Maximilians-Universität (LMU), Marchioninistr. 17, 81377 Munich, Germany; Carla.Sabariego@med.uni-muenchen.de
2 Instituto de Salud Carlos III, Centro de Investigación Biomédica en Red de Salud Mental (CIBERSAM), Diego de León 62, 28006 Madrid, Spain; kaloyan.kamenov@cibersam.es
3 Departamento de Estudios, Servicio Nacional de la Discapacidad (Senadis), Ministerio de Desarrollo Social, Catedral 1575, 8340309 Santiago, Chile; diego.rojasn@gmail.com (D.R.); gceron@senadis.cl (G.C.)
4 Institute and Outpatient Clinic for Occupational, Social and Environmental Medicine, Ludwig-Maximilians-Universität (LMU), Ziemssenstr. 1, 80336 Munich, Germany; Dennis.Nowak@med.uni-muenchen.de
* Correspondence: iivandic@med.lmu.de; Tel.: +49-89-2180-78229

Academic Editor: Paul B. Tchounwou
Received: 11 March 2017; Accepted: 22 April 2017; Published: 26 April 2017

Abstract: Depression and anxiety are highly prevalent disorders with an impact on existential aspects of person's life, including employment i.e., work performance (WP). In order to develop appropriate strategies, it is essential to identify determinants of WP. The objective of this study was to identify the built, social, attitudinal and health system-related environmental determinants of WP in workers with anxiety or depression in total (N = 1211) and regarding the level of disability. Hierarchical binary logistic regression was performed on data obtained from implementation of the WHO Model Disability Survey (MDS) in Chile in 2015. Hindering aspects of means of transportation and workplace, and the use of personal assistance were determinants of WP for all workers with anxiety or depression. Results differed with level of disability. Hindering aspects of means of transportation and workplace, and discrimination were determinants of WP for persons with mild to moderate disability, while hindering aspects of the workplace and dwelling, and the use of personal assistance were determinants of WP for persons with severe disability. Our results emphasize the need for a broader understanding of determinants of WP and the requirement for an integrative approach in developing both universal and specific strategies that go beyond workplace settings.

Keywords: mental health; anxiety; depression; workplace; work performance; environmental factors; disability

1. Introduction

Depression and anxiety are highly prevalent groups of mental disorders that are costly and significant contributors to the global burden of disease. Estimates on the lifetime prevalence of depression and anxiety range between 4–16.6% [1–3] and 3.8–25% [4], respectively. According to the Global Burden of Disease Study (GBD), depressive disorders were the third and anxiety the ninth leading cause of global disability in 2015 [5]. They are also associated with the highest productivity-loss related costs of all chronic illnesses [6]. The total costs of depression in the European Union (EU) have been estimated at €118 billion per year, of which 64% are due to productivity losses [7]. Additionally, the average annual costs, including medical, pharmaceutical and disability costs for workers with depression has been reported to be 4.2 times higher than those incurred by the usual beneficiary [8].

The individual burden of depression and anxiety impacts existential aspects of an individual's life, including employment. Compared to the general population, persons with mental disorders, including depression and anxiety, experience on average 15–30% lower employment rates, and long-term unemployment [7] can be twice as high [9]. For those who succeed in obtaining employment, there is an increased risk of exposure to inequalities at work, such as lower salaries and discrimination [10]. Persons with depression and anxiety also have increased absenteeism and presenteeism rates, as well as low productivity [11] resulting from decreased work performance [6]. Recent research linked depression to reduced work participation (e.g., time to return to work and work status) [12] and common mental disorders, including both depression and anxiety, to problems in work performance [12,13].

Work performance (WP) is a multidimensional construct that includes a worker's experience in fulfilling their work tasks and "results from the relationship between an individual's health resources and the expectations and structural conditions that operate within social settings such as the workplace" [12]. Evidence shows that workers with depression can only achieve an acceptable WP with extra effort, reporting on average 11.6 days requiring extra effort to be productive in the previous month, while workers with anxiety experience significantly more frequent days of partial inability to function normally at work [14]. In addition, workers with depression and anxiety have two and almost six times higher risk, respectively, of experiencing problems in WP in comparison to other workers [6]. Hence, effective strategies in terms of adaptations and accommodations, that would enable workers with depression and anxiety to achieve WP levels comparable to the general population, are warranted.

The Convention on the Rights of Persons with Disabilities (CRPD) provides a foundation that protects the rights of persons with disabilities (PwD), including persons with mental disorders. According to the Convention, PwD include "those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others" [15]. Barriers PwD encounter refer not only to the physical but also attitudinal or social environment that can act in a hindering or facilitating way. Article 27 of the CRPD provides a legal framework for the right of PwD to work on an equal basis with others. Among other things, it considers prohibition of discrimination with regard to access to the labor market and open, inclusive and accessible work environments [15]. To meet the CRPD mandate, ratified countries must ensure that effective strategies targeting barriers hindering optimal WP are in place. There is a substantial body of evidence that an individual's work environment, specifically psychosocial risk factors such as high job demands, low control or social support, are risk factors associated with depression and anxiety [16]. However, existing strategies mainly focus on the individual level, i.e., symptom reduction [16–19]. Evidence on the effectiveness of organizational strategies addressing work environment, adaptations and accommodations is scarce.

Although appropriate organizational strategies can only be effective if targets are clearly defined, evidence on which barriers are the most hindering for persons with depression and anxiety is still scarce. Recent studies have mostly addressed the relationship between work performance and personal factors (e.g., sociodemographic factors or personality traits) [20,21], work-related factors (e.g., employment characteristics, types of company, supervisory behavior) [22] and disorder-related factors (e.g., symptom severity, clinical history) [23–30]. However, there is a gap in knowledge of which built, political, social and attitudinal environmental factors (EF) might impact WP of persons with depression and anxiety. Due to the complexity and developmental nature of WP, a broadening of determinants of WP has been called for in a recent systematic review [31].

The main objective of this study is to identify the built, social, attitudinal and health system-related environmental determinants of WP in workers with anxiety or depression, for the total sample and for subgroups taking into account level of disability. This study uses data from a national implementation of the Model Disability Survey (MDS), developed by the World Health Organization (WHO) and World Bank [32]. The MDS is grounded in the biopsychosocial International Classification of Functioning, Disability and Health (ICF) model [33] and measures performance in different life domains, including work, as well as a broad range of EF such as social support, discrimination, accessibility to treatment,

accommodations at work and accessibility to aids and devices. This study will provide valuable information for policy makers on how to design future appropriate strategies to improve WP in persons with anxiety or depression. In addition, this study conforms to one of the major requirements of the 2030 Agenda for Sustainable Development set by the United Nations (UN) to reach the Sustainable Development Goals (SDG) [34], namely disaggregation by disability.

2. Materials and Methods

2.1. Study Design and Participants

We conducted secondary data analysis of the implementation of the MDS as a national disability survey in Chile (ENDISC II) carried out in 2015, using a large representative sample of the general population including more than 17,000 individual interviews. Participants of the survey were children and adults from 15 provinces. ENDISC II is based on the MDS, a project (http://www.who.int/disabilities/data/mds.pdf) initiated by the WHO and the World Bank in 2011. In the MDS, disability is conceptualized as the outcome of interactions between a person with a health condition and various environmental and personal factors. The survey utilizes a general population sample without screeners or filters and enables a direct comparison between groups with differing levels and profiles of disability, including a comparison to persons without disability. The current MDS Alpha version questionnaire consists of eight modules, and the ones implemented in Chile were module 3000: environmental factors; module 4000: functioning; and module 5000: health conditions and capacity. Additionally, the ENDISC II collected information on sociodemographic characteristics, work and health care resources utilization.

Employed persons with anxiety or depression of a working age (18–64 years old) were included in the present study (N = 1211). Persons were considered employed if, in the previous week, they worked at least one hour in a productive activity (excluding housework) for pay in cash or any kind, or if they worked on a casual or occasional activity (e.g., one-time occasion or part-time work). The presence of anxiety or depression was assessed based on the Self-Administered Comorbidity Questionnaire (SCQ) [35]. This questionnaire includes a list of country-specific high prevalent or high priority health conditions and for each condition participants were asked, "Do you have [DISEASE NAME]?" Comorbidities between depression and anxiety were allowed for.

2.2. Variables

2.2.1. Dependent Variable

WP was the dependent variable, operationalized with the question from module 4000, "How much of a problem is getting things done as required at work?" Responses were recorded on a 5-point Likert scale ranging from 1 ("none") to 5 ("extreme"). For the purpose of this study, the variable was dichotomized into "no problems" (response category 1) and "problems" (response categories 2–5). It is important to note that, while answering in module 4000, respondents are requested to take into account both health problems and EF.

2.2.2. Independent Variables

The following EF of module 3000 were included: hindering or facilitating aspects of health facilities, places to socialize, workplace, shops or banks, places to worship, transportation, dwelling, terrain and climate, lighting, noise and crowds. For each of these, respondents were asked to what extend these aspects of the general environment make it easy or hard for them to do what they want or need to do. The original responses were recorded on a 5-point Likert scale ranging from 1 ("very easy") to 5 ("very hard"). These variables were recoded into three categories: "facilitating" (response categories 1–2), "neutral" (response category 3) and "hindering" (response categories 4–5). Use of personal assistance and assistive devices and modifications were dichotomous variables ("use"

and "do not use"). Use of health care services and rehabilitation service in the last 12 months were included as dichotomous variables as well ("yes" and "no"). Perception of discrimination in the last 12 months was expressed on a 5-point Likert scale ranging from 1 ("not discriminated") to 5 ("extremely discriminated"). This variable was dichotomized into "no" (response category 1) and "yes" (response categories 2–5).

2.2.3. Control Variables

The following control variables were considered: sex, age, education, marital status and level of disability operationalized as capacity difficulties. Capacity refers to the health state of the individual considering the impact of one or more health conditions. The capacity variable is metrical, ranges from 0 ("no difficulties") to 100 ("extreme difficulties"), and was previously estimated by the National Disability Service of Chile using partial credit model analysis. In this study, levels capacity was stratified using cut-off points previously defined by the WHO [32]. Capacity scores >44.1 pointed out severe difficulties in capacity, scores between 30 and 44.1 denoted moderate difficulties, and scores <30 denoted mild or no difficulties. Capacity was considered to be a strong potential confounder in this study as it has an important impact on the performance in daily life and at work. Therefore, we adjusted the regression model targeting the complete sample for capacity. Additionally, stratified analysis by level of difficulties in capacity was carried out.

2.3. Statistical Analysis

Hierarchical binary logistic regression was performed to identify environmental determinants of WP for the total sample of workers with anxiety or depression, and stratified by levels of difficulties in capacity. Due to the relatively small sample size, the mild and moderate groups were merged and compared to the group with severe difficulties. Analyses were adjusted for sex, age, education and marital status and, in the case of the whole sample, also for capacity level. For each factor, Wald statistics was estimated and factors showing significant association ($p < 0.05$) with WP were selected for the final model. Hosmer-Lemeshow test and statistic were considered for overall model goodness-of-fit. Percentage of correctly classified cases was used as the model's predictive power measure. In addition, Nagelkerke's R2 was considered as a measure of variance explained by the model. Odds ratios (OR) and their 95% confidence intervals (95% CI) were calculated. The number of missing values in the factors was at most 2.0%, therefore no imputation was used. The final models were selected on the principle of parsimony. Data were analysed using IBM SPSS Statistics for Windows, version 24 (IBM Corp., Armonk, NY, USA).

3. Results

Participants were predominantly male (65.5%) with a mean age of 43.20 years (standard deviation (SD) = 11.81). The majority had anxiety (41.1%), while depression and both depression and anxiety (comorbidity) were reported by 31.5% and 27.4% of respondents, respectively. Most participants did not experience discrimination (74.1%). Characteristics of participants are presented in Table 1.

3.1. Total Sample (N = 1211)

The final logistic regression model included 1155 individuals, and correctly classified 83.4% of cases and explained 31.5% of the variance in WP. The Hosmer-Lemeshow test indicated a good model fit ($\chi^2 = 7.256$, $p = 0.509$, $df = 8$). Hindering and facilitating aspects of means of transportation and workplace as well as the use of personal assistance were significant determinants of WP. In comparison to individuals who considered the transportation facilitating, those who considered it as hindering had almost two times higher risk of experiencing problems in WP (OR = 1.977; 95% CI = 1.358–2.878). Workers who experienced their workplace as hindering had about 4.5 higher risk (OR = 4.498; 95% CI = 2.866–7.062) of having problems in WP, while this risk was still approximately 2.5 higher for individuals who perceived their workplace as neutral (OR = 2.513; 95% CI = 1.575–4.009). Regarding

the use of personal assistance, the risk of problems in WP was more than twice as high for workers who used personal assistance than for those who did not (OR = 2.327; 95% CI = 1.410–3.841). No interaction effects were found. Results are presented in Table 2.

Table 1. Characteristics of workers with anxiety or depression in the total sample and in the subgroups with and without problems in work performance (WP).

Variable	Category	Total Sample		Subsample with No Problems in WP **		Subsample with Problems in WP **	
		N	%	N	%	N	%
		1211	**100**	**954**	**78.8**	**238**	**19.7**
Sex	Male	793	65.5	619	64.9	166	69.7
	Female	418	34.5	335	35.1	72	30.3
Education	None/Elementary	248	20.5	173	18.1	71	29.8
	Secondary	575	47.5	460	48.2	105	44.1
	Tertiary	388	32.0	321	33.6	62	26.1
Marital status	Single	396	32.7	315	33.0	77	32.4
	Married/living together	562	46.4	448	47.0	103	43.3
	Separated/divorced	217	17.9	165	17.3	49	20.6
	Widowed	36	3.0	26	2.7	9	3.8
Self-reported mental disorder	Depression	381	31.5	531	30.4	170	36.1
	Anxiety	498	41.1	664	44.3	152	28.6
	Depression and anxiety	332	27.4	241	25.3	84	35.3
Perceived discrimination	No	897	74.1	727	76.2	157	66.0
	Yes	314	25.9	227	23.8	81	34.0
Capacity level *	Mild level of difficulties	377	31.1	351	36.8	22	9.2
	Moderate level of difficulties	390	32.2	333	34.9	52	21.8
	Severe level of difficulties	443	36.6	269	28.2	164	68.9

* Data was obtained on *N* = 1210 participants, capacity score not available for one person; ** data was obtained on *N* = 1192 participants, WP score was not available for 19 persons.

Table 2. Binary logistic regression models for the total sample (*N* = 1155) and the strata by level of difficulties in capacity. Odds ratios (OR) and 95% confidence intervals (95% CI) predicting the risk of experiencing problems in work performance (WP) for workers with anxiety or depression are reported. Variables that did not remain in the regression models, because they were not statistically significant, are identified as "not included".

Variable (Reference Group)	Total Sample (*N* = 1155)	Mild and Moderate Difficulties in Capacity (*N* = 733)	Severe Difficulties in Capacity (*N* = 429)
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Control variables			
Capacity (mild levels of difficulties)			
Moderate level of difficulties	2.397 (1.370–4.193) *		
Severe level of difficulties	8.293 (4.894–14.052) *		
Sex (female)	1.020 (0.701–1.482)	1.156 (0.659–2.030)	0.958 (0.577–1.591)
Age	0.971 (0.955–0.987) *	0.962 (0.936–0.988) *	0.979 (0.959–1.000) *
Education level (No education/Elementary)			
Secondary	0.578 (0.381–0.879) *	0.549 (0.268–1.127)	0.618 (0.366–1.044)
Tertiary	0.533 (0.330–0.862) *	0.464 (0.213–1.010)	0.627 (0.333–1.180)
Marital status (Single)			
Married/living together	1.019 (0.681–1.525)	0.909 (0.487–1.695)	1.157 (0.678–1.975)
Separated/divorced	1.311 (0.792–2.169)	1.516 (0.650–3.538)	1.340 (0.717–2.501)
Widowed	2.444 (0.909–6.570)	2.079 (0.406–10.634)	2.549 (0.704–9.226)
Environmental predictors			
Workplace (Facilitating)			
Neutral	2.513 (1.575–4.009) *	1.591 (0.734–3.447)	2.747 (1.431–5.271) *
Hindering	4.498 (2.866–7.062) *	3.481 (1.704–7.112) *	5.791 (3.169–10.583) *
Transportation (Facilitating)			*not included*
Neutral	1.390 (0.834–2.316)	1.221 (0.538–2.772)	
Hindering	1.977 (1.358–2.878) *	3.118 (1.737–5.597) *	

Table 2. *Cont.*

Variable (Reference Group)	Total Sample (*N* = 1155)	Mild and Moderate Difficulties in Capacity (*N* = 733)	Severe Difficulties in Capacity (*N* = 429)
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Dwelling (Facilitating)	*not included*	*not included*	
Neutral			1.323 (0.652–2.684)
Hindering			2.201 (1.190–4.073) *
Use of personal assistance (Do not use)		*not included*	
Use	2.327 (1.410–3.841) *		2.333 (1.337–4.070) *
Discrimination (Not discriminated)	*not included*		*not included*
Discriminated		1.877 (1.064–3.312) *	

* $p < 0.05$.

3.2. Group with Mild to Moderate Levels of Difficulties in Capacity (N = 733)

The logistic regression model, adjusted for sex, age, education and marital status, included 733 participants and correctly classified 90.7% of cases, explained 13.2% of the variance in WP, and had a good fit ($\chi^2 = 5.062$, $p = 0.751$, $df = 8$). Hindering and facilitating aspects of means of transportation and workplace as well as discrimination were significant determinants of WP. Workers who experienced their transportation and workplace as hindering had about 3.2 (OR = 3.118; 95% CI = 1.737–5.597) and 3.5 (OR = 3.481; 95% CI = 1.704–7.112) times higher risk of having problems in WP. The risk was even higher regarding perception of discrimination; workers who felt discriminated were almost as twice as likely to have problems in WP (OR = 1.877; 95% CI = 1.064–3.312). Differing from the results for the total sample, the use of personal assistance was not a significant determinant for this group. No interaction effects were found. Results are presented in Table 2.

3.3. Group with Severe Levels of Difficulties in Capacity (N = 429)

The logistic regression, adjusted for sex, age, education and marital status, included 429 participants and correctly classified 73.2% cases, explained 23.2% of the variance, and had a good fit ($\chi^2 = 5.984$, $p = 0.649$, $df = 8$). Hindering and facilitating aspects of the workplace and dwelling as well as personal assistance were significant determinants of WP. Compared to individuals who had a facilitating workplace, those whose workplace was hindering had an almost 6 times greater risk of experiencing problems in WP (OR = 5.791; 95% CI = 3.169–10.583). This risk was almost 3 times higher for individuals who were neutral regarding their workplace, in comparison to those who considered their workplace facilitating (OR = 2.747; 95% CI = 1.431–5.271). Individuals who used personal assistance had a 2.3 higher risk of experiencing problems in WP, in comparison to those who did not use personal assistance (OR = 2.333; 95% CI = 1.337–4.070). Workers experiencing a hindering dwelling had more than 2 times higher risk of having problems in WP (OR = 2.201; 95% CI = 1.190–4.073), compared to workers whose dwelling was facilitating. Neither transportation, perceived discrimination nor any other EF were significant determinants for this group, and no interaction effects were found. Results are presented in Table 2.

4. Discussion

The objective of the current study was to identify the built, social, attitudinal and health system-related related environmental determinants of work performance in workers with anxiety or depression in general, and taking into account disability, operationalized as levels of difficulties in capacity. Hindering aspects of transportation and workplace as well as use of personal assistance are determinants of WP for all workers with anxiety or depression. Results differ, however, when the level of disability is taken into account. Hindering aspects of transportation and the workplace as well as discrimination are determinants of WP for workers with mild and moderate disability levels, while hindering aspects of the workplace and dwelling, and the use of personal assistance are determinants of WP for persons with severe disability. Disaggregation by disability is one of the major

requirements to reach the SDGs [34], and our study corroborates its relevance. By disaggregating the sample, we learn that persons with different disability levels experience either the same barrier but to different extents (i.e., hindering workplace) or different barriers (i.e., hindering transportation and dwelling, discrimination and use of personal assistance). As a consequence, policy makers and other stakeholders must target both universal and specific strategies to effectively improve WP.

Similar to previous research, we found a hindering workplace to be a determinant of problems in WP. A growing body of evidence suggests a strong association between work conditions and performance in the general population [36–38] and our results corroborated this association in workers with anxiety or depression. While our study clearly shows the negative impact of hindering or even neutral aspects of the workplace, it lacks information on which specific workplace factors hinder WP. Previous studies, identified in a recent systematic review [39], focused on factors impacting return to work and work limitations in persons with mental disorders and highlighted the importance of changing work tasks and supervisor communication with employees. Considering the paucity of research on workplace factors predictive of WP, further studies are needed to identify more specific factors.

An even more important finding of our study is, however, the identification of environmental factors beyond an individual's workplace as determinants of WP. Personal assistance is a determinant both for all workers with depression or anxiety, and for the strata with severe disability; persons using personal assistance are about twice as likely to experience problems in WP as persons who have no assistance. This might sound intriguing at a first glance, but a potential explanation is that persons with severe disability are those who are in need and entitled to receive personal assistance. Another potential explanation could be the high levels of comorbidity between depression or anxiety and other rather "physical" conditions. For example, evidence show that the prevalence of depression is increased in cardiovascular disease, and up to 40% of people have either major or minor depression following a myocardial infarction [40,41]. Hindering aspects of means of transportation is another non-workplace determinant of problems in WP for all workers and especially for persons with mild and moderate disability. The identification of personal assistance and transportation as relevant determinants is in line with a study ranking and comparing EF most responsible for the disability experienced by persons with mental disorders and persons with four further major non-communicable conditions [42]. Finally, hindering aspects of the dwelling is an important determinant of WP for persons with anxiety or depression with severe disability. Similarly, dwelling has been identified as a relevant EF impacting the overall performance of persons with severe level of disability [43]. A key lesson learned from our study is that a person's life should not be strictly divided into "private" and "work" spheres, but rather considered from a holistic perspective since strategies targeting, for instance, the accessibility of transportation might also have an impact on WP. Given the importance of non-workplace EF, integrated approaches and cross-cutting strategies that go beyond symptoms and aspects of the workplace are needed when developing strategies to improve WP of workers with anxiety or depression.

Our work meets the current calls for complementing previous research on determinants of WP among workers with anxiety or depression [12]. Previous studies, included in the systematic review of Lagerveld et al. [12], identified mainly disorder-related (e.g., severity of symptoms), personal (e.g., gender, personality traits), and work-related (e.g., type of occupation) predictors of WP in persons with depression. This review concluded that, considering the complexity and developmental nature of WP, a broadening of the concept would be needed in future studies. Our study meets this call by addressing environmental determinants of WP from a broader perspective, including aspects of the general environment, personal assistance or use of health services. This was possible because we used data from a general population survey targeting functioning and disability and not from a labor or a workplace risk assessment survey, as is usually conducted in the field of research on work. However, our regression models explain a small proportion of variance, suggesting that information on specific aspects of the workplace such as job type and content, workload or organizational culture—usually

included in research on work—would have been important too. We conclude that the broadening of the WP concept and its determinants also requires a broadening of the type of data about EF included in labor or workplace risk assessment surveys. This would allow for holistic data analyses strategies that take into account both general EF and specific workplace factors.

An interesting finding of our study is that discrimination is a significant determinant of WP only for workers with anxiety or depression with mild to moderate disability. This is surprising, since discrimination and stigma are commonly experienced by persons with mental disorders generally [44,45] as well as in the workplace [10]. It is acknowledged that discrimination is associated with cultural context as well as with the age and gender of the individual [45]. Our study clearly demonstrates an important association of discrimination with the experienced level of disability, pointing out persons with rather low levels of disability as the target group for specific strategies.

This study reinforces the need of going beyond diagnosis and disaggregating data by levels of disability. Our results demonstrate that workers with anxiety or depression experience either the same barrier but to different extents (i.e., hindering workplace) or different barriers (i.e., hindering transportation, dwelling and discrimination), implying the need for both universal and specific strategies. Taking disability into account is in line with the requirements of the CRPD and of the SDG [34], and our study presents an exemplary work on how disaggregation can be done using data from an ICF-based disability survey.

Some limitations of this study need to be considered. Information on specific aspects of the workplace such as job type and content, workload or organizational culture should have been added to the regression models. However, these variables were not available in the kind of data used, a disability survey. Nevertheless, our study provides relevant information about variables not generally included in labor or demographic surveys. Due to the relatively small sample size of workers with depression or anxiety across categories, we had to create a dichotomous WP variable ("problems" versus "no problems") and were not able to identify determinants of mild, moderate or severe problems in WP. In addition, WP was assessed with only one self-report question, although WP should usually be assessed with specific questionnaires. This study used a self-report questionnaire of health conditions and has the risk of overestimating the number of persons with anxiety or depression. In contrast, there is a possibility of underestimating this number by using common diagnostic criteria. Since cognitive distortion can be present in persons with depression and anxiety, the assessment of WP and the environmental factors could be biased. Finally, we have data from one country, Chile, which limits the generalizability of results. Studies including additional countries are needed to confirm our results.

5. Conclusions

Environmental factors within and outside of the workplace are important determinants of WP among workers with depression or anxiety, emphasizing the need for an integrative approach in developing strategies that go beyond the workplace setting. Hindering aspects of transportation and the workplace as well as use of personal assistance are determinants of WP for the total sample. When the sample is disaggregated by disability level, hindering aspects of transportation and workplace as well as discrimination are significant determinants of WP for persons with mild to moderate disability levels, while hindering aspects of the dwelling, workplace, and use of personal assistance are significant determinants of WP for persons with severe disability. Since persons with different levels of disability experience either the same barrier but to different extents (i.e., hindering workplace) or different barriers (i.e., hindering transportation, dwelling and discrimination), both universal and specific strategies are needed. This study shows the importance of using a broader understanding of determinants and filling in the gap in knowledge of which built, political, social and attitudinal EF might impact WP of persons with depression and anxiety.

Acknowledgments: This project was funded by the People Programme (Marie Curie Actions) of the European Union's Seventh Framework Programme FP7/2007–2013 under REA grant agreement No. 316795.

Author Contributions: Ivana Ivandic and Carla Sabariego conceived the study aims and design. Ivana Ivandic analysed the data and drafted the manuscript. Kaloyan Kamenov supported the data analysis and result interpretation. Diego Rojas and Gloria Cerón collected the original data and supported the data analysis. Dennis Nowak made a substantial contribution to the design of the study. All authors reviewed the draft manuscript and read and approved the final manuscript.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Kessler, R.C.; Aguilar-Gaxiola, S.; Alonso, J.; Chatterji, S.; Lee, S.; Ormel, J.; Ustün, T.B.; Wang, P.S. The global burden of mental disorders: An update from the WHO World Mental Health (WMH) surveys. *Epidemiol. Psichiatr. Soc.* **2009**, *18*, 23–33. [CrossRef] [PubMed]
2. Ferrari, A.J.; Somerville, A.J.; Baxter, A.J.; Norman, R.; Patten, S.B.; Vos, T.; Whiteford, H.A. Global variation in the prevalence and incidence of major depressive disorder: A systematic review of the epidemiological literature. *Psychol. Med.* **2013**, *43*, 471–481. [CrossRef] [PubMed]
3. Kessler, R.C.; Berglund, P.; Demler, O.; Jin, R.; Merikangas, K.R.; Walters, E.E. Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. *Arch. Gen. Psychiatry* **2005**, *62*, 593–602. [CrossRef] [PubMed]
4. Remes, O.; Brayne, C.; Van Der Linde, R.; Lafortune, L. A systematic review of reviews on the prevalence of anxiety disorders in adult populations. *Brain Behav.* **2016**, *6*, e00497. [CrossRef] [PubMed]
5. Vos, T.; Allen, C.; Arora, M.; Barber, R.M.; Bhutta, Z.A.; Brown, A.; Carter, A.; Casey, D.C.; Charlson, F.J.; Chen, A.Z.; et al. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: A systematic analysis for the global burden of disease study 2015. *Lancet* **2016**, *388*, 1545–1602. [CrossRef]
6. Plaisier, I.; Beekman, A.T.; De Graaf, R.; Smit, J.H.; Van Dyck, R.; Penninx, B.W. Work functioning in persons with depressive and anxiety disorders: The role of specific psychopathological characteristics. *J. Affect. Disord.* **2010**, *125*, 198–206. [CrossRef] [PubMed]
7. McDaid, D.; Knapp, M.; Medeiros, H. Employment and Mental Health: Assessing the Economic Impact and the Case for Intervention. Available online: https://www.researchgate.net/profile/David_Mcdaid/publication/241038060_Employment_and_Mental_Health_Assessing_the_Economic_Impact_and_the_Case_for_Intervention/links/00463533be65c59c85000000/Employment-and-Mental-Health-Assessing-the-Economic-Impact-and-the-Case-for-Intervention.pdf (accessed on 6 September 2015).
8. World Health Organization. *Investing in Mental Health*; World Health Organization: Geneva, Switzerland, 2003.
9. OECD. *Fit Mind, Fit Job: From Evidence to Practice in Mental Health and Work*; OECD Publishing: Paris, France, 2015.
10. Belin, A.; Zamparutti, T.; Tull, K.; Hernandez, G.; Graveling, R. Occupational Health and Safety Risks for the Most Vulnerable Workers. Available online: http://www.europarl.europa.eu/document/activities/cont/201108/20110829ATT25418/20110829ATT25418EN.pdf (accessed on 6 September 2016).
11. Wynne, R.; De Broeck, V.; Vandenbroek, K.; Leka, S.; Jain, A.; Houtman, I.; McDaid, D.; Park, A. Promoting Mental Health in the Workplace: Guidance to Implementing a Comprehensive Approach. Available online: http://eprints.lse.ac.uk/62112/ (accessed on 6 September 2016).
12. Lagerveld, S.E.; Bultmann, U.; Franche, R.L.; Van Dijk, F.J.; Vlasveld, M.C.; Van Der Feltz-Cornelis, C.M.; Bruinvels, D.J.; Huijs, J.J.J.M.; Blonk, R.W.B.; Van Der Klink, J.J.L.; et al. Factors associated with work participation and work functioning in depressed workers: a systematic review. *J. Occup. Rehabil.* **2010**, *20*, 275–292. [CrossRef] [PubMed]
13. Gartner, F.R.; Nieuwenhuijsen, K.; van Dijk, F.J.; Sluiter, J.K. The impact of common mental disorders on the work functioning of nurses and allied health professionals: A systematic review. *Int. J. Nurs. Stud.* **2010**, *47*, 1047–1061. [CrossRef] [PubMed]
14. Dewa, C.S.; Lin, E. Chronic physical illness, psychiatric disorder and disability in the workplace. *Soc. Sci. Med.* **2000**, *51*, 41–50. [CrossRef]
15. United Nations General Assembly. Final report of the Ad Hoc Committee on a Comprehensive and Integral International Convention on the Protection and Promotion of the Rights and Dignity of Persons with Disabilities. Available online: http://heinonline.org/HOL/LandingPage?handle=hein.journals/intlm46&div=39&id=&page= (accessed on 6 September 2016).

16. Harvey, S.; Joyce, S.; Modini, M.; Christensen, H.; Bryant, R.; Mykletun, A.; Mitchell, P.B. Work and Depression/Anxiety Disorders—A Systematic Review of Reviews. Available online: https://www.beyondblue.org.au/docs/default-source/research-project-files/bw0204.pdf?sfvrsn=4 (accessed on 6 September 2016).
17. Martin, A.; Sanderson, K.; Cocker, F. Meta-analysis of the effects of health promotion intervention in the workplace on depression and anxiety symptoms. *Scand. J. Work Environ. Health* **2009**, *35*, 7–18. [CrossRef] [PubMed]
18. Joyce, S.; Modini, M.; Christensen, H.; Mykletun, A.; Bryant, R.; Mitchell, P.B.; Harvey, S.B. Workplace interventions for common mental disorders: A systematic meta-review. *Psychol. Med.* **2016**, *46*, 683–697. [CrossRef] [PubMed]
19. Ivandic, I.; Freeman, A.; Birner, U.; Nowak, D.; Sabariego, C. A systematic review of brief mental health and well-being interventions in organizational settings. *Scand. J. Work Environ. Health* **2017**, *43*, 99–108. [CrossRef] [PubMed]
20. Kornstein, S.G.; Schatzberg, A.F.; Thase, M.E.; Yonkers, K.A.; McCullough, J.P.; Keitner, G.I.; Gelenbergg, A.J.; Ryanf, C.E.; Hesse, A.L.; Harrisonh, W.; et al. Gender differences in chronic major and double depression. *J. Affect. Disord.* **2000**, *60*, 1–11. [CrossRef]
21. Michon, H.W.; Ten Have, M.; Kroon, H.; Van Weeghel, J.; De Graaf, R.; Schene, A.H. Mental disorders and personality traits as determinants of impaired work functioning. *Psychol. Med.* **2008**, *38*, 1627–1637. [CrossRef] [PubMed]
22. Lerner, D.; Adler, D.A.; Chang, H.; Berndt, E.R.; Irish, J.T.; Lapitsky, L.; Maggie, Y.H.; John, R.; William, H.R. The clinical and occupational correlates of work productivity loss among employed patients with depression. *J. Occup. Environ. Med.* **2004**, *46*, S46–S55. [CrossRef] [PubMed]
23. Claassen, C.A.; Trivedi, M.H.; Rush, A.J.; Husain, M.M.; Zisook, S.; Young, E.; Leuchterg, A.; Wisniewskih, S.R.; Balasubramanih, G.K.; Alperti, J. Clinical differences among depressed patients with and without a history of suicide attempts: Findings from the STAR*D trial. *J. Affect. Disord.* **2007**, *97*, 77–84. [CrossRef] [PubMed]
24. Druss, B.G.; Schlesinger, M.; Allen, H.M.J. Depressive symptoms, satisfaction with health care, and 2-year work outcomes in an employed population. *Am. J. Psychiatry* **2001**, *158*, 731–734. [CrossRef] [PubMed]
25. Lerner, D.; Adler, D.A.; Chang, H.; Lapitsky, L.; Hood, M.Y.; Perissinotto, C.; Reed, J.; McLaughlin, T.J.; Berndt, E.R.; Rogers, W.H. Unemployment, job retention, and productivity loss among employees with depression. *Psychiatr. Serv.* **2004**, *55*, 1371–1378. [CrossRef] [PubMed]
26. Sanderson, K.; Tilse, E.; Nicholson, J.; Oldenburg, B.; Graves, N. Which presenteeism measures are more sensitive to depression and anxiety? *J. Affect. Disord.* **2007**, *101*, 65–74. [CrossRef] [PubMed]
27. Stewart, W.F.; Ricci, J.A.; Chee, E.; Hahn, S.R.; Morganstein, D. Cost of lost productive work time among US workers with depression. *JAMA* **2003**, *289*, 3135–3144. [CrossRef] [PubMed]
28. Adler, D.A.; McLaughlin, T.J.; Rogers, W.H.; Chang, H.; Lapitsky, L.; Lerner, D. Job performance deficits due to depression. *Am. J. Psychiatry* **2006**, *163*, 1569–1576. [CrossRef] [PubMed]
29. Endicott, J.; Nee, J. Endicott work productivity scale (EWPS): A new measure to assess treatment effects. *Psychopharmacol. Bull.* **1997**, *33*, 13–16. [PubMed]
30. Hawthorne, G.; Cheok, F.; Goldney, R.; Fisher, L. The excess cost of depression in South Australia: A population-based study. *Aust. N. Z. J. Psychiatry* **2003**, *37*, 362–373. [CrossRef] [PubMed]
31. Lagerveld, S.E.; Blonk, R.W.; Brenninkmeijer, V.; Schaufeli, W.B. Return to work among employees with mental health problems: Development and validation of a self-efficacy questionnaire. *Work Stress* **2010**, *24*, 359–375. [CrossRef]
32. Sabariego, C.; Oberhauser, C.; Posarac, A.; Bickenbach, J.; Kostanjsek, N.; Chatterji, S.; Officer, A.; Coenen, M.; Chhan, L.; Cieza, A. Measuring disability: Comparing the impact of two data collection approaches on disability rates. *Int. J. Environ. Res. Public Health* **2015**, *12*, 10329–10351. [CrossRef] [PubMed]
33. World Health Organization. *International Classification of Functioning, Disability and Health: ICF*; World Health Organization: Geneva, Switzerland, 2001.
34. United Nations General Assembly. The 2030 Agenda for Sustainable Development. Resolution A/RES/70/1. 2015. Available online: http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E (accessed on 6 September 2016).

35. Sangha, O.; Stucki, G.; Liang, M.H.; Fossel, A.H.; Katz, J.N. The self-administered comorbidity questionnaire: A new method to assess comorbidity for clinical and health services research. *Arthritis Rheum.* **2003**, *49*, 156–163. [CrossRef] [PubMed]
36. Khan, M.M.; Jabbar, M. Determinants of Employees Performance in Corporate Sector: Case of an Emerging Market. Available online: http://www.sciedupress.com/journal/index.php/bmr/article/view/3044 (accessed on 6 September 2016).
37. Kahya, E. The effects of job characteristics and working conditions on job performance. *Int. J. Ind. Erg.* **2007**, *37*, 515–523. [CrossRef]
38. Ali, A.Y.S.; Ali, A.A.; Adan, A.A. Working conditions and employees' productivity in manufacturing companies in sub-Saharan African context: Case of Somalia. *Educ. Res. Int.* **2013**, *2*, 67–78.
39. Cornelius, L.R.; Van Der Klink, J.J.; Groothoff, J.W.; Brouwer, S. Prognostic factors of long term disability due to mental disorders: A systematic review. *J. Occup. Rehabil.* **2011**, *21*, 259–274. [CrossRef] [PubMed]
40. Carney, R.M.; Freedland, K.E. Depression, mortality, and medical morbidity in patients with coronary heart disease. *Biol. Psychiatry* **2003**, *54*, 241–247. [CrossRef]
41. Hare, D.L.; Toukhsati, S.R.; Johansson, P.; Jaarsma, T. Depression and cardiovascular disease: A clinical review. *Eur. Heart J.* **2014**, *35*, 1365–1372. [CrossRef] [PubMed]
42. Kamenov, K.; Cabello, M.; Ballert, C.S.; Cieza, A.; Chatterji, S.; Rojas, D.; Ceron, G.; Bickenbach, J.; Ayuso-Mateos, J.L.; Sabariego, C. What makes the difference in people's lives when they have a mental disorder? *Int. J. Public Health* **2016**, submitted.
43. Loidl, V.; Oberhauser, C.; Ballert, C.; Coenen, M.; Cieza, A.; Sabariego, C. Which environmental factors have the highest impact on the performance of people experiencing difficulties in capacity? *Int. J. Environ. Res. Public Health* **2016**, *13*, 416. [CrossRef] [PubMed]
44. Thornicroft, G.; Rose, D.; Mehta, N. Discrimination against people with mental illness: What can psychiatrists do? *Adv. Psychiatr. Treat.* **2010**, *16*, 53–59. [CrossRef]
45. Reavley, N.J.; Jorm, A.F. Stigmatizing attitudes towards people with mental disorders: Findings from an Australian national survey of mental health literacy and stigma. *Aust. N. Z. J. Psychiatry* **2011**, *45*, 1086–1093. [CrossRef] [PubMed]

4. References

1. World Health Organization. Mental health policies and programmes in the workplace. 2005.
2. Harnois G, Gabriel P. Mental health and work: impact, issues and good practices. World Health Organization; 2000.
3. Perkins R, Farmer P, Litchfield P. Realising ambitions: Better employment support for people with a mental health condition. 2009. London: Department of Work and Pensions Google Scholar.
4. Leka S, Jain A, Iavicoli S, Di Tecco C. An evaluation of the policy context on psychosocial risks and mental health in the workplace in the European Union: achievements, challenges, and the future. BioMed research international. 2015;2015:213089.
5. Baumann A, Muijen M, Gaebel W. Mental health and well-being at the workplace – protection and inclusion in challenging times: WHO Regional Office for Europe; 2010.
6. OECD. Mental Health and Work: Fit Mind, Fit Job: From Evidence to Practice in Mental Health and Work. Paris: OECD Publishing; 2015.
7. Ngui EM, Khasakhala L, Ndetei D, Roberts LW. Mental disorders, health inequalities and ethics: a global perspective. International Review of Psychiatry. 2010;22(3):235-44.
8. Vigo D, Thornicroft G, Atun R. Estimating the true global burden of mental illness. The Lancet Psychiatry. 2016;3(2):171-8.
9. European Commission. Mental Health: Special Eurobarometer 345/Wave 73.2. Brussels: European Commission 2010.
10. McDaid D, King D, Park A-L, Parsonage M. Promoting well-being in the workplace. London: Department of Health; 2011.
11. Melchior M, Caspi A, Milne BJ, Danese A, Poulton R, Moffitt TE. Work stress precipitates depression and anxiety in young, working women and men. Psychological medicine. 2007;37(8):1119-29.
12. OECD. Sick on the Job?: Myths and Realities about Mental Health and Work. Paris: OECD Publishing; 2012.
13. Trautmann S, Rehm J, Wittchen H-U. The economic costs of mental disorders. EMBO reports. 2016;17(9):1245-9.

14. Bloom D, Cafiero E, Jané-Llopis E, Abrahams-Gessel S, Bloom L, Fathima S, et al. The global economic burden of noncommunicable diseases. Program on the Global Demography of Aging; 2012.
15. Mcdaid D, Park A-L. Investing in mental health and well-being: findings from the DataPrev project. Health promotion international. 2011;26(suppl_1):i108-i39.
16. Leka S, Jain A. International Initiatives to Tackle Psychosocial Risks and Promote Mental Health in the Workplace: Is There a Good Balance in Policy and Practice? Psychosocial Factors at Work in the Asia Pacific: Springer; 2016. p. 23-43.
17. Wynne R, De Broeck V, Vandenbroek K, Leka S, Jain A, Houtman I, et al. Promoting mental health in the workplace: guidance to implementing a comprehensive approach. 2014.
18. European Union: European Agency for Fundamental Rights. Legal protection of persons with mental health problems under non-discrimination law. 2011.
19. Lamontagne AD, Keegel T, Louie AM, Ostry A, Landsbergis PA. A systematic review of the job-stress intervention evaluation literature, 1990–2005. International journal of occupational and environmental health. 2007;13(3):268-80.
20. LaMontagne AD, Martin A, Page KM, Reavley NJ, Noblet AJ, Milner AJ, et al. Workplace mental health: developing an integrated intervention approach. BMC psychiatry. 2014;14(1):131.
21. LaMontagne AD, Keegel T. Reducing stress in the workplace: an evidence review: full report. 2012.
22. Bergerman L, Corabian P, Harstall C. Effectiveness of organizational interventions for the prevention of workplace stress: Institute of Health Economics; 2009.
23. Lagerveld S, Bültmann U, Franche R, Van Dijk F, Vlasveld M, Van der Feltz-Cornelis C, et al. Factors associated with work participation and work functioning in depressed workers: a systematic review. Journal of occupational rehabilitation. 2010;20(3):275-92.
24. Seymour L, Grove B. Workplace interventions for people with common mental health problems: evidence review and recommendations: British Occupational Health Research Foundation; 2005.
25. Harvey SB, Joyce S, Modini M, Christensen H, Bryant R, Mykletun A, Mitchell P. Work and depression/anxiety disorders–a systematic review of reviews. Melbourne: University of New South Wales, Beyond Blue. 2012.

26. European Parliament. European Parliament Resolution on Mental Health. Brussels: European Parliament; 2009.

5. Acknowledgements

This Ph.D. dissertation would not have been possible without the support of respective institutions and individuals. Firstly, I would like to express my sincere gratitude to my two supervisors Prof. Dennis Nowak and Dr. Carla Sabariego for giving me the opportunity to carry out my PhD as a Marie Skłodowska-Curie Fellow, for their continuous support, motivation and immense knowledge. Their guidance on both research and my career have been invaluable. I could not have imagined having better advisors and mentors.

Besides my PhD supervisors, I would like to thank Ulrich Birner and Stefan Tromel for their valuable professional guidance and collaboration. In addition, I am thankful to the MARATONE coordination team - Alarcos Cieza and Magda Nowak, the Thesis Advisory Committee and the MMRS PhD coordination team for their assistance and practical guidance.

I thank my MARATONE fellows, my colleagues from the Research Unit for Biopsychosocial Health, ILO Disability team and members of the Gender, Equality and Diversity Branch as well as all other colleagues I have had the opportunity to collaborate with for their encouragement, humor, interesting discussions and insightful comments. It has been a pleasure to work with such diverse group of people.

Finally, I would like to thank my family for their unconditional love and support throughout this PhD journey and my life in general.