The role of significant others in work re-integration of workers with chronic diseases

Nicole Snippen

The role of significant others in work re-integration of workers with chronic diseases

Nicole Snippen

Colophon
This research was supported by Instituut Gak (grant number 2016755). This research was conducted within the Research Institute SHARE of the Graduate School of Medical Sciences, University Medical Center Groningen, University of Groningen and under auspices of the research program Public Health Research (PHR).
The printing of this thesis was financially supported by the Graduate School of Medical Sciences, Research Institute SHARE, University Medical Center Groningen, and the University of Groningen.

Cover design and layout: Nicole Snippen & Wendy Bour-van Telgen
Printed by: Gildeprint | www.gildeprint.nl

© 2023 Nicole Snippen, the Netherlands
All rights reserved. No part of this thesis may be reproduced or transmitted in any form or by any means without the prior written permission of the author.

rijksuniversiteit
groningen

The role of significant others in work re-integration of workers with chronic diseases

Proefschrift

ter verkrijging van de graad van doctor aan de
Rijksuniversiteit Groningen
op gezag van de
rector magnificus prof. dr. C. Wijmenga
en volgens besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op

woensdag 29 maart 2023 om 12.45 uur

door

Nicole Snippen

geboren op 24 november 1989
te Groningen

Promotores
Prof. dr. S. Brouwer
Prof. dr. M. Hagedoorn

Copromotor
Dr. H.J. de Vries

Beoordelingscommissie
Prof. dr. A.V. Ranchor
Prof. dr. W. van Rhenen
Prof. dr. F.G. Schaafsma

CONTENTS

Chapter 1

General introduction

General introduction

For many people, work is an important part of life. Among other things, work provides people with income, a sense of purpose, and social contact [1,2]. Moreover, work is generally beneficial for health and wellbeing [1,3]. Having a chronic disease, however, can negatively affect a person's work participation [4,5]. About a quarter of the people within the working population in Europe has one or more chronic diseases, and this number is expected to rise due to an aging working population, unhealthy lifestyles and higher life expectancy after diagnosis as a consequence of improved medical treatments [5–8]. Many workers with chronic diseases experience difficulties in staying at work or returning to work after sickness absence, for example due to fatigue, pain or functional limitations [5,6]. It is therefore not surprising that workers with chronic diseases have a higher risk of long-term or recurrent sickness absence, work disability and unemployment than workers who do not have a chronic disease [5,8].

While disease-related factors and personal factors influence whether an individual is able to work despite his or her disease [9–12], there is an increasing awareness that environmental factors also play an important role [13–17]. Disability and adaptation to chronic disease do not occur in a social vacuum, but are influenced by the environment in which the worker lives and works [18–20]. Factors in both the work environment and the personal environment can facilitate or hinder a worker's recovery, functioning and work ability. While the role of work environmental factors has been frequently investigated [15,16,21–27], little attention has been paid to factors in the personal environment that can influence work participation of workers with chronic diseases. This thesis aims to address this knowledge gap, specifically focusing on the role of significant others like partners, family members and friends in the return-to-work process of sick-listed workers with chronic diseases.

The role of significant others in work participation and return to work

Significant others like partners, family members and friends have been shown to play an important role in a person's adaptation to chronic illness [18,19,28,29]. In many cases, significant others are one of the most important sources of support and they are often actively involved in problem solving and decision-making when it comes to dealing with the consequences of a chronic disease [18,19]. In prior studies, it has been suggested that significant others can be a valuable source of support to enable workers to cope effectively with their chronic disease and to work despite their health complaints [13–17]. On the other hand, it has also been noted that significant others can hinder a worker's recovery and work participation, for instance when they are overly concerned and exert pressure on the worker not to work [13–17].

While research on the influence of significant others on work outcomes is scarce, more knowledge is available with regard to other outcomes in the context of adaptation to chronic disease. For instance, empirical research indicates that open communication as well as positive perceptions, social support, and encouragement from significant others are associated with improved behavioral, psychological and health outcomes [28–35]. On the other hand, negative perceptions about the illness, lack of social support, criticism, solicitousness, overprotection, and controlling behaviors of significant others and poor communication between patients and significant others have been shown to be associated with negative patient outcomes [29,36–41].

Several theoretical models have been developed to describe pathways and mechanisms through which significant others can influence adaptation to chronic disease and other patient outcomes. One such model that aims to describe how couples make sense of and cope with chronic illness is the "Cognitive-Transactional Model of couples' adaptation to chronic illness" of Badr and Acitelli [18]. This model describes an individual process in which the perceptions that a person has about the illness and what he or she can do about it, determine how this person copes with the situation, thereby influencing his or her own outcomes. Furthermore, it posits that a simultaneous interpersonal process can occur in which the person with the disease and his or her significant other communicate about the situation, develop shared perceptions and appraisals and cope with the situation together (i.e., dyadic coping).

A key assumption of models on dyadic coping is that there is interdependence between the members of a couple, with both members influencing each other’s cognitions, coping responses and outcomes [18,19]. These models, therefore, propose that coping and adaptation to chronic disease should be viewed from a dyadic perspective, in which the role of perceptions of both the person with the chronic disease and the significant other as well as interactions between them are considered. Both empirical research and theoretical models highlight the importance of cognitions, behaviors and interactions of individuals and their significant others in adaptation to chronic disease. It is therefore likely that these factors are also important in the context of work participation and return to work.

Occupational health care in the Netherlands

In the context of work retention and return to work, occupational health physicians play an important supportive role. Internationally, occupational health physicians have different roles with regard to improving work ability, preventing sickness absence and supporting return to work. In this thesis, with “occupational health physicians” we refer to occupational physicians and insurance physicians. While employed workers can access an occupational physician for various issues related to work and health, in the Netherlands consultations with occupational physicians mostly take place in the context of sickness absence. When workers report sick, the employer pays at least 70% of the income for a period of two years and is legally obligated to provide workers with access to an occupational physician. Sick-listed workers consult with an occupational physician within six weeks after reporting sick to certify sickness absence. The occupational physician explores medical, personal, work, and environmental factors contributing to the sick leave, and gives advice about (work accommodations to facilitate) return to work. If return to work within two years fails, an insurance physician and labor expert asses the worker's capability to work and determine whether or not the worker is eligible to receive a work disability benefit paid by the state. Furthermore, insurance physicians play a role in the certification of sickness absence and work ability of self-employed, temporarily employed, and unemployed workers.

In recent decades, the focus in occupational health care has shifted from a predominantly biomedical approach towards a biopsychosocial approach [42–44]. According to the biopsychosocial approach, functioning and disability are the result of the complex interplay between a person's physical, psychological, social and environmental factors [42–46]. It emphasizes the need to consider all these factors and their interactions in a worker's functioning and disability. Consequently, there is a call for occupational health physicians to embrace an integrated holistic approach [42–44]. This requires an advisory role for occupational health physicians, with less emphasis on providing cure-oriented care and more emphasis on supporting workers to return to work despite having health complaints [42]. In this context, occupational health physicians should support workers to use their own resources to successfully adapt to a disease and to enable them to work despite their health complaints. This is reflected by occupational health guidelines that advise occupational health physicians to address not only biomedical factors but also personal factors and environmental factors within and outside of the workplace [47–52]. This may include assessing the influence of significant others and involving them in the return-to-work process, as significant others can be an important environmental factor and potential resource for successful work participation and return to work.

Involving significant others in occupational health care

While not much is known with regard to involving significant others in occupational health care, there is some evidence from clinical health care that interventions in which significant others are involved are more effective than care without significant other involvement [53–58]. The findings of several systematic reviews indicate that interventions aimed at both patients and significant others can have positive effects on a range of individual and relationship outcomes. For instance, one systematic review found evidence that couple interventions are more effective in reducing depressive symptoms, enhancing marital functioning, and reducing pain of patients with chronic diseases than individual interventions or usual care [53]. Another systematic review found that couple-based interventions for couples affected by cancer were most efficacious in improving couple communication, psychological distress and relationship functioning [58].

Some studies have suggested that involving significant others could also be beneficial in occupational health care and have stressed the need to consider the role of significant others like family members in order to improve health and work outcomes [14,17,59–62]. For instance, in one study it was suggested that harnessing support from significant others could be an effective strategy to help workers with chronic musculoskeletal pain to stay at work [17]. Another study pointed out that including significant others in vocational rehabilitation programs could be a valuable way to mobilize social resources to support optimal functioning of workers with chronic back pain [14].

Although this topic has received little attention in occupational health care, some occupational health guidelines explicitly mention the influence of significant others and advise occupational health physicians to take this into consideration [47–52]. For instance, the Dutch insurance medicine protocol on schizophrenia and related psychoses states that insurance physicians should pay attention to recovery-impeding factors in the private environment as well as to the care and help from significant others [52]. Furthermore, in the Dutch occupational health guideline on the treatment of employees with ischemic heart disease, occupational physicians are advised to involve the worker’s partner or other significant others who can provide support in the intervention [48]. However, these guidelines provide very little information on how significant others can influence work outcomes and which cognitions, behaviors and interactions might play a role. Moreover, guidance and training for occupational health physicians on how to assess the influence of significant others and how they can involve significant others to better support workers in their functioning and return to work is lacking.

Knowledge gaps

Despite promising results of significant other involvement in other health care fields [53–57], several knowledge gaps need to be addressed before significant other involvement can be broadly implemented in occupational health care. First, more knowledge is needed on which cognitions and behaviors of significant others and which interpersonal processes between workers and significant others play a role in the work outcomes of workers with chronic diseases. Secondly, research is needed on how occupational health physicians can assess the influence of significant others and involve them in occupational health care to better support workers in their recovery and return to work. Moreover, such knowledge needs to be made available and accessible to occupational health physicians. With regard to this last point, education is one of the most important ways for occupational health physicians to obtain new knowledge and skills, and to promote behavioral change and the implementation of research findings in daily practice [63–66]. As education on significant other involvement in occupational health care is lacking, there is a need for education for occupational health physicians on how they can address the influence of significant others in the re-integration process of workers with chronic diseases.

Thesis aim and research questions

The research gaps described above led to the two main aims of this thesis. The first aim was to gain more knowledge about the influence of significant others on work outcomes of workers with chronic diseases. The second aim was to gain insight into perspectives of workers and occupational health physicians on significant other involvement in occupational health care, and to strengthen the supportive role of occupational health physicians through the development of education on involving significant others in the re-integration process. The first part of this thesis focuses on acquiring insight into the influence of significant others and individual and interpersonal factors related to work outcomes of workers with chronic diseases. The second part of this thesis focuses on gaining insight into perspectives of workers and occupational health physicians on significant other involvement in occupational health care, and on the development and evaluation of an e-learning module for occupational health physicians on involving significant others in work re-integration. Based on the previously outlined knowledge gaps on this topic, the following questions guided the research presented in this thesis:

1. What is known in the literature about the influence of significant others on work outcomes of workers with chronic diseases? (Chapter 2)
2. Which individual and interpersonal factors of workers and their significant others can be targeted to facilitate positive work outcomes? (Chapter 2, Chapter 3, and Chapter 4)
3. What are the experiences, views and considerations of workers and occupational health physicians with regard to involving significant others in occupational health care? (Chapter 5 and Chapter 6)
4. What is the efficacy of the e-learning module *"Training for Occupational Health Physicians to Involve Significant Others"* (TOTIS) for improving occupational health physicians' knowledge, attitudes, and self-efficacy with regard to involving significant others in the return-to-work process? (Chapter 7)

Outline of this thesis

In the first part of this thesis, knowledge is acquired about the influence of significant others on work outcomes and which factors might be targeted to facilitate positive work outcomes of workers with chronic diseases. *Chapter 2* describes a systematic review that aimed to identify cognitions and behaviors of significant others that are related to work participation of workers with chronic diseases. *Chapter 3* presents a cross-sectional study that investigated whether there are individual and interpersonal associations of illness perceptions with expectations about the worker's return to work in dyads of workers with chronic diseases and their significant others. *Chapter 4* describes a longitudinal study among workers with chronic diseases and their significant others that investigated whether return to work expectations, illness perceptions, and significant other behaviors are associated with the duration of sick leave of workers.

In the second part of this thesis, insight is gained into perspectives of workers and occupational health physicians on involving significant others in occupational health care. In addition, the development and evaluation of the e-learning module *"Training for Occupational Health Physicians to Involve Significant Others"* is described. *Chapter 5* presents the findings from a survey study among occupational health physicians that investigated to what extent they assess cognitions and behavioral responses of significant others in their daily practice and explored why occupational health physicians either assess or overlook these factors. In *Chapter 6*, a focus group study is presented in which the views and considerations of workers with chronic diseases regarding involvement of significant others in occupational health care were explored. *Chapter 7* describes the development and evaluation of the e-learning module *"Training for Occupational Health Physicians to Involve Significant Others"* (TOTIS), which was developed to educate occupational health physicians on how they can address the role of significant others and manage their involvement in the return-to-work process of workers with chronic diseases.

Finally, in the general discussion in *Chapter 8*, the main findings of this thesis are discussed and recommendations for policy, practice, and future research are described.

References

1. Waddell G, Burton AK. Is Work Good for Your Health and Well-Being? 2006. doi:ISBN 0 11 703694 3
2. Vooijs M, Leensen MCJ, Hoving JL, *et al.* Value of work for employees with a chronic disease. *Occup Med (Chic Ill)* 2018;**68**:26–31. doi:10.1093/occmed/kqx178
3. Schuring M, Mackenbach J, Voorham T, *et al.* The effect of re-employment on perceived health. *J Epidemiol Community Health* 2011;**65**:639–44. doi:10.1136/jech.2009.103838
4. Scharn M, Oude Hengel K, Boot CRL, *et al.* Influence of chronic diseases on societal participation in paid work, volunteering and informal caregiving in Europe: A 12-year follow-up study. *J Epidemiol Community Health* 2019;**73**:136–41. doi:10.1136/jech-2018-211107
5. European Chronic Disease Alliance. Joint Statement on "Improving the employment of people with chronic diseases in Europe". 2017.https://ec.europa.eu/health/sites/health/files/policies/docs/2017_chronic_framingdoc_en.pdf
6. Schoemaker CG, van Loon J, Achterberg PW, *et al.* The Public Health Status and Foresight report 2014: Four normative perspectives on a healthier Netherlands in 2040. *Health Policy (New York)* Published Online First: 2019. doi:10.1016/j.healthpol.2018.10.014
7. Sociaal Economische Raad (SER). Werk: van belang voor iedereen. Een advies over werken met een chronische ziekte. [Work: of importance for everyone. An advice about working with a chronic illness]. Den Haag: 2016.
8. OECD/EU (2016). Health at a Glance: Europe 2016 - State of Health in the EU Cycle. OECD Publishing 2016. doi:http://dx.doi.org/10.1787/9789264265592-en
9. Cancelliere C, Donovan J, Stochkendahl MJ, *et al.* Factors affecting return to work after injury or illness: Best evidence synthesis of systematic reviews. *Chiropr Man Ther* 2016;**24**:1–23. doi:10.1186/S12998-016-0113-Z/TABLES/3
10. Gragnano A, Negrini A, Miglioretti M, *et al.* Common Psychosocial Factors Predicting Return to Work After Common Mental Disorders, Cardiovascular Diseases, and Cancers: A Review of Reviews Supporting a Cross-Disease Approach. *J Occup Rehabil* 2018;**28**:215–31. doi:10.1007/S10926-017-9714-1/TABLES/5
11. Sewdas R, de Wind A, Abma FI, *et al.* Personal and Environmental Factors Influencing Work Participation Among Individuals with Chronic Diseases. In: *Handbook of Disability, Work and Health*. 2020. 1–15. doi:10.1007/978-3-319-75381-2_21-1
12. Vooijs M, Leensen MCJ, Hoving JL, *et al.* Disease-generic factors of work participation of workers with a chronic disease: a systematic review. *Int Arch Occup Environ Health* 2015;**88**:1015–29. doi:10.1007/S00420-015-1025-2/TABLES/2
13. Nielsen K, Yarker J, Munir F, *et al.* IGLOO: An integrated framework for sustainable return to work in workers with common mental disorders. *Work Stress* 2018;**32**:400–17. doi:10.1080/02678373.2018.1438536
14. Brooks J, McCluskey S, King N, *et al.* Illness perceptions in the context of differing work participation outcomes: Exploring the influence of significant others in persistent back pain. *BMC Musculoskelet Disord* 2013;**14**:1–11. doi:10.1186/1471-2474-14-48
15. Islam T, Dahlui M, Majid HA, *et al.* Factors associated with return to work of breast cancer survivors: a systematic review. *BMC Public Health* 2014;**14**:S8. doi:10.1186/1471-2458-14-S3-S8

16. Dorland HF, Abma FI, Roelen CAM, *et al.* Factors influencing work functioning after cancer diagnosis: a focus group study with cancer survivors and occupational health professionals. *Support Care Cancer* 2016;**24**:261–6. doi:10.1007/s00520-015-2764-z
17. McCluskey S, de Vries H, Reneman M, *et al.* 'I think positivity breeds positivity': a qualitative exploration of the role of family members in supporting those with chronic musculoskeletal pain to stay at work. *BMC Fam Pract* 2015;**16**:1–7. doi:10.1186/s12875-015-0302-1
18. Badr H, Acitelli LK. Re-thinking dyadic coping in the context of chronic illness. *Curr Opin Psychol* 2017;**13**:44–8. doi:10.1016/j.copsyc.2016.03.001
19. Berg CA, Upchurch R. A developmental-contextual model of couples coping with chronic illness across the adult life span. *Psychol Bull* 2007;**133**:920–54. doi:10.1037/0033-2909.133.6.920
20. Schneidert M, Hurst R, Miller J, *et al.* The role of environment in the International Classification of Functioning, Disability and Health (ICF). *Disabil Rehabil* 2003;**25**:588–95. doi:10.1080/0963828031000137090
21. Jansen J, van Ooijen R, Koning PWC, *et al.* The Role of the Employer in Supporting Work Participation of Workers with Disabilities: A Systematic Literature Review Using an Interdisciplinary Approach. *J Occup Rehabil* 2021;**31**:916–49. doi:10.1007/s10926-021-09978-3
22. Nieuwenhuijsen K, Verbeek JHAM, De Boer AGEM, *et al.* Supervisory behaviour as a predictor of return to work in employees absent from work due to mental health problems. *Occup Environ Med* 2004;**61**:817–23. doi:10.1136/oem.2003.009688
23. Boot CRL, Hogg-Johnson S, Bültmann U, *et al.* Differences in predictors for return to work following musculoskeletal injury between workers with and without somatic comorbidities. *Int Arch Occup Environ Health* 2014;**87**:871–9. doi:10.1007/s00420-014-0928-7
24. Netterstrøm B, Eller NH, Borritz M. Prognostic Factors of Returning to Work after Sick Leave due to Work-Related Common Mental Disorders: A One-And Three-Year Follow-Up Study. *Biomed Res Int* 2015;:1–7. doi:10.1155/2015/596572
25. Haveraaen LA, Skarpaas LS, Berg JE, *et al.* Do psychological job demands, decision control and social support predictreturn to work three months after a return-to-work (RTW) programme? the rapid-RTW cohort study. *Work* 2016;**53**:61–71. doi:10.3233/WOR-152216
26. Post M, Krol B, Groothoff JW. Work-related determinants of return to work of employees on long-term sickness absence. *Disabil Rehabil* 2005;**27**:481–8. doi:10.1080/09638280400018601
27. Joyce S, Modini M, Christensen H, *et al.* Workplace interventions for common mental disorders: A systematic meta-review. *Psychol Med* 2016;**46**:683–97. doi:10.1017/S0033291715002408
28. Cano A, Leong L. Significant Others in the Chronicity of Pain and Disability. In: Hasenbring M, Rusu A, Turk D, eds. *From Acute to Chronic Back Pain: Risk Factors, Mechanisms, and Clinical Implications*. Oxford, England: Oxford University Press 2012. 339–54.http://replace-me/ebraryid=10581482
29. Rosland A-MM, Heisler M, Piette JD. The impact of family behaviors and communication patterns on chronic illness outcomes: a systematic review. *J Behav Med* 2012;**35**:221–39. doi:10.1007/s10865-011-9354-4
30. Maly RC, Umezawa Y, Leake B, *et al.* Mental health outcomes in older women with breast cancer: impact of perceived family support and adjustment. *Psycho-Oncology J Psychol Soc Behav Dimens Cancer* 2005;**14**:535–45.
31. Strom JL, Egede LE. The Impact of social support on outcomes in adult patients with type 2 diabetes: A systematic review. *Curr Diab Rep* 2012;**12**:769–81. doi:10.1007/s11892-012-0317-0

32. Applebaum AJ, Stein EM, Lord-Bessen J, *et al.* Optimism, social support, and mental health outcomes in patients with advanced cancer. *Psycho-oncology* 2014;**23**:299–306.
33. Karnell LH, Christensen AJ, Rosenthal EL, *et al.* Influence of social support on health-related quality of life outcomes in head and neck cancer. *Head Neck J Sci Spec Head Neck* 2007;**29**:143–6.
34. Leifheit-Limson EC, Reid KJ, Kasl S V, *et al.* Changes in social support within the early recovery period and outcomes after acute myocardial infarction. *J Psychosom Res* 2012;**73**:35–41.
35. Moser DK, Dracup K. Role of spousal anxiety and depression in patients' psychosocial recovery after a cardiac event. *Psychosom Med* 2004;**66**:527–32.
36. Band R, Wearden A, Barrowclough C. Patient Outcomes in Association With Significant Other Responses to Chronic Fatigue Syndrome: A Systematic Review of the Literature. *Clin Psychol (New York)* 2015;**22**:29–46. doi:10.1111/cpsp.12093
37. Romano JM, Turner JA, Jensen MP, *et al.* Chronic pain patient-spouse behavioral interactions predict patient disability. *Pain* 1995;**63**:353–60. doi:10.1016/0304-3959(95)00062-3
38. Heijmans M, Ridder D De, Bensing J. Dissimilarity in patients' and spouses' representations of chronic illness: Exploration of relations to patient adaptation. *Psychol Health* 1999;**14**:451–66. doi:10.1080/08870449908407340
39. Schmaling KB, Smith WR, Buchwald DS. Significant other responses are associated with fatigue and functional status among patients with chronic fatigue syndrome. *Psychosom Med* 2000;**62**:444–50.http://www.ncbi.nlm.nih.gov/pubmed/10845358
40. Luttik ML, Jaarsma T, Moser D, *et al.* The importance and impact of social support on outcomes in patients with heart failure: an overview of the literature. *J Cardiovasc Nurs* 2005;**20**:162–9.
41. Berry E, Davies M, Dempster M. Managing Type 2 diabetes as a couple: The influence of partners' beliefs on diabetes distress over time. *Diabetes Res Clin Pract* 2018;**141**:244–55.
42. Kant I, Van Amelsvoort LGPM. Applying a biopsychosocial perspective in occupational health: Easier said than done! *Work* 2017;**57**:149–51. doi:10.3233/WOR-172550
43. Gentry K, Snyder K, Barstow B, *et al.* The Biopsychosocial Model: Application to Occupational Therapy Practice. *Open J Occup Ther* 2018;**6**:12. doi:10.15453/2168-6408.1412
44. Van Amelsvoort LGPM, De Brouwer CPM, Heerkens YF, *et al.* Fostering functioning of workers: A new challenge for prevention in occupational health. *Work* 2017;**57**:153–6. doi:10.3233/WOR-172549
45. Engel GL. The need for a new medical model: A challenge for biomedicine. *Science (80-)* 1977;**196**:129–36. doi:10.1126/science.847460
46. World Health Organization. *ICF : international classification of functioning, disability and health.* Geneva: : World Health Organization 2001.
47. Vooijs M, van der Heide I, Leensen MCJ, *et al.* Richtlijn Chronisch Zieken en Werk [Guideline 'The chronically ill and work']. Amsterdam: 2016. https://www.psynip.nl/wp-content/uploads/2017/03/Richtlijn_chronisch_zieken_en_werk_2016.pdf
48. van Dijk JL, Bekedam MA, Brouwer W, *et al.* Richtlijn Ischemische Hartziekten [Guideline Ischemic Heart Disease]. Utrecht: 2007. www.nvab-online.nl (accessed 21 Feb 2019).
49. Scottish Intercollegiate Guidelines Network (SIGN). Management of chronic pain. A national clinical guideline. Sign. 2019.https://www.sign.ac.uk/media/1108/sign136_2019.pdf
50. National Institute for Health and Clinical Excellence (NICE). Rehabilitation after critical illness. Clinical guideline [CG83]. 2009.https://www.nice.org.uk/guidance/cg83/resources/rehabilitation-after-critical-illness-in-adults-pdf-975687209413

51. National Institute for Health and Care Excellence (NICE). Stroke rehabilitation in adults. Clinical guideline [CG162]. 2013.https://www.nice.org.uk/guidance/cg162
52. Werkgroep Schizofrenie en verwante psychosen. Verzekeringsgeneeskundig Protocol Schizofrenie en Verwante Psychosen [Insurance Medicine Protocol Schizophrenia and Related Psychoses]. Utrecht: 2008.
53. Martire LML, Schulz R, Helgeson VSVS, *et al.* Review and meta-analysis of couple-oriented interventions for chronic illness. *Ann Behav Med* 2010;**40**:325–42. doi:10.1007/s12160-010-9216-2
54. Hartmann M, Bäzner E, Wild B, *et al.* Effects of interventions involving the family in the treatment of adult patients with chronic physical diseases: A meta-analysis. *Psychother Psychosom* 2010;**79**:136–48. doi:10.1159/000286958
55. Kelly GR, Scott JE, Mamon J. Medication compliance and health education among outpatients with chronic mental disorders. *Med Care* 1990;**28**:1181–97.http://www.ncbi.nlm.nih.gov/pubmed/2250501
56. McCrady BS, Epstein EE, Cook S, *et al.* A randomized trial of individual and couple behavioral alcohol treatment for women. *J Consult Clin Psychol* 2009;**77**:243–56. doi:10.1037/a0014686
57. Deek H, Hamilton S, Brown N, *et al.* Family-centred approaches to healthcare interventions in chronic diseases in adults: A quantitative systematic review. *J Adv Nurs* 2016;**72**:968–79. doi:10.1111/jan.12885
58. Regan TW, Lambert SD, Girgis A, *et al.* Do couple-based interventions make a difference for couples affected by cancer? A systematic review. *BMC Cancer* 2012;**12**:1–14. doi:10.1186/1471-2407-12-279/TABLES/1
59. McCluskey S, Brooks J, King N, *et al.* The influence of ‘significant others’ on persistent back pain and work participation: A qualitative exploration of illness perceptions. *BMC Musculoskelet Disord* 2011;**12**:236. doi:10.1186/1471-2474-12-236
60. McCluskey S, Brooks J, King N, *et al.* Are the treatment expectations of ‘significant others’ psychosocial obstacles to work participation for those with persistent low back pain? *Work* 2014;**48**:391–8. doi:10.3233/WOR-131789
61. Bartys S, Frederiksen P, Bendix T, *et al.* System influences on work disability due to low back pain: An international evidence synthesis. *Health Policy (New York)* 2017;**121**:903–12. doi:10.1016/j.healthpol.2017.05.011
62. Prang K-H, Newnam S, Berecki-Gisolf J. The impact of family and work-related social support on musculoskeletal injury outcomes: a systematic review. *J Occup Rehabil* 2015;**25**:207–19. doi:10.1007/s10926-014-9523-8
63. Kok R, Hoving JL, Smits PBA, *et al.* A Clinically Integrated Post-Graduate Training Programme in Evidence-Based Medicine versus ‘No Intervention’ for Improving Disability Evaluations: A Cluster Randomised Clinical Trial. *PLoS One* 2013;**8**. doi:10.1371/journal.pone.0057256
64. Grol R, Grimshaw J. From best evidence to best practice: Effective implementation of change in patients’ care. Lancet. 2003. doi:10.1016/S0140-6736(03)14546-1
65. Michie S, van Stralen MM, West R. The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implement Sci* Published Online First: 2011. doi:10.1186/1748-5908-6-42
66. Bero LA, Grilli R, Grimshaw JM, *et al.* Getting research findings into practice. Closing the gap between research and practice: An overview of systematic reviews of interventions to promote the implementation of research findings. *Br Med J* 1998;**317**. doi:10.1136/bmj.317.7156.465

Chapter 2

Influence of significant others on work participation of individuals with chronic diseases: a systematic review

Nicole Snippen, Haitze de Vries, Sylvia van der Burg-Vermeulen, Mariët Hagedoorn,

Sandra Brouwer

BMJ Open, 2019, DOI: 10.1136/bmjopen-2018-021742

Abstract

Objective: It is widely recognised that significant others (SOs), such as a partner, family member or friend, can influence health outcomes of individuals with a chronic disease. However, not much is known about which specific cognitions (i.e. illness perceptions and expectation of work ability) and behaviours (e.g. emotional and practical support) of SOs influence work participation. Therefore, we aimed to identify cognitions and behaviours of SOs that are related to work participation of individuals with a chronic disease.

Design: A systematic review and thematic synthesis.

Data sources: PubMed, Embase, PsycINFO, SocINDEX and Web of Science were searched until 28 March 2017.

Eligibility criteria for selecting studies: We included studies reporting on cognitions and behaviours of SOs related to work participation in populations with various chronic diseases.

Data extraction and synthesis: Two independent reviewers extracted the data and performed a quality assessment using the Quality Assessment Tool for Quantitative Studies from the Effective Public Health Practice Project 2007 and a checklist for assessment of qualitative studies derived from the Cochrane Supplemental Handbook Guidance. Evidence was thematically synthesised.

Results: Out of 5,168 articles, 18 were included (15 qualitative and 3 quantitative) of moderate to high quality. Studies were on cancer, chronic pain, brain injuries and mental health disorders. After thematic synthesis 27 factors could be distinguished. Consistent evidence was found that SOs' positive and encouraging attitudes regarding work participation, encouragement and motivating behaviour, and open communication with patients are facilitators for work participation. Consistently reported barriers were SOs' positive attitudes towards sickness absence and advice, encouragement or pressure to refrain from work.

Conclusions: Our findings show that several cognitions and behaviours of SOs can facilitate or hinder work participation of individuals with a chronic disease. Intervening on these factors by involving SOs in disability prevention and return to work intervention strategies may be beneficial. More prognostic studies are needed, as the current evidence is mostly based on qualitative studies.

Introduction

Cognitions and behaviours of significant others (SOs) in the personal environment, such as a partner, family member or friend, can play an important role in health outcomes of individuals with a chronic disease [1–6]. In the clinical setting it has been shown that the behaviour of SOs can have either detrimental or favourable effects on perceived symptoms and behaviour of individuals with a chronic disease, thereby influencing recovery, treatment effects, quality of life and disability [3–5]. Although it is widely recognised that SOs can also influence work participation of individuals with a chronic disease, for instance through social support [7–11], research on the influence of SOs on work outcomes is scarce. Despite increasing evidence that beliefs and behaviours of SOs are important for work outcomes [7–11], not much is known about which specific cognitions or behaviours of SOs influence work participation of their relatives and friends.

A rationale for the influence of SOs on work participation can be found in cognitive behavioural models, which propose that a person's cognitions with regard to the disease and work, i.e. thoughts, beliefs, attitudes and expectations [12–15], generate behavioural and emotional responses to illness events and guide coping strategies [3,16–18]. There is evidence that behaviours of SOs influence the behaviour and consequently health and work outcomes of individuals with a chronic disease [19–21]. Illness perceptions held by SOs–consisting of perceptions and beliefs concerning the disease–have been proposed to be a mechanism through which SOs may influence work participation [19,21]. In this context, several studies have described that SOs can reinforce an individual's unhelpful cognitions about the illness, such as beliefs about limitations due to the disease, mistaken beliefs about the nature of illness, pessimistic beliefs regarding the outcome of treatment, and the unlikelihood of returning to work [22,23].

In occupational health care, there is a growing notice that the social context plays an important role in return-to-work processes and that it can be beneficial to address social factors such as responses of SOs [24,25]. As there is evidence that clinical health care interventions in which SOs are involved are more effective than care as usual where SOs are not involved [26–29], this may also prove to be beneficial in occupational health care. Consequently, various multidisciplinary guidelines recommend (occupational) health professionals to address social factors and involve significant others such as family members in treatment and care [30–35].

In recent years, the focus in health care has shifted to self-management and adapting to a disease [36], which requires a more supportive role for (occupational) health professionals [37]. Aside from facilitating and supporting the return to work (RTW) process of sick-listed workers, occupational health professionals have the responsibility to support workers to cope with problems due to disease and to empower them to manage their own health and wellbeing to prevent sickness absence [36,37]. In this context, professionals should support workers to use their own resources to successfully adapt to a disease and to enable them to work [36]. One resource that may be used to support individuals with a chronic disease to participate in work is their network of SOs.

Although it is recognised that SOs can influence workers' recovery and work outcomes [1,30,38], more research is needed to determine which specific cognitive behavioural factors in the social environment influence work participation and should therefore be taken into account in occupational health care. Therefore, in this systematic review we aim to identify cognitions and behaviours of SOs that are related to work participation of individuals with a chronic disease. Investigating which SO-related factors are associated with work participation of individuals with a chronic disease may increase our understanding of staying at work and RTW processes, which can be applied in occupational health interventions to facilitate work participation.

Method

Search strategy

We conducted a search in PubMed, Embase, PsycINFO, SocINDEX and Web of Science (inception of databases until 28 March 2017). When available, subject headings such as MeSH terms in PubMed were used, in addition to free text words. Four main categories (1. chronic illness, 2. work participation, 3. SOs and 4. SOs' cognitions and behaviours) were combined with the Boolean operator 'AND' to identify studies (Supplementary file: Text S1). We included terms on the following chronic diseases: diabetes mellitus, cancer, chronic pain, chronic fatigue, cardiovascular diseases, pulmonary diseases, musculoskeletal disorders, brain injuries, and depressive disorder. Additionally, we included broader search terms such as "chronic disease" and "disabled persons". In addition to the search, we conducted a reference check to identify additional studies not retrieved through database searching.

Selection of studies

The article selection was performed in three phases by two independent reviewers (NS, HdV). In the first phase, articles were excluded based on title. Secondly, articles were excluded based on abstract. In the third phase, the reviewers selected articles for final inclusion based on full text appraisal. To be included, articles had to meet the following criteria: (i) the study population consisted of subjects with a chronic illness or their SOs; (ii) the subjects were 18-67 years old (working population); (iii) the study examined sickness absence, work disability, unemployment, RTW or staying at work as the outcome; (iv) at least one of the independent variables investigated concerned cognitions or behaviour of a SO (a close family member, close friend, spouse or partner) and (v) the article was written in English.

In this study, we were interested in SOs' cognitions such as their perceptions and interpretations of the causes and consequences of their close other's illness and work ability, in this study defined as thoughts, beliefs, attitudes and expectations [12–15]. Furthermore, with regard to behaviour, studies were included if they reported on specific supportive or obstructive behaviours of SOs (e.g. giving advice, showing empathy, taking over household chores, pressuring their close other to rest). As we aimed to find specific behaviours of SOs related to work outcomes, only studies in which constructs such as social support or emotional support were defined as actual provided or received behaviour were included. Studies reporting on satisfaction with support or experienced support from SOs, without providing information on specific provided or received behaviours of SOs, were excluded. Finally, we included both self-reported cognitions and behaviours by SOs and cognitions and behaviours of SOs as perceived by individuals with a chronic disease, as both perspectives are relevant for the research question in this review [39].

Studies were excluded when both reviewers considered that these did not fulfil the inclusion criteria. Disagreements regarding inclusion were resolved by consensus. If no consensus was reached or in case of doubt, the article was screened by the other authors and discussed to reach consensus.

Data extraction

Two reviewers (NS, HdV) independently extracted the data from all selected studies using an adapted version of the Cochrane Data collection form for intervention reviews on RCTs and non-RCTs [40]. The following information was extracted from every included study: study design; study objectives; diagnosed condition; general description of subjects including age, gender and additional details; outcome measures; type of SO; investigated or identified cognitions or behaviour of SOs; and relation with the studied work outcome.

Assessment of quality

The quality of included quantitative studies was assessed using the Quality Assessment Tool for Quantitative Studies from the Effective Public Health Practice Project 2007, recommended by Cochrane [41,42]. This tool is suitable for assessment of studies of any quantitative design. Two reviewers (NS, HdV) used this tool to rate studies on selection bias, study design, confounders, blinding, data collection method and withdrawals and dropouts (Supplementary file: Table S1). Based on these criteria, quality was rated as low when two or more components had weak ratings, moderate when one component had a weak rating and strong if there were no weak ratings.

The quality of included qualitative studies was independently assessed by two reviewers (NS, HdV) using a checklist with criteria for assessment of qualitative studies derived from the Cochrane Supplemental Handbook Guidance [43]. This checklist identified credibility, transferability, dependability and confirmability (Supplementary file: Table S2). Based on these criteria, studies were rated as having high quality if all criteria were met; moderate if flaws were identified in one or more criteria that raised some doubt about the results; and low when flaws were identified in one or more criteria that seriously weakened confidence in the results.

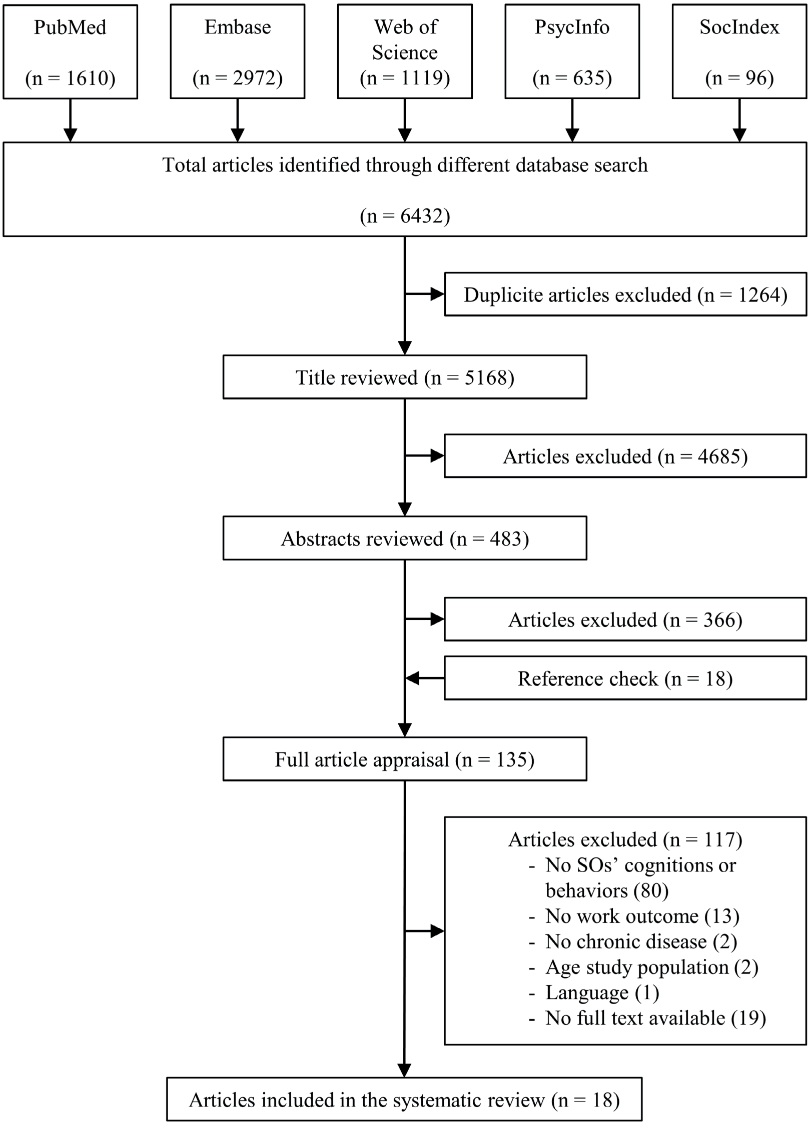


Figure 1. Flow diagram of the search process.

Evidence grading

For each individual outcome, the body of evidence was assessed using the GRADE approach [42]. In grading the evidence, qualitative studies were not considered. The initial level of evidence was determined by study design, after which the level of evidence may have been downgraded depending on the presence of five factors or upgraded depending on the effect size (Supplementary file: Box S1).

Data synthesis

As it was expected that most studies would be of qualitative nature, a thematic synthesis [44] was conducted, with a separate synthesis of results for quantitative and qualitative studies. This method is often used to analyse data in primary qualitative research to integrate the findings of multiple qualitative studies. The thematic analysis consisted of three stages: line-by-line extraction of the data, developing descriptive themes, and generating analytical themes. In the first stage, the relevant findings of the studies were extracted, including the association with the studied work outcome. In the second stage, the findings were grouped together to form various descriptive themes. Finally, in the third stage, the descriptive themes were grouped together by type of factor, based on whether it concerns SOs' cognitions or behaviours. Furthermore, as prior research has found moderate correlations between self-reports and informant reporting [39,45–47], a distinction was made between self-reported cognitions and behaviours versus cognitions and behaviours of SOs as perceived by individuals with a chronic disease.

To give an overall overview of the results, we summarized for each factor: (i) the total number of studies reporting on the factor, (i) the number of studies of low, moderate and high quality reporting on the factor, and (iii) whether the factor was consistently reported as either a facilitator or barrier for work participation of individuals with a chronic disease across studies.

Patient involvement

In this systematic review, no patients were involved in setting the research question, the outcome measures, the design or conduct of the study. No patients were asked to advise on interpretation of results or to contribute to the writing or editing of this document. An advisory work group consisting of a patient representative and occupational health professionals will be consulted on dissemination of the study results.

Results

Selection of studies

The search of the databases identified 5,168 articles, excluding duplicates (Figure 1). After screening on titles and abstracts, 117 articles remained for possible inclusion. Reference checks identified 18 additional studies, resulting in a total of 135 articles for full-text assessment. After full-text screening, 117 studies were excluded. The main reason for exclusion was that no cognitions or behaviours of SOs were identified or discussed. Other reasons for exclusion were that studies did not examine any work outcome; did not focus on workers with a chronic disease; or the study population was not of working age. Five articles were discussed within the team in order to reach consensus. The first author of one article was contacted for additional information to allow making a decision. Finally, 18 articles met the criteria for inclusion and were assessed for quality.

Study characteristics

The main characteristics of the included quantitative and qualitative studies are respectively presented in Tables 1 and S3 (Supplementary file). The reported cognitions and behaviours of SOs are presented with the direction of its association with the studied work outcome. We aimed to provide a comprehensive overview of participant characteristics of each study, including information on age, gender, ethnicity, education and chronic disease(s). Unfortunately, not all the desired information was available across articles and this could therefore not be consistently reported in Tables 1 and S3. For example, as most studies did not include information about participants' ethnicity, this information is only included for the studies that did report on participants' ethnicity.

Studies with various populations were included, mostly involving somatic diseases including various types of cancer, chronic pain and brain injuries. However, one study focused on individuals with severe and persistent mental illnesses. Within the included studies, participants' age ranged from their early twenties to their late sixties.

Three quantitative studies (one cross-sectional, one retrospective and one prospective cohort study) and 15 qualitative studies were included. One quantitative study focused primarily on the influence of behaviours of SOs on work participation of individuals with a chronic disease, while in the other two studies the influence of behaviours and cognitions of SOs on work participation was one of several factors being investigated. In all three studies, the study population consisted of individuals with a chronic disease, in which participants reported about perceived cognitions and behaviours of their SOs. Of the qualitative studies, seven studies focused primarily on the role of SOs regarding work participation of individuals with a chronic disease. In four of these studies, interviews were conducted with both SOs who reflected on their own behaviour and individuals with a chronic disease who reported about perceived cognitions and behaviours of their SOs. In one study, the study population consisted of SOs only and in two studies the study population consisted only of individuals with a chronic disease. Aside from those studies with a primary focus on the influence of SOs on work outcome, eight qualitative studies did include findings on this topic, but did not primarily focus on the influence of SOs on work outcomes. In these studies, only interviews with individuals with a chronic disease were conducted.

Table 1. Characteristics of included quantitative studies.

Author, year (Ref no.) Country	**Study design**	**Aim of the study**	**Sample**	**Involved significant other(s)**	**Work outcome**	**Identified cognitions or behaviours of significant other(s)**	**Association with work outcome**
Balswick 1970 [50] USA, Iowa	Cross-sectional.	To examine the relationship between spouse companionship support and the degree of vocational rehabilitation success on the part of a handicapped spouse.	245 predominantly white participants diagnosed with a physical or mental handicap, a mean age of 36 years and an average education of 12 years.	Spouse	Employment success (proportion of time that the patient was employed fulltime during the previous year)	Participation of the spouse in the patient's life outside the job (only for those patients having had twelve or more years of education) χ^2=6.34 ($p <$ 0.01)[a]	+
						More "dubious" support from the spouse: expressing concern about the handicap, encouraging the patient in work, talking with the patient about goals and plans (among those subjects with an education under 12 years) χ^2=4.57 ($p < 0.05$)[a]	-
Kong et al. 2012 [48] China	Retrospective cohort study.	To predict the RTW outcome and optimize the intervention scheme of a case management program initiated in China.	335 participants with work-related injuries– mostly fractures (61.8%) or another limb injury (75.8%)– with a mean age of 36.3 years (SD = 9.7 years). Most participant were male (86.0%), married (75.8%), migrant workers (60.3%), with middle school education (82.7%). 261 participants (77.9%) were successful at RTW. For those who were not currently employed, 45	Family members	Successful return to work (sustained work for at least 3 months during follow-up period) and shorter absence duration (period between discharge from the rehabilitation	Positive family attitude towards return to work (RTW: $p < 0.05$, HR = 4.0, absence duration: $p < 0.01$) [a]	+

Table 1. Characteristics of included quantitative studies (continued).

Author, year (Ref no.) Country	**Study design**	**Aim of the study**	**Sample**	**Involved significant other(s)**	**Work outcome**	**Identified cognitions or behaviours of significant other(s)**	**Association with work outcome**
			workers (60.8%) were under sick leave until the end of follow-up, 23 (31.1%) failed to find suitable jobs, 3 (4.1%) did not intend to work again, and 3 (4.1%) retired early because of age.		center and resuming work)		
Sandström & Esbjornsson 1986 [49] Sweden	Prospective cohort study with follow-up at 1 and 4 year.	To determine the significance of the patient's own prediction as to whether he/she would, or would not, return to work after vocational rehabilitation.	52 participants with non-specific low back pain. Male participants (*n* = 35) had a mean age of 41 years (range 27-49) and female participants (*n* = 17) had a mean age of 38 years (range 29-49). Twelve men and six women were unemployed at the start of the study.	Close relatives	Return to work (study I: sick listed for 25 days or less, study II: sick listed for six months or less)	Opinion of closest relatives that the patient is too ill to return to work ($p < 0.05$)[a] Worries of closest relatives regarding deterioration of the patient's condition if returning to work ($p < 0.01$) comparing sick listed persons with workers with less than 25 sick days during one year, $p < 0.05$ comparing sick listed persons with workers with less than 6 months of sick leave during one year)[a]	- -

* = reported by individuals with a chronic disease
\+ = facilitator for studied work outcome
RTW = return to work
\- = barrier for studied work outcome

Quality assessment

The results of the quality assessment of quantitative studies are presented in Table 2. In all studies the data collection method was rated as weak because the data collection tools were not shown to be reliable and/or valid or this was unclear. However, as this was the only weak rating in every study, the overall quality was moderate for all studies.

The results of the quality assessment of qualitative studies are presented in Table 3. The quality of the included qualitative studies ranged from moderate to high. The agreement of the two reviewers was high on credibility, transferability and dependability and moderate on confirmability. The confirmability was unclear for multiple studies, often due to lack of information; however, we considered it unlikely that this would seriously alter the results.

Table 2. Quality assessment of quantitative studies.

Author(s)	Selection bias	Study design	Confounders	Blinding	Data collection method	Withdrawals and dropouts	Quality
Balswick , 1970 [50]	2	2	2	2	3	4	2
Kong et al., 2012 [48]	1	2	1	2	3	2	2
Sandstrom and Esbjornsson, 1986 [49]	2	2	2	2	3	1	2

1 = strong rating 2 = moderate rating 3 = weak rating 4 = not applicable

Table 3. Quality analysis of qualitative studies.

Author(s)	Credibility	Transferability	Dependability	Confirmability	Quality
Auerbach and Richardson, 2005 [52]	1	1	1	?	2
Brooks et al., 2013 [19]	1	1	1	?	2
Dorland et al., 2016 [57]	1	1	1	1	1
Duijts et al., 2016 [58]	1	1	1	?	2
Frederiksen et al., 2015 [59]	1	1	1	?	2
Gagnon et al., 2016 [55]	1	1	1	1	1
Main et al., 2005 [62]	1	1	1	1	1
McCluskey et al., 2011 [51]	1	1	1	1	1
McCluskey et al., 2014 [4]	1	1	1	?	2
McCluskey et al., 2015 [53]	1	1	1	?	2
Nilsson et al., 2011 [60]	1	1	1	1	1
Rubenson et al., 2007 [56]	1	1	1	?	2
Svensson et al., 2010 [54]	1	1	1	1	1
Tamminga et al., 2012 [61]	1	1	1	1	1
Tan et al., 2012 [10]	1	1	1	?	2

1 = high 2 = moderate 3 = low ? = unclear

Grading the evidence of SO factors in quantitative studies

The results of the level of evidence assessment of quantitative studies are presented in Table 4. All three studies were observational; therefore all studied factors initially had a low level of evidence. We found no reasons to downgrade the level of evidence of any of the factors. The level of evidence of one factor (positive family attitude towards RTW) was upgraded to moderate because a large effect was found ($HR = 4.0$) [48]. The five factors assessed for level of evidence were each found in only one quantitative study. Although many factors were not studied in quantitative studies and could therefore not be graded, various factors were reported in multiple qualitative studies (Table 5).

Synthesis of quantitative studies

In the three quantitative studies five SO factors were reported, which are described in the sections below. In these studies, all factors were reported by individuals with a chronic disease.

Significant others' cognitions

Beliefs of SOs regarding the consequences of the disease and RTW were found to be related with RTW. The opinion of close relatives that patients were too ill to return to work and worries that the condition would deteriorate if patients would return to work were both negatively related to RTW [49]. Additionally, positive attitudes of family towards RTW was found to be strongly related to a shorter duration of sickness absence and a higher chance of RTW [48].

Significant others' behaviours

Participatory support from a spouse–measured by a combination of engaging in relaxing activities together, attending events together and sharing meals–was found to be significantly associated with more employment success (the proportion of time the patient was employed full-time during the past year) [50]. However, this was only true for patients with twelve or more years of education [50]. On the other hand, the degree of what the authors defined as "dubious support" from a spouse had a negative relationship with employment success among lower educated patients [50]. In that study, dubious support was measured with three questions in which participants had to indicate how much their spouse was concerned about the participant's handicap, how much their spouses encouraged them in their work, and the number of times participants talked over their goals and plans with their spouses [50]. The authors reasoned that spouses should be less concerned about the handicap when participants were more adjusted in their work, and that more adjusted participants would need less encouragement and had less need to talk over life goals and plans. The authors state that positive responses on dubious support could therefore not only be a sign of healthy companionship support, but could also be an indication of oversupport [50].

Table 4. Level of evidence of SO factors studied in quantitative studies.

Factor	Number of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Quality of evidence
Participating in the patient's life outside the job [50]	1	Cross-sectional study	Not serious	Not serious	Not serious	Not serious	None	Low
“Dubious” support [50]	1	Cross-sectional study	Not serious	Not serious	Not serious	Not serious	None	Low
Positive family attitude towards return to work [48]	1	Retrospective cohort study	Not serious	Not serious	Not serious	Not serious	Strong association	Moderate
Opinion of closest relatives that the patient is too ill to return to work [49]	1	Prospective cohort study	Not serious	Not serious	Not serious	Not serious	None	Low
Worries of closest relatives regarding deterioration of the patient’s condition if returning to work [49]	1	Prospective cohort study	Not serious	Not serious	Not serious	Not serious	None	Low

Table 5. Overview of evidence found for SO factors associated with work participation.

Type of factor	Factors investigated	Number & type of articles^{a}	High quality^{a}	Moderate quality^{a}	Consistency^{b}	Reported by
Cognitions	Work as cause of the disease [51]	1 QS	1 QS		n/a	SOs
	Working is not possible due to disease (ability to work depends on a cure) [4,49]	1 PCS, 1 QS		1 PCS, 1 QS	+	Individuals with a chronic disease & SOs
	Consequences of the disease are permanent [19,51]	2 QS	1 QS	1 QS	+	SOs
	Believing that return to work will lead to deterioration of condition [49,51]	1 PCS, 1 QS	1 QS	1 PCS	+	Individuals with a chronic disease & SOs
	Perceiving that patient has no rights with regard to previous employment [19]	1 QS		1 QS	n/a	SOs
	Perceived low level of control over the patient's employment [4,19]	2 QS		2 QS	+	SOs
	Positive and encouraging attitudes/outlook in general and with regard to return to work [48,53–55]	1 RCS, 3 QS	2 QS	1 RCS, 1QS	+	Individuals with a chronic disease & SOs
	Positive attitude about the patient and his abilities (viewing the patient as not being disabled or a victim) [19,52]	2 QS		2 QS	+	Individuals with a chronic disease & SOs
	Negative attitudes about the availability of suitable work [51]	1 QS	1 QS		n/a	SOs
	Distrust towards the patient and the severity of the complaints and disease [54]	1 QS	1 QS		n/a	Individuals with a chronic disease
	Exaggerated protective attitude [56]	1 QS		1 QS	n/a	Individuals with a chronic disease
	Positive attitudes towards sickness absence [57–60]	4 QS	2 QS	2 QS	+	Individuals with a chronic disease
Behaviours	Enabling discussion about return to work, talking with, and listening to the patient [52,53,55,61]	4 QS	2 QS	2 QS	+	Individuals with a chronic disease & SOs
	Sharing information [60]	1 QS	1 QS		n/a	Individuals with a chronic disease

Table 5. Overview of evidence found for SO factors associated with work participation (continued).

Type of factor	Factors investigated	Number & type of articles^a	High quality^a	Moderate quality^a	Consistency^b	Reported by
	Sharing information [60]	1 QS	1 QS		n/a	Individuals with a chronic disease
	Giving feedback, advice and guidance with regard to future planning [52,55]	2 QS	1 QS	1 QS	+	Individuals with a chronic disease & SOs
	Showing understanding and empathy [51,53,55,56]	4 QS	2 QS	2 QS	-	Individuals with a chronic disease & SOs
	Emphasizing what a patient can still do [19]	1 QS		1 QS	n/a	SOs
	Highlighting beneficial consequences of employment [19]	1 QS		1 QS	n/a	SOs
	Encouraging and motivating the patient [10,52,53,55,57,61,62]	7 QS	4 QS	3 QS	+	Individuals with a chronic disease & SOs
	Emphasizing the negative consequences of the disease [19]	1 QS		1 QS	n/a	SOs
	Waiting on a cure [4]	1 QS		1 QS	n/a	SOs
	Validating patients' statements of incapacity and self-limiting behaviour [19,51]	2 QS	1 QS	1 QS	+	SOs
	Advising, encouraging and pressuring the patients to refrain from work or not return to work [10,57–60]	5 QS	2 QS	3 QS	+	Individuals with a chronic disease
	Helping with daily activities, household tasks and transportation [51,54–56,60,61]	6 QS	5 QS	1 QS	-	Individuals with a chronic disease & SOs
	Exploring and accessing beneficial services and resources (both at and outside of work) [19,55]	2 QS	1 QS	1 QS	+	SOs
	Participation in the patient's life, doing joint activities/ initiating activities [50,53]	1 CSS, 2 QS	1 QS	1 CSS, 1 QS	+	Individuals with a chronic disease & SOs
	Providing dubious support [50]	1 CSS		1 CSS	n/a	Individuals with a chronic disease

Synthesis of qualitative studies

The 15 qualitative studies reported on 60 factors (including duplicate factors). After thematic synthesis 26 factors remained, the results of which are described below. Of these factors, 13 were reported by SOs, five by workers with a chronic disease, and eight by both workers with a chronic disease and SOs.

Significant others' cognitions

Negative beliefs of SOs regarding the causes and consequences of the disease were reported to be a barrier for work participation. Beliefs that work was the cause of the disease or complaints and that RTW would lead to subsequent complaints were both found to be barriers for RTW [51]. Additionally, beliefs that the consequences of the illness (on work) were permanent [19,51] and that return to work depended on a cure for the disease [4] were found to be present in SOs of patients that were not able to remain in employment and return to work. Finally, perceptions that patients had no rights with regard to their previous employment [19] and that SOs had a low level of personal control over patients' illness, recovery, work situation, and employment [4,19] were reported to be barriers for patients' ability to remain in employment and RTW. However, factors concerning SOs' perceived negative consequences of the disease (for work) and lack of control over the disease and employment were only mentioned by SOs, not by individuals with a chronic disease.

Additionally, positive, encouraging and supportive attitudes from SOs were reported as a determinant of patients' ability to remain in employment [19], job retention [52], staying at work [53], RTW [54] and return to productive occupations [55]. In these cases, SOs remained positive both about patients and their abilities and viewed patients as not being disabled or victims [19,52]. On the other hand, negative and pessimistic attitudes of SOs were reported to negatively affect patients' ability to stay at work [54] and RTW [51]. SOs' negative attitudes were directed at the availability of suitable work [54] and consisted of distrust towards the severity of patients' complaints and disease. Finally, exaggerated protective attitudes [56] and expressing positive attitudes towards sickness absence [57–60] were reported to be barriers for work functioning and RTW. Although SOs' positive attitudes towards sickness absence was frequently reported as a barrier for work participation by individuals with a chronic disease, it was not mentioned by SOs.

Significant others' behaviours

Maintaining open communication with patients was reported as a behavioural determinant of job retention [52], staying at work [53], RTW [60,61] and return to productive occupations [55]. This communication included talking with and actively listening to patients; sharing information; enabling discussion about return to work; and giving feedback, advice and guidance.

There are contradicting findings with regard to showing understanding and empathy. On the one hand, patients and SOs emphasized the importance of understanding and sympathy from SOs with regard to patients' ability to stay at work [53] and return to work [56] and productive activities [55]. On the other hand, in one study, patients who had not successfully returned to work reported a high degree of sympathy from their SOs in combination with SOs validating their incapacity and self-limiting behaviour [51]. The authors hypothesized that these behaviours may have acted as obstacles for RTW, as SOs reinforced patients' unhelpful beliefs concerning for example the chance of re-injury or the likelihood of RTW [51].

Empowering, encouraging and motivating behaviour from SOs was also reported as a behavioural determinant of a patient's ability to remain in employment [19], job retention [52], staying at work [53], work functioning [57] and return to work [10,61,62] and productive occupations [55]. SOs emphasized what patients could still do despite their illness and highlighted beneficial consequences of employment. Furthermore, they encouraged and motivated patients to have a positive outlook and to keep active or return to activities and work. On the other hand, SOs of patients who were not able to remain in employment or return to work emphasized the negative consequences of the disease and seemed to validate patients' statements of incapacity and self-limiting behaviour [19,51]. Furthermore, SOs of patients with a disability claim expressed that they were waiting on a cure in order for the patient to be able to return to work [4]. Additionally, advising, encouraging and pressuring patients to refrain from working or returning to work were reported as barriers for work functioning [57] and RTW [10,58,60], and could lead patients to take sickness absence days [59]. Although pressure from SOs not to (return to) work was frequently reported as a barrier for work participation by individuals with a chronic disease, this was not mentioned by SOs.

Furthermore, practical support was reported to be a facilitator for patients' ability to remain in employment [19] and for RTW [54,56,60,61] and return to productive occupations [55]. Practical support in this context varied from providing practical help with daily activities, household tasks and transportation, to exploring and accessing beneficial services and resources. However, one study reported that help with everyday activities and high levels of routine dependency could be a barrier for RTW [51].

Finally, initiating activities and doing joint activities were seen as facilitators of returning to productive occupations [55] and staying at work [53] by patients and SOs.

Synthesis of overall results

After thematic synthesis, a total of 27 factors were distinguished (Table 5). Ten out of 27 (37%) factors were reported both by individuals with a chronic disease and SOs, of which eight were consistently reported as either a facilitator or barrier for work participation. The results indicate that SOs' cognitions and behaviours potentially can facilitate or hinder work participation of workers with a chronic disease. A positive attitude of SOs towards RTW, and activity participation outside work were found to be facilitators for work participation in both qualitative and quantitative studies. Overall, there is consistent evidence that positive, encouraging and supportive attitudes; maintaining open communication; and encouraging and motivating behaviour of SOs were facilitators for work participation (i.e., staying at work, a shorter duration of sickness absence, job retention and RTW). There is also consistent evidence that negative perceptions, beliefs and attitudes regarding the causes and consequences of the disease and overprotective behaviour were barriers for work participation (i.e., employment success, work functioning, ability to remain in employment and RTW). Evidence regarding the influence of practical support and showing understanding and empathy on work participation is inconsistent.

Discussion

Within our knowledge, this is the first systematic review that aims to identify cognitions and behaviours of significant others, like relatives and friends, that are related to work participation of individuals with a chronic disease. Although the possible influence of SOs on work participation is recognised in occupational health care [1,2], research focusing primarily on relevant cognitions and behaviours of SOs in the context of work participation is scarce. This review aimed to address this research gap, with some promising results.

We included 18 studies with various populations, consisting of patients with cancer, chronic pain, brain injuries, and in one study patients with severe and persistent mental illnesses. Seven qualitative studies focused primarily on the role of SOs regarding work participation of individuals with a chronic disease [4,19,50,51,53–55]. The findings show that cognitions and behaviours of SOs may influence work participation of their relative or friend. Of the 27 identified factors, seven factors were reported in at least four studies.

First, there was consistent evidence that positive and encouraging attitudes of SOs regarding returning to work or staying at work can facilitate these outcomes [48,53–55]. Secondly, there was consistent evidence that encouragement and motivating behaviour from SOs may facilitate job retention, work functioning, staying at work and RTW [10,52,53,55,57,61,62]. Maintaining open communication–e.g. to enable discussion on return to work and have conversations with patients about the illness and (return to) work–was also reported to be a facilitator for job retention, staying at work and RTW [52,53,55,61]. On the other hand, SOs' positive attitudes towards sickness absence and their advice, encouragement or pressure to refrain from work were consistently found to be barriers for staying at work, work functioning and RTW [10,57–60]. Finally, there is some evidence that practical help with daily activities and empathy and understanding from SOs can facilitate work participation [53–56,60,61]. However, the evidence for these factors is not consistent, as each factor has once been reported as a possible barrier for staying at work and RTW [51]. These contradicting findings can be explained by underlying processes, such as interactions sbetween cognitions and behaviours of patients and SOs. For example, practical help from SOs could enable patients to stay at or return to work which would otherwise not be possible due to fatigue or pain [54,56,61]. On the other hand, practical help could also be indicative of overprotection in which SOs may reinforce patients' unhelpful beliefs and encourage or pressure patients to limit activities and not to return to work [51].

The findings in this review are consistent with findings of studies on the influence of cognitions and behaviours of SOs on other patient outcomes (e.g. health outcomes, symptom severity, quality of life, self-management behaviour, functioning) [20,21,63–66]. For instance, SOs' beliefs on the causes and consequences of the disease and symptoms and their own and patients' personal control of the disease have been shown to be related to patient outcomes [20,21,64]. Furthermore, various behaviours of SOs–such as encouraging patients to rest, discouraging patients from activities, expressing concern, encouraging activities, initiating and participating in activities, taking over tasks, maintaining open communication and talking with patients–have also been found to be related to various outcomes [20,63,66].

With regard to the results of this systematic review it should be noted that, with the exception of one study, all included studies focused on populations with somatic chronic diseases, i.e. cancer, chronic pain and brain injuries. It remains unclear whether the processes involved are similar for populations with other somatic or mental diseases, as the role of significant others–for example concerning beliefs and type of support–may differ between these groups. Research on illness perceptions about health outcomes has shown that the respective importance of the five dimensions of patients' illness representations–causes, duration, consequences, symptoms and controllability or curability of the disease–differ between diseases [67,68]. Thus, instead of a generic importance of cognitions and behaviours, specific maladaptive cognitions and behaviours may be more common or of more importance in some diseases than in others [69]. Finally, as the work outcomes studied in the included studies varied widely, it was impossible to determine whether cognitions and behaviours of SOs differ across work outcomes. The majority of studies focused on RTW, while research on other work outcomes such as staying at work, job retention and work functioning is scarce.

Limitations

A limitation of this study is that articles in languages other than English were excluded. As a consequence, some useful and relevant studies might have been missed. In addition, all included studies were from high-income countries except for two studies from upper middle-income countries, restricting the generalizability of the results. Generalizability of results is also restricted due to the limited amount of quantitative studies that were available on this topic. Most of the included studies were of qualitative design, with relatively small study samples. Thus, although various cognitions and behaviours of SOs were reported as being important with respect to work participation, most of these factors were not confirmed in quantitative studies. In addition, the small number of quantitative studies rendered a meta-analysis impossible. Therefore, no statistical analyses were performed.

Finally, we identified multiple qualitative studies exploring facilitators and/or barriers for work performance or RTW that did not report on any cognitions or behaviours of SOs. Thus, not all individuals with a chronic disease report their social environment as being a relevant factor for work participation. There are various possible explanations why individuals may not mention their SOs when discussing facilitators and barriers for work participation [70]. For instance, participants may not relate their disease and ability to work to circumstances in their social environment [70] or they may be unaware of how SOs may influence their cognitions, behaviours and work participation.

Implications and recommendations for future research

Our findings support the hypothesis that cognitions and behaviours of SOs can influence work participation of individuals with chronic diseases such as cancer, chronic pain, brain injuries and mental health disorders. As there is growing evidence that clinical health care interventions in which SOs are involved in treatment are more effective than care as usual where SOs are not involved in treatment [26–29], this may also prove to be beneficial in the work context of occupational health care. However, with the limited amount of studies on this topic with regard to work participation more research is needed for which several recommendations can be made.

First, our review shows that quantitative research on cognitions and behaviours of SOs with regard to work participation of individuals with a chronic disease is scarce. We identified only three quantitative studies in which specific cognitions or behaviours of SOs were investigated in relation to work participation [48–50]. More qualitative research is available in this context, in which cognitions and behaviours of SOs are identified that may be important with regard to work participation. Therefore, future research should focus on quantitatively confirming these findings, thus providing a higher level of evidence.

Second, future studies should explore which cognitions and behaviours of SOs are most strongly related to work participation and determine if these relationships are disease generic or disease specific. This could result in valuable insights into which of these factors would be most promising to take into account in occupational health care to facilitate return to work of workers on sick leave and prevent work disability of individuals with a chronic disease.

Finally, future prognostic studies may focus on the relationship between dyadic agreement of patients with a chronic disease and their SOs and work participation, as dyadic agreement has been shown to influence other patient outcomes such as wellbeing [71] and may also influence work participation.

Conclusions

In this review, we identified 27 cognitions and behaviours of SOs that were reported as determinants for work participation of individuals with a chronic disease. Our findings show that several cognitive behavioural factors of SOs can facilitate or hinder work participation. Aside from one factor (positive family attitude towards return to work) for which moderate-level evidence was found, all factors were of low-level evidence. Despite the overall low level of evidence, our review indicates that involving SOs in occupational health care and intervening on these factors may be beneficial. High quality prognostic studies are needed that investigate cognitive behavioural factors of SOs in relation to work participation to confirm our findings. Future studies could for example focus on exploring which cognitions and behaviours of SOs are most strongly related to duration of sick leave and RTW.

Abbreviations

RTW	Return to work
SOs	Significant others

Acknowledgements: We would like to thank Truus van Ittersum for her contribution in developing the search strategy.

References

1. World Health Organization. ICF : international classification of functioning, disability and health. Geneva: World Health Organization 2001.
2. McDougall J, Wright V, Rosenbaum P. The ICF model of functioning and disability: Incorporating quality of life and human development. Dev Neurorehabil 2010;**13**:204–11. doi:10.3109/17518421003620525
3. Cano A, Leong L. Significant Others in the Chronicity of Pain and Disability. In: Hasenbring M, Rusu A, Turk D, eds. From Acute to Chronic Back Pain: Risk Factors, Mechanisms, and Clinical Implications. Oxford, England: : Oxford University Press 2012. 339–54.http://replace-me/ebraryid=10581482
4. McCluskey S, Brooks J, King N, et al. Are the treatment expectations of 'significant others' psychosocial obstacles to work participation for those with persistent low back pain? Work 2014;**48**:391–8. doi:10.3233/WOR-131789
5. Prang K-H, Newnam S, Berecki-Gisolf J. The impact of family and work-related social support on musculoskeletal injury outcomes: a systematic review. J Occup Rehabil 2015;**25**:207–19. doi:10.1007/s10926-014-9523-8
6. Berg CA, Upchurch R. A developmental-contextual model of couples coping with chronic illness across the adult life span. Psychol Bull 2007;**133**:920–54. doi:10.1037/0033-2909.133.6.920
7. Shaw WS, Campbell P, Nelson CC, et al. Effects of workplace, family and cultural influences on low back pain: what opportunities exist to address social factors in general consultations? Best Pract Res Clin Rheumatol 2013;**27**:637–48. doi:10.1016/j.berh.2013.09.012
8. Islam T, Dahlui M, Majid HA, et al. Factors associated with return to work of breast cancer survivors: a systematic review. BMC Public Health 2014;**14**:S8. doi:10.1186/1471-2458-14-S3-S8
9. Jetha A, Badley E, Beaton D, et al. Transitioning to employment with a rheumatic disease: the role of independence, overprotection, and social support. J Rheumatol 2014;**41**:2386–94. doi:10.3899/jrheum.140419
10. Tan FL, Loh SY, Su TT, et al. Return to work in multi-ethnic breast cancer survivors - a qualitative inquiry. Asian Pacific J Cancer Prev 2012;**13**:5791–7. doi:10.7314/APJCP.2012.13.11.5791
11. Wagner S, White M, Schultz I, et al. Modifiable worker risk factors contributing to workplace absence: A stakeholder-centred best-evidence synthesis of systematic reviews. Work J Prev Assess Rehabil 2014;**49**:541–58. doi:10.3233/WOR-131709
12. Nevid JS, Rathus SA, Greene B. Classification and Assessment of Abnormal Behavior. In: Abnormal Psychology in a Changing World. Upper Saddle River: : Pearson Education 2008. 68–101.
13. Morin CM, Blais F, Savard J. Are changes in beliefs and attitudes about sleep related to sleep improvements in the treatment of insomnia? Behav Res Ther Published Online First: 2002. doi:10.1016/S0005-7967(01)00055-9
14. Freeman A [Ed], Mahoney MJ [Ed], DeVito P [Ed], et al. Cognition and psychotherapy (2nd ed.). Cogn. Psychother. (2nd ed.). 2004.
15. Shettleworth SJ. Social Learning. In: Cognition, Evolution and Behavior. 2010. doi:10.1016/B978-012273965-1/50009-1
16. Dobson KS. HANDBOOK OF COGNITIVE- BEHAVIORAL THERAPIES THIRD EDITION. 2010. doi:10.3928/00485713-20090821-01

17. Sharp TJ. Chronic pain: A reformulation of the cognitive-behavioural model. Behav Res Ther 2001;**39**:787–800. doi:10.1016/S0005-7967(00)00061-9
18. Turk D, Meichenbaum D, Genest M, et al. Pain and Behavioral Medicine: A Cognitive-Behavioral Perspective. Scand. J. Behav. Ther. 1984;**13**:243–4. doi:10.1016/0163-8343(84)90047-1
19. Brooks J, McCluskey S, King N, et al. Illness perceptions in the context of differing work participation outcomes: Exploring the influence of significant others in persistent back pain. BMC Musculoskelet Disord 2013;**14**:1–11. doi:10.1186/1471-2474-14-48
20. Band R, Wearden A, Barrowclough C. Patient Outcomes in Association With Significant Other Responses to Chronic Fatigue Syndrome: A Systematic Review of the Literature. Clin Psychol (New York) 2015;**22**:29–46. doi:10.1111/cpsp.12093
21. Searle A, Norman P, Thompson R, et al. Illness representations among patients with type 2 diabetes and their partners: Relationships with self-management behaviors. J Psychosom Res 2007;**63**:175–84. doi:10.1016/j.jpsychores.2007.02.006
22. Romano JM, Turner JA, Jensen MP, et al. Chronic pain patient-spouse behavioral interactions predict patient disability. Pain 1995;**63**:353–60. doi:10.1016/0304-3959(95)00062-3
23. Main CJ, Watson PJ. Psychological aspects of pain management. Man Ther 1999;**4**:203–15.http://www.ncbi.nlm.nih.gov/pubmed/2728573
24. Sociaal Economische Raad (SER). Werk: van belang voor iedereen. Een advies over werken met een chronische ziekte. [Work: of importance for everyone. An advice about working with a chronic illness]. Den Haag: 2016.
25. Nicholas DB, Mitchell W, Dudley C, et al. An Ecosystem Approach to Employment and Autism Spectrum Disorder. J Autism Dev Disord 2018;**48**:264–75. doi:10.1007/s10803-017-3351-6
26. Martire LML, Schulz R, Helgeson VSVS, et al. Review and meta-analysis of couple-oriented interventions for chronic illness. Ann Behav Med 2010;**40**:325–42. doi:10.1007/s12160-010-9216-2
27. Hartmann M, Bäzner E, Wild B, et al. Effects of interventions involving the family in the treatment of adult patients with chronic physical diseases: A meta-analysis. Psychother Psychosom 2010;**79**:136–48. doi:10.1159/000286958
28. Kelly GR, Scott JE, Mamon J. Medication compliance and health education among outpatients with chronic mental disorders. Med Care 1990;**28**:1181–97.http://www.ncbi.nlm.nih.gov/pubmed/2250501
29. McCrady BS, Epstein EE, Cook S, et al. A randomized trial of individual and couple behavioral alcohol treatment for women. J Consult Clin Psychol 2009;**77**:243–56. doi:10.1037/a0014686
30. Vooijs M, van der Heide I, Leensen MCJ, et al. Richtlijn Chronisch Zieken en Werk [Guideline 'The chronically ill and work']. Amsterdam: 2016. https://www.psynip.nl/wp-content/uploads/2017/03/Richtlijn_chronisch_zieken_en_werk_2016.pdf
31. Scottish Intercollegiate Guidelines Network (SIGN). Management of chronic pain. A national clinical guideline. Sign. 2019.https://www.sign.ac.uk/media/1108/sign136_2019.pdf
32. Scottish Intercollegiate Guidelines Network (SIGN). Brain injury rehabilitation in adults. A national clinical guideline. 2013. http://www.sign.ac.uk/assets/sign130.pdf
33. National Institute for Health and Care Excellence (NICE). Stroke rehabilitation in adults. Clinical guideline [CG162]. 2013.https://www.nice.org.uk/guidance/cg162
34. National Institute for Health and Clinical Excellence (NICE). Depression in Adults: recognition and Management. Clinical guideline [CG90]. 2009.https://www.nice.org.uk/guidance/cg90/resources/depression-in-adults-recognition-and-management-975742636741

35. National Institute for Health and Clinical Excellence (NICE). Rehabilitation after critical illness. Clinical guideline [CG83]. 2009. https://www.nice.org.uk/guidance/cg83/resources/rehabilitation-after-critical-illness-in-adults-pdf-975687209413
36. Huber M, André Knottnerus J, Green L, et al. How should we define health? BMJ Published Online First: 2011. doi:10.1136/bmj.d4163
37. Schaufeli W, van Dijk FJH. Ontwikkelingen die de bedrijfsgezondheidszorg veranderen. TBV 2014;**22**:353–7.
38. Finger ME, Glässel A, Erhart P, et al. Identification of relevant ICF categories in vocational rehabilitation: a cross sectional study evaluating the clinical perspective. J Occup Rehabil 2011;**21**:156–66. doi:10.1007/s10926-011-9308-2
39. Alexander LA, McKnight PE, Disabato DJ, et al. When and How to use Multiple Informants to Improve Clinical Assessments. J. Psychopathol. Behav. Assess. 2017. doi:10.1007/s10862-017-9607-9
40. The Cochrane Collaboration. Data collection forms for intervention reviews: Rcts and non-RCTs. 2014.http://training.cochrane.org/resource/data-collection-forms-intervention-reviews (accessed 20 Jul 2017).
41. Thomas BH, Ciliska D, Dobbins M, et al. A process for systematically reviewing the literature: Providing the research evidence for public health nursing interventions. Worldviews Evidence-Based Nurs 2004;**1**:176–84. doi:10.1111/j.1524-475X.2004.04006.x
42. Higgins JPT, Green S. Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]. In: The Cochrane Collaboration. 2011. Table 7.7.a: Formulae for combining groups.
43. Hannes K. Critical appraisal of qualitative research. In: Supplementary Guidance for Inclusion of Qualitative Research in Cochrane Systematic Reviews of Interventions. 2011. 1–14.http://cqrmg.cochrane.org/supplemental-handbook-guidance
44. Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. BMC Med Res Methodol 2008;**8**:45. doi:1471-2288-8-45 [pii]\r10.1186/1471-2288-8-45 [doi]
45. Klonsky ED, Oltmanns TF, Turkheimer E. Informant-Reports of Personality Disorder : Relation to Self- Reports and Future Research Directions. Clin Psychol Sci Pract Published Online First: 2002. doi:10.1093/clipsy.9.3.300
46. Achenbach TM, Krukowski RA, Dumenci L, et al. Assessment of adult psychopathology: Meta-analyses and implications of cross-informant correlations. Psychol Bull Published Online First: 2005. doi:10.1037/0033-2909.131.3.361
47. Pence L, Cano A, Thorn B, et al. Perceived spouse responses to pain: The level of agreement in couple dyads and the role of catastrophizing, marital satisfaction, and depression. J Behav Med Published Online First: 2006. doi:10.1007/s10865-006-9073-4
48. Kong W, Tang D, Luo X, et al. Prediction of Return to Work Outcomes Under an Injured Worker Case Management Program. J Occup Rehabil 2012;**22**:230–40. doi:10.1007/s10926-011-9343-z
49. Sandstrom J, Esbjornsson E. Return to work after rehabilitation. The significance of the patient's own prediction. Scand J Rehabil Med 1986;**18**:29–33.
50. Balswick JO. The Effect of Spouse Companionship Support on Employment Success. J Marriage Fam 1970;32:212.–5.

51. McCluskey S, Brooks J, King N, et al. The influence of 'significant others' on persistent back pain and work participation: A qualitative exploration of illness perceptions. BMC Musculoskelet Disord 2011;12:236. doi:10.1186/1471-2474-12-236
52. Auerbach ES, Richardson P. The long-term work experiences of persons with severe and persistent mental illness. Psychiatr Rehabil J 2005;**28**:267–73. doi:10.2975/28.2005.267.273
53. McCluskey S, de Vries H, Reneman M, et al. 'I think positivity breeds positivity': a qualitative exploration of the role of family members in supporting those with chronic musculoskeletal pain to stay at work. BMC Fam Pract 2015;16:1–7. doi:10.1186/s12875-015-0302-1
54. Svensson T, Müssener U, Alexanderson K. Sickness absence, social relations, and self-esteem: a qualitative study of the importance of relationships with family, workmates, and friends among persons initially long-term sickness absent due to back diagnoses. Work J Prev Assess Rehabil 2010;37:187–97.
55. Gagnon A, Lin J, Stergiou-Kita M. Family members facilitating community re-integration and return to productivity following traumatic brain injury - motivations, roles and challenges. Disabil Rehabil 2016;38:433–41. doi:10.3109/09638288.2015.1044035
56. Rubenson C, Svensson E, Linddahl I, et al. Experiences of returning to work after acquired brain injury. Scand J Occup Ther 2007;14:205–14. doi:10.1080/11038120601110934
57. Dorland HF, Abma FI, Roelen CAM, et al. Factors influencing work functioning after cancer diagnosis: a focus group study with cancer survivors and occupational health professionals. Support Care Cancer 2016;**24**:261–6. doi:10.1007/s00520-015-2764-z
58. Duijts SFA, van Egmond MP, Gits M, et al. Cancer survivors' perspectives and experiences regarding behavioural determinants of return to work and continuation of work. Psychooncology 2016;**25**:23. doi:10.1002/pon.4272
59. Frederiksen P, Karsten MM V, Indahl A, et al. What Challenges Manual Workers' Ability to Cope with Back Pain at Work, and What Influences Their Decision to Call in Sick? J Occup Rehabil 2015;**25**:707–16. doi:10.1007/s10926-015-9578-1
60. Nilsson M, Olsson M, Wennman-Larsen A, et al. Return to work after breast cancer: Women's experiences of encounters with different stakeholders. Eur J Oncol Nurs 2011;15:267–74. doi:10.1016/j.ejon.2011.03.005
61. Tamminga SJ, de Boer AGEM, Verbeek JHAM, et al. Breast cancer survivors' views of factors that influence the return-to-work process--a qualitative study. Scand J Work Environ Health 2012;38:144–54. doi:10.5271/sjweh.3199
62. Main D, Nowels C, Cavender T, et al. A qualitative study of work and work return in cancer survivors. Psychooncology 2005;**14**:992–1004. doi:10.1002/pon.913
63. Rosland A-MM, Heisler M, Piette JD. The impact of family behaviors and communication patterns on chronic illness outcomes: a systematic review. J Behav Med 2012;**35**:221–39. doi:10.1007/s10865-011-9354-4
64. Heijmans M, Ridder D De, Bensing J. Dissimilarity in patients' and spouses' representations of chronic illness: Exploration of relations to patient adaptation. Psychol Health 1999;**14**:451–66. doi:10.1080/08870449908407340
65. Schmaling KB, Smith WR, Buchwald DS. Significant other responses are associated with fatigue and functional status among patients with chronic fatigue syndrome. Psychosom Med 2000;**62**:444–50.http://www.ncbi.nlm.nih.gov/pubmed/10845358

66. Romano JM, Jensen MP, Schmaling KB, et al. Illness behaviors in patients with unexplained chronic fatigue are associated with significant other responses. J Behav Med 2009;**32**:558–69. doi:10.1007/s10865-009-9234-3
67. Petrie KJ, Weinman J. Patients' Perceptions of Their Illness: The Dynamo of Volition in Health Care. Curr Dir Psychol Sci 2012;**21**:60–5. doi:10.1177/0963721411429456
68. Moss-Morris R, Chalder T. Illness perceptions and levels of disability in patients with chronic fatigue syndrome and rheumatoid arthritis. J. Psychosom. Res. 2003;**55**:305–8. doi:10.1016/S0022-3999(03)00013-8
69. Leventhal H, Diefenbach M, Leventhal EA. Illness cognition: Using common sense to understand treatment adherence and affect cognition interactions. Cognit Ther Res 1992;**16**:143–63. doi:10.1007/BF01173486
70. Ockander M, Timpka T, Nyce JM. How to avoid long-term sickness absence: The advice from women with personal experience. Fam Pract 2005;**22**:394–8. doi:10.1093/fampra/cmh725
71. Cremeans-Smith JK, Stephens MAP, Franks MM, et al. Spouses' and physicians' perceptions of pain severity in older women with osteoarthritis: Dyadic agreement and patients' well-being. Pain 2003;**106**:27–34. doi:10.1016/S0304-3959(03)00268-9

Supplementary material

Text S1. Detailed search strategy of the literature

Search history PubMed:
#1 Mesh terms and free text words related to chronic illness
"Chronic Disease"[Mesh] OR "Disabled Persons"[Mesh] OR "Chronic Pain"[Mesh] OR "Diabetes Mellitus"[Mesh] OR "Neoplasms"[Mesh] OR "Fatigue Syndrome, Chronic"[Mesh] OR "Musculoskeletal Diseases"[Mesh] OR "Pulmonary Disease, Chronic Obstructive"[Mesh] OR "Cardiovascular Diseases"[Mesh] OR "Brain Injuries"[Mesh] OR "Back Pain"[Mesh] OR "Depressive Disorder"[Mesh] OR chronic disease[tiab] OR chronic diseases[tiab] OR disabled person[tiab] OR disabled persons[tiab] OR Chronic pain [tiab] OR Chronic fatigue [tiab] OR Diabetes mellitus [tiab] OR Neoplasm [tiab] OR Neoplasms [tiab] OR Cancer [tiab] OR pulmonary disease[tiab] OR pulmonary diseases[tiab] OR COPD [tiab] OR Cardiovascular [tiab] OR Musculoskeletal [tiab] OR back pain [tiab] OR heart disease[tiab] OR heart diseases[tiab] OR brain injuries[tiab] OR brain injury[tiab]

#2 Mesh and free text terms related to work
“Employment” [MESH] OR “sick leave” [MESH] OR employed[tiab] OR employment[tiab] OR Return to work [tiab] OR Back to work [tiab] OR Sickness absence [tiab] OR work disabled[tiab]

#3 Mesh and free text terms related to significant others
“Family”[MESH] OR “Interpersonal relations”[MESH] OR Family [tiab] OR interpersonal relation[tiab] OR interpersonal relations[tiab] OR interpersonal relationship[tiab] OR interpersonal relationships[tiab] OR spouse[tiab] OR Husband [tiab] OR Wife [tiab] OR partner[tiab] OR significant other[tiab] OR significant others[tiab] OR close communities[tiab] OR close community[tiab]

#4 Mesh and free text terms related to significant others’ cognitions, beliefs, attitudes or behaviour
"Communication"[Mesh] OR belief[tiab] OR beliefs[tiab] OR support[tiab] OR supported[tiab] OR attitude[tiab] OR attitudes[tiab] OR cognition[tiab] OR cognitions[tiab]
#1 AND #2 AND #3 AND #4

Search history Embase:
#1 Emtree terms and free text words related to chronic illness
'chronic disease'/exp OR 'disabled person'/exp OR 'chronic pain'/exp OR 'diabetes mellitus'/exp OR 'neoplasm'/exp OR 'chronic fatigue syndrome'/exp OR 'musculoskeletal disease'/exp

OR 'chronic obstructive lung disease'/exp OR 'cardiovascular disease'/exp OR 'brain injury'/exp OR 'backache'/exp OR 'depression'/exp OR ‘Chronic disease’:ti,ab OR ‘Chronic diseases’:ti,ab OR ‘Disabled person’:ti,ab OR ‘Disabled persons’:ti,ab OR ‘Chronic pain’:ti,ab OR ‘Chronic fatigue’:ti,ab OR ‘Diabetes mellitus’:ti,ab OR Neoplasm:ti,ab OR Neoplasms:ti,ab OR Cancer:ti,ab OR ‘Pulmonary disease’:ti,ab OR ‘Pulmonary diseases’:ti,ab OR COPD:ti,ab OR Cardiovascular:ti,ab OR Musculoskeletal:ti,ab OR ‘back pain’:ti,ab OR ‘Heart disease’:ti,ab OR ‘Heart diseases’:ti,ab OR ‘Brain injuries’:ti,ab OR ‘Brain injury’:ti,ab

#2 Emtree terms and free text words related to work
'employment'/exp OR 'medical leave'/exp OR employed:ti,ab OR employment:ti,ab OR 'return to work':ti,ab OR 'back to work':ti,ab OR 'sickness absence':ti,ab OR 'work disabled':ti,ab

#3 Emtree terms and free text words related to significant others
'family'/exp OR 'human relation'/exp OR Family:ti,ab OR ‘interpersonal relation’:ti,ab OR ‘interpersonal relations’:ti,ab OR ‘interpersonal relationship’:ti,ab OR ‘interpersonal relationships’:ti,ab OR spouse:ti,ab OR Husband:ti,ab OR Wife:ti,ab OR partner:ti,ab OR ‘significant other’:ti,ab OR ‘significant others’:ti,ab OR ‘close communities’:ti,ab OR ‘close community’:ti,ab

#4 Emtree terms and free text words related to significant others’ cognitions, beliefs, attitudes or behaviour
'interpersonal communication'/exp OR Belief:ti,ab OR Beliefs:ti,ab OR Support:ti,ab OR Supported:ti,ab OR Attitude:ti,ab OR Attitudes:ti,ab OR cognition:ti,ab OR cognitions:ti,ab

#1 AND #2 AND #3 AND #4

Search history PsycINFO:
#1 Descriptor terms and free text words related to chronic illness
DE "Chronic Illness" OR DE "Disorders" OR DE "Chronic Mental Illness" OR DE "Chronic Fatigue Syndrome" OR DE "Chronic Pain” OR DE "Disabilities" OR DE "Illness Behavior" OR DE "Disabled Personnel" OR DE "Diabetes Mellitus" OR DE "Type 2 Diabetes" OR DE "Diabetes" OR DE "Diabetes Insipidus" OR DE "Neoplasms" OR DE "Musculoskeletal Disorders" OR DE "Physical Disorders" OR DE "Lung Disorders" OR DE "Cardiovascular Disorders" OR DE "Traumatic Brain Injury" OR DE "Back Pain" OR DE "Major Depression" OR DE "Depression (Emotion)" OR TI ”chronic disease” OR AB ”chronic disease” OR TI ”chronic diseases” OR AB ”chronic diseases” OR TI ”disabled person” OR AB ”disabled person” OR TI ”disabled persons” OR AB ”disabled persons” OR TI ”Chronic pain” OR AB

”Chronic pain” OR TI ”Chronic fatigue” OR AB ”Chronic fatigue” OR TI ”Diabetes mellitus” OR AB ”Diabetes mellitus” OR TI ”Neoplasm” OR AB ”Neoplasm” OR TI ”Neoplasms” OR AB ”Neoplasms” OR TI ”Cancer” OR AB ”Cancer” OR TI ”pulmonary disease” OR AB ”pulmonary disease” OR TI ”pulmonary diseases” OR AB ”pulmonary diseases” OR TI ”COPD” OR AB ”COPD” OR TI ”Cardiovascular” OR AB ”Cardiovascular” OR TI ”Musculoskeletal” OR AB ”Musculoskeletal” OR TI ”back pain” OR AB ”back pain” OR TI ”heart disease” OR AB ”heart disease” OR TI ”heart diseases” OR AB ”heart diseases” OR TI ”brain injuries” OR AB ”brain injuries” OR TI ”brain injury” OR AB ”brain injury”

#2 Descriptor terms and free text words related to work
DE "Employment Status" OR DE "Unemployment" OR DE "Employability" OR DE "Reemployment" OR DE "Employee Retention" OR DE "Employee Leave Benefits" OR DE "Employee Benefits" OR TI ”employed” OR AB ”employed” OR TI ”employment” OR AB ”employment” OR TI ”Return to work” OR AB ”Return to work” OR TI ”Back to work” OR AB ”Back to work” OR TI ”Sickness absence” OR AB ”Sickness absence” OR TI ”work disabled” OR AB ”work disabled”

#3 Descriptor terms and free text words related to significant others
DE "Spouses" OR DE "Family" OR DE "Significant Others" OR DE "Family Members" OR DE "Marital Relations" OR DE "Interpersonal Relationships" OR DE "Husbands" OR DE "Wives" OR DE "Spouses"OR TI ”Family” OR AB ”Family” OR TI ”interpersonal relation” OR AB ”interpersonal relation” OR TI ”interpersonal relations” OR AB ”interpersonal relations” OR TI ”interpersonal relationship” OR AB ”interpersonal relationship” OR TI ”interpersonal relationships” OR AB ”interpersonal relationships” OR TI ”spouse” OR AB ”spouse” OR TI ”Husband” OR AB ”Husband” OR TI ”Wife” OR AB ”Wife” OR TI ”partner” OR AB ”partner” OR TI ”significant other” OR AB ”significant other” OR TI ”significant others” OR AB ”significant others” OR TI ”close communities” OR AB ”close communities” OR TI ”close community” OR AB ”close community”

#4 Descriptor terms and free text words related to significant others’ cognitions, beliefs, attitudes or behaviour
DE "Communication" OR DE "Interpersonal Communication" OR DE "Nonverbal Communication" OR TI ”belief” OR AB ”belief” OR TI ”beliefs” OR AB ”beliefs” OR TI ”support” OR AB ”support” OR TI ”supported” OR AB ”supported” OR TI ”attitude” OR AB ”attitude” OR TI ”attitudes” OR AB ”attitudes” OR TI ”cognition” OR AB ”cognition” OR TI ”cognitions” OR AB ”cognitions”

#1 AND #2 AND #3 AND #4

Search history SocINDEX:

#1 Descriptor terms and free text words related to chronic illness
DE "CHRONIC diseases" OR DE "CHRONIC diseases -- Psychological aspects" OR DE "CHRONIC diseases -- Social aspects" OR DE "PEOPLE with disabilities" OR DE "SICK" OR DE "PEOPLE with disabilities -- Employment" OR DE "CHRONIC fatigue syndrome" OR DE "DIABETES" OR DE "CANCER" OR DE "CANCER -- Psychological aspects" OR DE "CANCER -- Social aspects" OR DE "LUNGS -- Cancer" OR DE "HEART diseases" OR DE "PAIN" OR DE "MENTAL depression" OR TI ”chronic disease” OR AB ”chronic disease” OR TI ”chronic diseases” OR AB ”chronic diseases” OR TI ”disabled person” OR AB ”disabled person” OR TI ”disabled persons” OR AB ”disabled persons” OR TI ”Chronic pain” OR AB ”Chronic pain” OR TI ”Chronic fatigue” OR AB ”Chronic fatigue” OR TI ”Diabetes mellitus” OR AB ”Diabetes mellitus” OR TI ”Neoplasm” OR AB ”Neoplasm” OR TI ”Neoplasms” OR AB ”Neoplasms” OR TI ”Cancer” OR AB ”Cancer” OR TI ”pulmonary disease” OR AB ”pulmonary disease” OR TI ”pulmonary diseases” OR AB ”pulmonary diseases” OR TI ”COPD” OR AB ”COPD” OR TI ”Cardiovascular” OR AB ”Cardiovascular” OR TI ”Musculoskeletal” OR AB ”Musculoskeletal” OR TI ”back pain” OR AB ”back pain” OR TI ”heart disease” OR AB ”heart disease” OR TI ”heart diseases” OR AB ”heart diseases” OR TI ”brain injuries” OR AB ”brain injuries” OR TI ”brain injury” OR AB ”brain injury”

#2 Descriptor terms and free text words related to work
DE "EMPLOYMENT (Economic theory)" OR DE "SICK leave" OR DE "ABSENTEEISM (Labor)" OR DE "LEAVE of absence" OR TI ”employed” OR AB ”employed” OR TI ”employment” OR AB ”employment” OR TI ”Return to work” OR AB ”Return to work” OR TI ”Back to work” OR AB ”Back to work” OR TI ”Sickness absence” OR AB ”Sickness absence” OR TI ”work disabled” OR AB ”work disabled”

#3 Descriptor terms and free text words related to significant others
DE "FAMILIES" OR DE "FAMILY relations" OR DE "INTERPERSONAL relations" OR DE "HUSBAND & wife" OR DE "WIVES" OR DE "SPOUSES" OR DE "HUSBANDS" OR TI ”Family” OR AB ”Family” OR TI ”interpersonal relation” OR AB ”interpersonal relation” OR TI ”interpersonal relations” OR AB ”interpersonal relations” OR TI ”interpersonal relationship” OR AB ”interpersonal relationship” OR TI ”interpersonal relationships” OR AB ”interpersonal relationships” OR TI ”spouse” OR AB ”spouse” OR TI ”Husband” OR AB ”Husband” OR TI ”Wife” OR AB ”Wife” OR TI ”partner” OR AB ”partner” OR TI ”significant other” OR AB ”significant other” OR TI ”significant others” OR AB ”significant others” OR TI ”close communities” OR AB ”close communities” OR TI ”close community” OR AB ”close community”

#4 Descriptor terms and free text words related to significant others’ cognitions, beliefs, attitudes or behaviour
DE "COMMUNICATION" OR DE "COGNITION " OR DE "PERCEPTION" OR DE "FAMILY communication" OR TI ”belief” OR AB ”belief” OR TI ”beliefs” OR AB ”beliefs” OR TI ”support” OR AB ”support” OR TI ”supported” OR AB ”supported” OR TI ”attitude” OR AB ”attitude” OR TI ”attitudes” OR AB ”attitudes” OR TI ”cognition” OR AB ”cognition” OR TI ”cognitions” OR AB ”cognitions”

#1 AND #2 AND #3 AND #4

Search history Web of Science:

#1 Topic terms and free text words related to chronic illness
TS="Depressive Disorder" OR TS="Depressive Disorders" OR TS="Depression" OR TS=”chronic disease” OR TS=”chronic diseases” OR TS=”disabled person” OR TS=”disabled persons” OR TS=”Chronic pain” OR TS=”Chronic fatigue” OR TS=”Diabetes mellitus” OR TS=”Neoplasm” OR TS=”Neoplasms” OR TS=”Cancer” OR TS=”pulmonary disease” OR TS=”pulmonary diseases” OR TS=”COPD” OR TS=”Cardiovascular” OR TS=”Musculoskeletal” OR TS=”back pain” OR TS=”heart disease” OR TS=”heart diseases” OR TS=”brain injuries” OR TS=”brain injury”

#2 Topic terms and free text words related to work
TS=“sick leave” OR TS=”employed” OR TS=”employment” OR TS=”Return to work” OR TS=”Back to work” OR TS=”Sickness absence” OR TS=”work disabled”

#3 Topic terms and free text words related to significant others
TS=”Family” OR TS=”interpersonal relation” OR TS=”interpersonal relations” OR TS=”interpersonal relationship” OR TS=”interpersonal relationships” OR TS=”spouse” OR TS=”Husband” OR TS=”Wife” OR TS=”partner” OR TS=”significant other” OR TS=”significant others” OR TS=”close communities” OR TS=”close community”

#4 Topic terms and free text words related to significant others’ cognitions, beliefs, attitudes or behaviour
TS="Communication" OR TS=”belief” OR TS=”beliefs” OR TS=”support” OR TS=”supported” OR TS=”attitude” OR TS=”attitudes” OR TS=”cognition” OR TS=”cognitions”

#1 AND #2 AND #3 AND #4

Table S1. Overview of quality assessment criteria for quantitative studies (from the Effective Public Health Practice Project) [41].

Component	Strong rating	Moderate rating	Weak rating
Selection bias	The study sample was very likely to be representative of the target population and the participation rate was more than 80%	The study sample was somewhat likely to be representative of the target population and the participation rate was 60-79%	All other responses or not stated
Design	Randomized controlled trial or controlled clinical trial	Cohort studies, case control, or an interrupted time series	All other study designs
Confounders	Controlled for at least 80% of confounders	Controlled for 60-79% of confounders	Controlled for less than 60% of confounders, or not stated.
Blinding	Outcome assessor(s) and study participants were blinded to intervention status and/or research question	Blinding of either outcome assessor(s) or study participants	No blinding of either outcome assessor(s) or study participants
Data collection methods	Tools are shown to be valid and reliable	Tools are shown to be valid, but reliability is not described	No evidence of validity or reliability
Withdrawals and dropouts	The follow up rate was more than 80% of participants	The follow up rate was 60-79% of participants	The follow-up rate was less than 60% of participants or withdrawals and dropouts were not described

Table S2. Overview of quality assessment criteria for qualitative studies (derived from Cochrane) [43].

Criteria	Questions for assessment
Credibility	Were techniques used to validate the findings of the study, such as: member checks, verbatim quotes or triangulation, independent analysis of the data by more than one researcher?
Transferability	Were details provided about the setting, context and study sample, such that the readers can evaluate to what extent the research findings are transferable to other settings?
Dependability	Was information provided about the data collection method, saturation, taping and transcribing interviews and analysis procedures, with a self-critical account of the research process?
Confirmability	Were techniques used to assure that findings are qualitatively confirmable, such as: use of an audit trail such that each research stage could be repeated or assessing the effects of the researcher(s) due to background, education, personal experiences, and perspective?

Box S1. Criteria for assessing the level of evidence [42].

Underlying methodology	**Quality rating**
Randomized trials; or double-upgraded observational studies	High
Downgraded randomized trials; or upgraded observational studies	Moderate
Observational studies or double-downgraded randomized trials	Low
Triple-downgraded randomized trials; or downgraded observational studies; or case series/case reports	Very low

Downgrade if

-1 serious risk of bias
-2 very serious risk of bias
-1 serious inconsistency of results
-2 very serious inconsistency of results of unexplained heterogeneity
-1 serious indirectness of evidence
-2 very serious indirectness of evidence
-1 serious imprecision of results
-2 very serious imprecision of results
-1 likely publication bias
-2 very likely publication bias

Upgrade if

+1 large effect (RR/HR > 2 or RR < 0.5 with no plausible confounders)
+2 very large effect (RR/HR > 5 or RR < 0.2 with no major threats to validity)
+1 Presence of a dose-response gradient
+1 All plausible confounding would reduce a demonstrated effect
+1 All plausible confounding would suggest a spurious effect when results show no effect

Definition of level of evidence

High	= we are very confident that the true effect lies close to that of the estimate of the effect
Moderate	= we are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low	= our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect
Very low	= we have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of the effect

Table S3. Characteristics of included qualitative studies.

Author, year (Ref no.) Country	Study design	Aim of the study	Sample	Involved significant other(s)	Work outcome	Identified cognitions or behaviours of significant other(s) [a-c]	Association with work outcome
Auerbach & Richardson 2005 [52] USA, California	Semi-structured interviews.	To investigate the work experiences of individuals with SMI to determine their perspectives on the processes involved in working.	6 participants (4 women) diagnosed with severe and persistent mental illness (SMI), with an age range of 21-60 years. All participants worked in competitive employment for at least 18 months during the previous 3 years.	Peers, family and friends	Job retention	Peers, family and friends encouraging the patient to work[a] Peers, family and friends talking with and giving feedback to the patient[a] Peers, family and friends believing in the patient[a] Peers, family and friends letting the patient know that the illness doesn't identify the patient[a]	+ + + +
McCluskey, de Vries, Reneman, Brooks, and Brouwer 2015 [53] UK & The Netherlands	Semi-structured interviews & open-ended questions. Patients and significant others were interviewed separately.	To examine the extent and nature of support provided by significant others.	62 participants, of whom 31 participants were diagnosed with chronic musculoskeletal pain and 31 participants were a significant other of one of the patients. The mean age of patients was 49.2 years in the UK and 49.0 years in the Netherlands and of the significant others 36.6 years and 50.2 years respectively. All patient participants had managed to stay at work.	Significant other, partner/ spouse	Staying at work	Significant other, partner or spouse helping the patient to cope with the illness by maintaining communication about the pain, listening to the patient and showing understanding[C] Significant other, partner or spouse encouraging the patient to keep active[C] Significant other, partner or spouse supporting the worker in their management of pain by doing joint activities[C] Significant other, partner or spouse maintaining a positive attitude in general[C] Significant other, partner or spouse encouraging a positive outlook in patients[C]	+ + + + +
Frederiksen, Karsten, Indahl,	Three semi-structured	To explore and obtain knowledge	20 participants (5 women) who had	Spouse	Sickness absence	Spouse trying to talk the patient out of going to work[a]	+

Table S3. Characteristics of included qualitative studies (continued).

Author, year (Ref no.) Country	Study design	Aim of the study	Sample	Involved significant other(s)	Work outcome	Identified cognitions or behaviours of significant other(s)[a-c]	Association with work outcome
and Bendix 2015 [59] Denmark	focus group interviews	of factors that challenge/help manual workers to cope with back pain at work, and factors influencing their decision to call in sick.	reported back pain at least once during follow up of an RCT study. Participants had a mean age of 53.5 years (*SD* =7.0). All participants had daily physically demanding work. 3 participants also functioned as a trade union, safety or working environment representative, involving half-day administrative work.		(calling in sick)		
Dorland, Abma, Roelen, Smink, Ranchor, and Bültmann 2016 [57] The Netherlands	Focus group study, with semi-structured interview schedules (three groups).	To explore barriers and facilitators of work functioning from the perspectives of cancer survivors and occupational health professionals.	22 participants (15 women) with various cancer diagnoses; the majority of them hadbreast cancer (*n* = 10). The mean age of participants was 47.2 years (*SD*=7.4). Participants had a high (68%) or medium (32%) level of education, had returned to work within the three years prior to the study and were working at least 12 hours per week.	Family and friends	Work functioning (varying from working without any problems to not working at all)	Family and friends encouraging the cancer survivor to go back to work or to stay at work[a] Family and friends advising against return to work due to concern[a]	+ -

Table S3. Characteristics of included qualitative studies (continued).

Author, year (Ref no.) Country	**Study design**	**Aim of the study**	**Sample**	**Involved significant other(s)**	**Work outcome**	**Identified cognitions or behaviours of significant other(s)** [a-c]	**Association with work outcome**
Brooks, McCluskey, King and Burton 2013 [19] England (UK)	Individual semi-structured interviews.	To explore whether the illness beliefs of significant others differed depending on their relative's working status, and to make some preliminary identification of how significant others may facilitate or hinder work participation for those with persistent back pain.	18 participants, of whom 9 participants diagnosed with non-specific low back pain of at least twelve weeks duration and 9 participants were a significant other of one of the patients. Participants were either working (n = 5) or were not working due to back problems (n = 4). Working patients had a mean age of 49.2 years (range 45-52 years) and patients who were not working had a mean age of 57 years (range 51-63 years).	Spouse (7) child (2)	Ability to remain in employment	Spouse or child emphasizing what the patient could do despite their back problem, rather than what they were unable to do[b]	+
						Spouse or child being involved in negotiating and maintaining necessary concessions at work[b]	+
						Spouse or child highlighting beneficial consequences of employment[b]	+
						Spouse or child rejecting any notion of the patient being disabled by their condition[b]; not seeing the patient as a victim[b]	+
						Spouse or child emphasizing the far-reaching consequences of the back pain[b]; Spouse or child 'catastrophizing' regarding potential rather than actual consequences of the condition[C]	-
						Spouse or child not perceiving the patient as having any rights or recourse to action in the context of his or her previous employment[b]	-
						Spouse or child being resigned to the permanent effects of the patient's back problem on their employment status[b]; Spouse or child considering the patient as 'disabled'[b]	-
						Spouse or child defending the patients by railing against others' lack of understanding of the patient's condition[b]; Spouse or child	-

Table S3. Characteristics of included qualitative studies (continued).

Author, year (Ref no.) Country	Study design	Aim of the study	Sample	Involved significant other(s)	Work outcome	Identified cognitions or behaviours of significant other(s) $^{a-c}$	Association with work outcome
						viewing patients as unfairly stigmatized as potential malingerers^{b}	
						Spouse or child perceiving themselves as lacking in personal control over their –or their significant other's–employment situation^{b}	-
McCluskey, Brooks, King, and Burton 2011 [51] England (UK)	Individual semi-structured interviews (disability benefit claimants and significant others were interviewed separately).	To explore the illness perceptions of individuals with disabling back pain and those of their significant others promoting work participation.	10 participants, of whom 5 participants were disability benefit claimants diagnosed with non-specific back pain and 5 participants were a significant other of one of the claimants. Most claimants were male (*n* = 4) and all significant others were female (*n* = 5). The mean age of the claimants was 41.0 years (ranging from 29 to 54 years).	Spouse, parent or child	Return to work	Spouse or child believing that work caused the illness and the complaints^{b}	-
						Spouse or child believing that return to work will lead to subsequent complaints^{b}	-
						Spouse or child believing that the consequences of the illness on work participation are permanent^{b}	-
						Spouse or child having a sceptical attitude about the availability of suitable work and sympathy from employers^{b}	-
						Spouse or child validating the claimant's statements of incapacity and self-limiting behaviour^{b}	-
						Spouse or child helping the claimant in their everyday lives, with high levels of routine dependency^{b}	-
						Spouse or child having a shared understanding and high degree of empathy with claimants^{b}	-
McCluskey, Brooks, King, and Burton	Individual semi-structured interviews	To explore the wider psychosocial obstacles involved	18 participants, of whom 9 participants were diagnosed with	Spouse, parent or child	Return to work	Spouse or child believing that return to work is dependent on a cure^{b}	-
						Spouse or child waiting for a better	-

Table S3. Characteristics of included qualitative studies (continued).

Author, year (Ref no.) Country	Study design	Aim of the study	Sample	Involved significant other(s)	Work outcome	Identified cognitions or behaviours of significant other(s) $^{a\text{-}c}$	Association with work outcome
2014 [4] England (UK)	(disability benefit claimants and significant others were interviewed separately).	in recovery and continued work participation for individuals with persistent low back pain.	persistent low back pain (5 male) and 9 participants were a significant other of the claimants (6 female). The mean age of the claimants was 48.1 years (ranging from 29 to 63 years) and of the significant others 49.7 years (ranging from 21to 68 years). All claimants were unfit for work for a period ranging from six months to 11 years. With one exception, all claimants had previously worked in unskilled/manual occupations, and none had continued their education past high school.			cure or treatment which would then allow them to return to work[b]	
						Pessimistic attitude of the spouse or child about their relative's condition and their level of control in their relative's recovery and return to work[b]	-
						Spouse or child believing that patients had not yet received a 'correct' diagnosis, and that the 'real' problem remained undiscovered and therefore untreated, and that this required further medical investigations before being able to return to work[b]	-
Duijts, van Egmond, Gits, van der Beek, and Bleiker 2016 [58] The Netherlands	Semi-structured one-to-one telephone interviews. A face-to-face interview only if more convenient for	To explore the perspectives and experiences of cancer survivors regarding behavioural determinants of RTW and	28 participants (14 women) diagnosed with breast, colorectal or head or neck cancer one to two years prior to the study. The mean age of the participants was 52 years (range:	Family and friends	Return to work	Family and friends pressuring the patient not to return to work, to take it easy for a while[a]	-

Table S3. Characteristics of included qualitative studie (continued).

Author, year (Ref no.) Country	**Study design**	**Aim of the study**	**Sample**	**Involved significant other(s)**	**Work outcome**	**Identified cognitions or behaviours of significant other(s)** $^{a-c}$	**Association with work outcome**
	the participant	continuation of work	28–62 years). Participants had either returned to work (68%) or were not working (32%). The majority had an upper vocational or university level of education (54%).				
Main, Nowels, Cavender, Etschmaier, and Steiner 2005 [62] USA	Semi-structured face-to-face interviews	To describe work issues and work return among a diverse group of cancer survivors who were working at the time of diagnosis and to explore factors influencing decisions about work and work return and describe the work experiences of these survivors after cancer diagnosis and treatment.	28 participants (14 women) diagnosed with various types of cancer with a mean age of 42.6 years (ranging from 24 to 63 years). All participants were working in a paid job prior to the cancer diagnosis.	Family and friends	Return to work	Family and friends encouraging the patient to work^{a}	+
Nilsson, Olsson, Wennman-Larsen, Petersson, and	Focus group study with an interview guide	To gain knowledge about women's experiences of	23 female participants diagnosed with breast cancer with a mean	Family and friends	Return to work	Practical support from family and friends (e.g. transportation)^{a}	+

Table S3. Characteristics of included qualitative studies (continued).

Author, year (Ref no.) Country	**Study design**	**Aim of the study**	**Sample**	**Involved significant other(s)**	**Work outcome**	**Identified cognitions or behaviours of significant other(s)** [a-c]	**Association with work outcome**
Alexanderson 2011 [60] Sweden		encounters with stakeholders regarding RTW during and after breast cancer trajectory.	age of 53 years (ranging from 37 to 62 years). All participants worked prior to diagnosis.			Friends with personal experience of cancer sharing information about possible cognitive problems and rehabilitation options[a] Family and friends expressing positive attitudes towards sickness absence (e.g. encouraging or pressuring the patient to refrain from work)[a]	+ -
Rubenson, Svensson, Linddahl, and Bjorklund 2007 [56] Sweden	Individual semi-structured interviews.	To explore the experiences of returning to work after rehabilitation from the viewpoint of people with acquired brain injury.	8 participants (3 women) diagnosed with acquired brain injury, with a mean age of 39 years (ranging from 23 to 63 years). All participants had professions within the areas of health- and medical care, computer business/ information technology, transport, forwarding, marketing, production and management, pedagogies, and technical work.	Family and relatives	Return to work	Family and relatives showing understanding for the patient's situation[a] Family and relatives providing practical help (taking greater responsibility for the housework, providing transportation)[a] Family and relatives showing an exaggerated protective attitude[a]	+ + -
Svensson, Müssener, and Alexanderson 2010 [54] Sweden	Focus group interviews.	To explore and analyse participants' accounts of social interactions and relationships with	18 participants (13 women) diagnosed with back, neck or shoulder pain, ranging in age from 25 to 34 years. Participants	Family	Return to work (through self-evaluation and self-esteem)	Family members' encouraging and supporting attitude towards the situation as well as the patient's coping[a] Practical help in the household from the spouse and family members[a]	+ +

Table S3. Characteristics of included qualitative studies (continued).

Author, year (Ref no.) Country	Study design	Aim of the study	Sample	Involved significant other(s)	Work outcome	Identified cognitions or behaviours of significant other(s) [a-c]	Association with work outcome
		family, workmates, and friends that seemed to involve positive and negative self-evaluative aspects, and therefore may be important to self-conception and self-esteem, and possibly to return to work.	either had a low level of sickness absence (an annual sick leave of 60 days or less) or a high level of sickness absence (an annual sick leave of 60 days or more).			Negative attitude of the spouse towards the patient (thinking of the patient as a nuisance)[a] Negative attitudes of close relatives towards the patient[a] Close relatives mistrusting the severity of the patients problems[a]	- - -
Tamminga, de Boer, Verbeek, and Frings-Dresen 2012 [61] The Netherlands	Semi-structured interviews.	Identifying factors that have been experienced as barriers to or facilitators of the initial and post RTW processes.	12 female participants diagnosed with breast cancer, with a mean age of 42 (*SD* = 7, age ranging from 31 to 51 years). All participants were working at the time of diagnosis.	Friends and family	Return to work	Friends and family providing practical support[a] Friends and family encouraging the patient (to return to work)[a] Friends and family enabling discussion about return to work[a]	+ + +
Tan, Loh, Su, Veloo, and Ng 2012 [10] Malaysia	Focus groups.	To explore the perception of barriers and facilitators to return to work, in a group of multi-ethnic women with breast cancer.	40 female participants diagnosed with stage 1-3 breast cancer. Participants had either returned to work or not. The age range for participants who had returned to work was 21 to 54 years and for	Family, husband, spouse, children	Return to work	Family members (e.g. husband, spouse, children) encouraging the patient to return to work[a] Family members (e.g. husband, spouse, children) restricting the patient to return to work[a]	+ -

Table S3. Characteristics of included qualitative studies (continued).

Author, year (Ref no.) Country	**Study design**	**Aim of the study**	**Sample**	**Involved significant other(s)**	**Work outcome**	**Identified cognitions or behaviours of significant other(s)** [a-c]	**Association with work outcome**
			participants who had not returned to work 40-58 years.				
Gagnon, Lin, and Stergiou-Kita 2016 [55] Canada	In-depth semi-structured in-person or telephone interviews with family members of traumatic brain injury survivors.	To gain an in-depth understanding of the experiences of immediate adult family members when supporting traumatic brain injury survivors' return to productive occupations.	14 immediate adult family members (10 women) of patients diagnosed with traumatic brain injury (TBI). Participants had a mean age of 51 (age ranging from 25 to 60 years).	Parents (6), spouses (7) and siblings (1)	Return to productive occupations (meaningful activities, school and community activities, volunteer work and paid part- or full-time employment)	Family members educating others regarding the implications of TBI to promote acceptance of the patient in community and work contexts[b]	+
						Family members exploring social, community, rehabilitation services and resources that could benefit the patient; searching and locating information regarding the diagnosis, prognosis, functional implications and relevant treatments; Family members collecting the necessary information to prepare themselves for future expectations and to adapt to the changes they were experiencing[b]	+
						Family members endorsing survivors' rights to medical and therapy services, access to community resources, and awareness of implications of the illness in the community[b]	+
						Family members engaging in logistical tasks (e.g. coordinating appointments, planning ahead for services, accessing resources, initiating and maintaining contact with the health care team)[b]	+
						Family members initiating leisure or therapeutic activities[b]	+

Table S3. Characteristics of included qualitative studies (continued).

Author, year (Ref no.) Country	**Study design**	**Aim of the study**	**Sample**	**Involved significant other(s)**	**Work outcome**	**Identified cognitions or behaviours of significant other(s)** [a-c]	**Association with work outcome**
						Family members providing personal advice and guidance in relation to future planning[b]	+
						Active listening, empathizing with the patient's position, empowering and motivating them to return to their activities of choice by family members[b]	+
						Family members encouraging and motivating the patient to return to their activities of choice[b]	+
						Family members keeping it upbeat and positive[b]	+
						Family members assisting the patient with their daily activities (e.g. cooking, transportation and toileting)[b]	+

[a] = reported by individuals with a chronic disease
[b] = reported by SOs
[c] = reported by individuals with a chronic disease and SOs

+ = facilitator for studied work outcome
- = barrier for studied work outcome

Chapter 3

The associations between illness perceptions and expectations about return to work of workers with chronic diseases and their significant others: a dyadic analysis

Nicole Snippen, Haitze de Vries, Corné Roelen, Sandra Brouwer,

Mariët Hagedoorn

Journal of Occupational Rehabilitation, 2022, DOI: 10.1007/s10926-022-10062-7

Abstract

Purpose: To examine the associations between illness perceptions and expectations about full return to work (RTW) of workers with chronic diseases and their significant others.

Methods: This study used cross-sectional data of 94 dyads consisting of workers with chronic diseases and their significant others. We performed dyadic analyses based on the Actor-Partner Interdependence Model (APIM), estimating associations of illness perceptions of the two members of the dyad with their own expectations about the worker's full RTW within six months (actor effect) as well as with the other dyad member's expectations about the worker's RTW (partner effect).

Results: Illness perceptions of one dyad member were significantly associated with his or her own RTW expectations (actor effect composite illness perceptions score; $B = -0.05$, $p < .001$; $r_d = .37$) and with the other dyad member's RTW expectations (partner effect composite illness perceptions score; $B = -0.04$, $p < .001$; $r_d = .35$). That is, more negative illness perceptions of one member of the dyad were associated with more negative RTW expectations in both dyad members. For most illness perception domains, we found small to moderate actor and partner effects on RTW expectations (r_d range: .23–.44).

Conclusions: This study suggests that illness perceptions and RTW expectations should be considered at a dyadic level as workers and their significant others influence each other's beliefs. When trying to facilitate adaptive illness perceptions and RTW expectations, involving significant others may be more effective than an individualistic approach targeted at the worker only.

Introduction

Workers with chronic diseases are at higher risk of involuntary early labor market exit because of work disability and unemployment as compared to workers without a chronic disease [1,2]. In recent years, increasing attention has been paid to the role of illness perceptions in the context of work participation of workers with chronic diseases [3–7]. Previous research has shown that negative perceptions of workers concerning the duration, consequences, emotional impact, treatment efficacy, personal control and understanding of the illness are associated with increased risks of involuntary early labor market exit across various chronic health conditions [3,5–7]. In addition, illness perceptions of workers have been shown to be strongly related to expectations about return to work (RTW) [4], which is one of the strongest prognostic factors of work-related outcomes like RTW, duration of sick leave and disability benefit receipt [7–14].

There is increasing evidence that significant others like partners, family members or friends affect an individual's illness perceptions, adaptation to chronic illness and work participation through their interactions with the person with the disease [15–18]. Rather than illness perceptions being developed in isolation, the perceptions of individuals with chronic diseases and their significant others are connected [15]. It has therefore been proposed that coping and adaptation to chronic disease should be viewed from a dyadic perspective, in which the significant other's appraisals, responses and interactions with the person with the chronic disease are also taken into account [17–21]. There is already some evidence that illness perceptions and RTW expectations of both workers and their significant others might play an important role in work participation outcomes of workers with persistent back pain [22,23]. For instance, one study suggests that pessimistic beliefs about the likelihood of RTW of disability benefit claimants and their significant others may act as obstacles to work participation [23]. Another study found that couples in which the worker had become incapacitated for work had more negative perceptions about the consequences of the worker's persistent back pain than couples in which the worker had remained in work despite persistent back pain [22]. However, the current level of evidence is low as the existing evidence is based on qualitative studies with relatively small study samples and quantitative knowledge on this topic is lacking. Moreover, to date the associations between illness perceptions and RTW expectations among workers with chronic diseases and their significant others has not been examined dyadically.

Gaining insight into effects of illness perceptions of workers and significant others on their RTW expectations could provide evidence-based recommendations regarding intrapersonal and interpersonal factors that can be targeted to modify RTW expectations in order to facilitate RTW [7–14]. Therefore, the aim of this study was to examine the associations between illness perceptions and RTW expectations of workers with chronic diseases and their significant others at a dyadic level. More specifically, we examined the associations of both the worker's and his/her significant other's illness perceptions with (i) a person's own RTW expectations, and (ii) the other dyad member's RTW expectations.

Method

Study design

This study used cross-sectional data of dyads consisting of workers and their significant others, which was collected for the purpose of this study and subjected to dyadic analysis [24].

Participants and inclusion criteria

We included dyads consisting of workers who had been on sick leave due to a chronic health condition for at least two weeks, and one of their significant others (i.e., partner, family member or friend). To be eligible for participation, workers had to be between 18 and 65 years of age, be or recently have been on sick leave due to chronic health problems, and have a significant other who was willing to participate in the study (self-chosen by the worker). In addition, participants had to be proficient in written Dutch. Furthermore, the source population consisted of employees only, with self-employed workers falling beyond this population. The inclusion period lasted from June 2019 until September 2020.

Procedure

We recruited participants through Arbo Unie, a large Dutch occupational health service (OHS). In the Netherlands, the OHS advises sick-listed workers and their employers about RTW. For this purpose, sick-listed workers are invited for a consultation with an occupational health physician within six weeks after the first registered day of sick leave. During the 15-month inclusion period, an extra paragraph was added to the invitation for this consultation, informing workers and their significant others about this study. In the added paragraph, a link was included to a dedicated webpage with more detailed study information and the online questionnaires for both the worker and significant other.

At the start of the questionnaire, participants were screened for eligibility and asked to give informed consent. Participants who did not meet the inclusion criteria or did not give informed consent were excluded and automatically directed to the end of the questionnaire. To minimize attrition due to missing values, automatic response requests were used to alert participants about any unanswered questions when moving to another page of the questionnaire.

The Central Ethics Review Board of the University Medical Center Groningen approved the study protocol (CTc UMCG 201700925). Participants received written information regarding the confidentiality and anonymity of the study results and were given an opportunity to ask questions. Informed consent was obtained from all participants.

Measures

Workers and significant others individually completed a questionnaire that measured expectations about the worker's RTW, illness perceptions and sociodemographic characteristics.

Primary outcome

The primary outcome measure was expectations about the worker's full RTW within six months, based on the 'self-predicted certainty question' of Heymans et al. [8]: "How certain are you that you will be fully back at work in six months?". Workers answered the question on a 5-point scale: (1) "completely uncertain", (2) "a little uncertain", (3) "somewhat certain", (4) "certain", (5) "completely certain". Full RTW was defined as working the contracted working hours [8]. Significant others answered the question "How certain are you that the worker will be fully back at work in six months?" on the same 5-point scale.

Illness perceptions

We measured illness perceptions of workers and significant others with respectively the Dutch version of the Brief Illness Perception Questionnaire (IPQ-B) [25,26] and a significant other version of the IPQ-B, which was adapted from the spouse version of the IPQ-R [27]. In this study, we used the first eight items of the IPQ-B which were measured on a 11-point scale (ranging from zero to ten). The eight items assessed the worker's and significant other's illness perceptions about: (1) the influence of the illness on the worker's daily life (consequences), (2) the duration of the illness (illness duration), (3) the worker's control over the illness (personal control), (4) the extent to which treatment can help with controlling the illness (treatment control), (5) the severity of the symptoms experienced by the worker (illness identity), (6) the worker's concern about the illness (concern), (7) the worker's emotional response to the illness (emotional response), and (8) the worker's degree of understanding of the illness (illness coherence).

Higher scores on consequences, illness duration, illness identity, concern, and emotional response reflected more negative perceptions, while higher scores on personal control, treatment control, and illness coherence reflected more positive perceptions. A composite illness perceptions score was computed by summing up the scores of the eight items, with a reverse scoring of the items on personal control, treatment control and illness coherence. For this composite score, we person-mean imputed data for participants with missing data on no more than three items. A higher composite score reflected more negative perceptions. The Cronbach's alpha of the IPQ-B composite score in this study was .71 for workers and .74 for significant others, which is similar to what was found in previous research [28–31].

Covariates

Sociodemographic measures and data about workers' and significant others' perceived relationship quality was collected to describe the sample and potentially include as covariates. With regard to sociodemographic measures, we collected data about the workers' age, gender, educational level (low, medium, or high), type of chronic disease (somatic, mental, mixed), and employment status (fulltime vs. parttime). In addition, data was collected about the significant others' age, gender, educational level, chronic disease (yes/no), and their relationship with the worker (i.e., partner, parent, adult child, sibling, friend). Finally, we collected data from both workers and significant others about their perceived relationship quality with the other dyad member, using a relationship quality rating scale from 0 through 10, with zero representing the worst possible and ten the best possible relationship [32].

Preliminary analyses

Preliminary analyses were performed to ensure that there was no violation of the assumptions of normality and homogeneity of variance. In addition, we conducted a series of preliminary analyses to examine associations between demographic characteristics and the outcome variables (i.e., RTW expectations) to assess the need to include covariates in the analyses. Significant others' age was significantly associated with their own expectations of the worker's RTW (r = -.329, p = .001). Gender, educational level, type of chronic disease, employment status, type of relationship with the other dyad member, and perceived relationship quality were not associated with dyad members' RTW expectations.

Dyadic analyses

In preparation for the analyses, data was formatted in a pairwise structure in SPSS version 26 using the individual-to-pairwise macro from Kenny [33] and the predictor variables were grand-mean centered in accordance with the recommendations from Kenny et al [24].

We performed dyadic analyses using the Actor-Partner Interdependence Model (APIM) [24] to determine dyadic associations between illness perceptions of workers and significant others (i.e., independent variable) and their expectations about the worker's full RTW within six months (i.e., outcome variable). Interdependence means that the responses from the two individuals within a dyad are linked (i.e., non-independent). APIM analysis allows researchers to model the non-independence in the two dyad members' responses by measuring the associations between their scores, as well as their intrapersonal (i.e., actor) effects and interpersonal (i.e., partner) effects [34]. Thus, in this study, worker and significant other expectations about the worker's full RTW within six months were regressed on their own illness perceptions (i.e., actor effect) as well as on their counterpart's illness perceptions (i.e., partner effect). Figure 1 displays the APIM framework applied to this study. We ran separate analyses for the composite illness perceptions score and each of the eight illness perception domains.

The analyses consisted of four steps, in which the two-intercept method of Multilevel Modeling was applied [24,35]. In the first step the full APIM was estimated. To increase statistical power and simplify the models, we tested for differences in coefficients between dyad members (step 2) and, when appropriate, tested more parsimonious models in which intercepts, actor effects and partner effects that did not differ between workers and significant others were constrained to be equal for dyad members (step 3). Finally, in the fourth step, correlation coefficient effect sizes (r_d) were estimated for the statistically significant effects in the final models. Each of the four analyses steps is described in more detail below. Furthermore, an example syntax for the first three steps is provided in Online Resource 1.

Step 1: Estimating the full APIM

In the first step, the full APIM was estimated including an intercept, actor effect and partner effect for each dyad member (i.e., the estimated model included two intercepts, two actor effects and two partner effects). A total of nine APIMs were conducted to test whether illness perceptions of workers and significant others were significantly associated with a dyad member's own expectations about the worker's RTW (actor effect) and the other member's RTW expectations (partner effect). To account for the interdependence between dyad members' scores, the actor and partner effects were estimated simultaneously and the correlations of dyad members' predictor and outcome variables, respectively, were also modeled. The models controlled for workers' and significant others' age.

Step 2: Testing for differences between dyad members

In the second step, contrast analyses were used to examine whether there were statistically meaningful differences between dyad members in the estimated intercepts, actor effects and partner effects. More specifically, we tested whether the intercepts, actor effects and partner effects significantly differed between workers and significant others (i.e., to examine whether actor effects and partner effects were stronger for one of the dyad members) or whether they could be considered to be equal for both dyad members. The findings of this step were used to develop more parsimonious models in step 3.

Step 3: Estimating average intercepts and effects across dyad members

Based on the results obtained in the second step, in the third step, we tested more parsimonious models in which, when appropriate, the intercepts, actor effects and partner effects were constrained to be equal for dyad members. In addition to developing more parsimonious models with fewer beta coefficients, an important advantage of constraining the coefficients to be equal for dyad members is an increase in statistical power as the scores of both dyad members are used to estimate average beta coefficients (i.e., the number of observations used for each beta coefficient is doubled). We therefore estimated average beta coefficients across dyad members for the intercepts, actor effects and partner effects that could be considered to be equal for workers and significant others, and tested whether the average actor effects and partner effects were significantly associated with RTW expectations. The intercepts, actor effects and partner effects that were statistically different between workers and significant others (step two) remained as separate beta coefficients in the models. The final models could therefore include separate coefficients for workers and significant others, average coefficients or a combination of separate and average coefficients.

Step 4: Estimating correlation coefficient effect sizes

Finally, in the fourth step, we estimated correlation coefficient effect sizes (r_d) for the statistically significant actor and partner effects in the final models [24]. Following the recommendations of Kenny et al. [24], we adjusted the effect sizes for the independent variables of which the scores of workers and significant others were strongly correlated (i.e., >.5 or <-.5) to take into account the non-independence within dyads, and otherwise used the unadjusted effect sizes. We refer to the book of Kenny et al. [24] for more detailed information about determining the effect sizes in APIM analyses. Following the guidelines of Cohen [36], effects sizes of $r_d = .1$, $r_d = .3$, and $r_d = .5$ were considered to be small, medium and large in magnitudes, respectively.

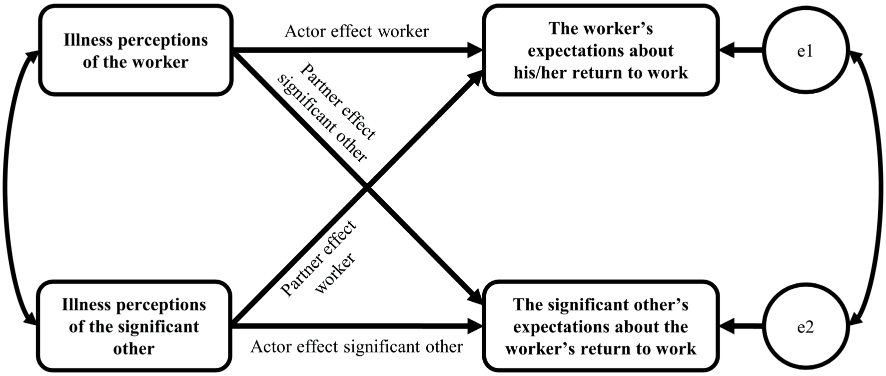


Figure 1. Actor-Partner Interdependence Model applied to this study.

Results

A total of 166 workers completed the questionnaire. Workers for whom there was no data available from a significant other were excluded from the analyses ($n = 72$). The final study sample consisted of 94 dyads of workers (56.6%) and their significant others. There were no statistically significant differences between included and excluded workers with regard to age, gender, educational level, type of disease, comorbid conditions, perceived relationship quality, illness perceptions and RTW expectations. The mean age of included workers was

53.7 years (*SD* = 9.9, range: 25–65 years). A small majority of workers was male (55.3%) and had a low or medium level of education (53.2%). Most workers (80.9%) indicated to have a somatic disease, particularly musculoskeletal disorders (47.9%), cardiovascular disease (19.1%), neurological conditions (17.0%), and respiratory disease (14.9%). Furthermore, 36.2% of the workers had a mental illness, and almost half of the workers (44.7%) had comorbid conditions. The mean age of significant others was 52.6 years (*SD* = 13.4, range: 20-96 years), the majority was the partner or spouse of the worker (88.3%) (Table 1).

Representativeness of the study sample

There was no data available on the number and characteristics of sick-listed workers who received the invitation but decided not to participate in this study. However, we were able to compare our sample with a large and representative cohort from Arbo Unie consisting of 3,729 workers with a chronic disease who were sick-listed between January 2020 and September 2021. The mean age of workers was considerably higher in our study (53.7 years, *SD* = 9.9) than in the larger cohort (40.4 years, *SD* = 15.9). Furthermore, compared to workers in that cohort, a higher percentage of workers in our study sample was male (55.3% vs. 33.6%), had a musculoskeletal disorder (47.9% vs. 34.5%) or a mental illness (36.2% vs. 24.4%).

Correlations

The correlation coefficients of all variables are depicted in Table 2. We found strong correlations between workers' and significant others' composite illness perceptions scores ($r = .64$) and their expectations about the worker's RTW ($r = .77$). While most of the correlations between their scores on the illness perception domains were moderate to strong ($r \geq .41$), there were weak correlations between workers and significant others for the domains *illness identity* ($r = .28$) and *illness coherence* ($r = .21$). Workers' and significant others' composite illness perceptions scores and scores on the domains *consequences*, *timeline*, *treatment control*, and *concern* were significantly associated with both their own and the other dyad member's certainty that the worker would be fully back at work in six months ($r \leq -.27$ or $r \geq .34$).

Table 1. Participant characteristics (*N* = 94 dyads).

Characteristic	Workers		Significant others	
Age in years (*SD*)	53.7	(9.9)	52.6	(13.4)
Gender				
Male	52	(55.3%)	39	(41.5%)
Female	42	(44.7%)	55	(58.5%)
Educational level				
Low	17	(18.1%)	19	(20.2%)
Medium	33	(35.1%)	44	(46.8%)
High	43	(45.7%)	30	(31.9%)
Missing	1	(1.1%)	1	(1.1%)
Relation to worker				
Partner/spouse	-		83	(88.3%)
Parent	-		5	(5.3%)
Adult child	-		4	(4.3%)
Sibling	-		1	(1.1%)
Friend	-		1	(1.1%)
Relationship quality, mean (range)	8.7	(6-10)	8.6	(5-10)
Type of chronic disease				
Somatic	59	(62.8%)	37	(39.4%)
Mental	17	(18.1%)	5	(5.3%)
Mixed	17	(18.1%)	6	(6.4%)
None	-		45	(47.9%)
Missing	1	(1.1%)	1	(1.1%)
Number of chronic diseases				
0	-		45	(47.9%)
1	51	(54.3%)	27	(28.7%)
>1	42	(44.7%)	21	(22.3%)
Missing	1	(1.1%)	1	(1.1%)
Employment status				
Fulltime (≥ 36 hours per week)	59	(62.8%)	26	(27.7%)
Part-time (12 – 35 hours per week)	35	(37.2%)	38	(40.4%)
Not employed (< 12 hours per week)	-		29	(30.9%)
Missing	-		1	(1.1%)
Mean scores (*SD*)				
RTW expectations (scale 1-5)	3.0	(1.3)	3.0	(1.4)
Composite illness perceptions score (scale 0-80)	48.7	(10.2)	46.4	(10.5)
Consequences (scale 1-10)	7.7	(2.0)	7.4	(2.0)
Timeline (scale 0-10)	6.2	(3.0)	6.0	(3.0)
Personal control (scale 0-10)	4.1	(2.4)	4.8	(2.7)
Treatment control (scale 0-10)	6.8	(2.1)	7.3	(2.4)
Illness identity (scale 0-10)	7.6	(1.8)	7.2	(1.9)
Concern (scale 0-10)	6.5	(2.5)	7.0	(2.2)
Illness coherence (scale 0-10)	7.3	(2.4)	8.0	(2.0)
Emotional response (scale 0-10)	6.7	(2.4)	6.6	(2.5)

SD = standard deviation

Table 2. Intercorrelations of worker and significant other illness perceptions and RTW expectations (condensed table).

	Composite illness perceptions score	Consequences	Timeline	Personal control	Treatment control	Illness identity	Concern	Illness coherence	Emotional response	RTW expectations of significant others[b]	RTW expectations of workers[b]
Composite illness perceptions score	.64**	.78**	.55**	-.54**	-.39**	.59**	.72**	-.28**	.69**	-.48**	-.50**
Consequences	.67**	.48**	.41**	-.33**	-.18	.53**	.59**	-.09	.47**	-.43**	-.30**
Timeline	.63**	.27*	.73**	-.11	-.22*	.21*	.26*	.03	.07	-.44**	-.46**
Personal control	-.42**	-.31**	-.13	.41**	.44**	-.33**	-.18	.11	-.28**	.41**	.38**
Treatment control	-.34**	-.05	-.22*	.25*	.62**	-.01	.00	.09	-.08	.37**	.37**
Illness identity	.58**	.67**	.26*	-.19	.04	.28**	.53**	.11	.34**	-.21*	-.15
Concern	.76**	.55**	.46**	-.18	.00	.43**	.47**	-.02	.67**	-.27**	-.31**
Illness coherence	-.34**	.04	-.04	.17	.27**	.15	-.149	.24*	-.25*	-.10	-.09
Emotional response	.66**	.40**	.21*	-.06	.01	.42**	.51**	-.14	.58**	-.14	-.21*
RTW expectations of workers[a]	-.60**	-.44**	-.51**	.19	.39**	-.32**	-.44**	.05	-.15	.77**	1
RTW expectations of significant others[a]	-.57**	-.46**	-.45**	.14	.34**	-.40**	-.48**	.09	-.27**	1	.77**

Correlations among workers are below the diagonal; correlations among significant others are above the diagonal; the diagonal depicts the correlations between workers and significant others. * $p < .05$; ** $p < .01$. [a]Correlations with illness perceptions of workers; [b]Correlations with illness perceptions of significant others; RTW = return to work.

Actor and partner effects

An overview of the two-intercept models and the final models including effect sizes (r_d) for all statistically significant actor and partner effects is provided in Table 3.

Composite illness perceptions score

Both actor and partner effects of illness perceptions on expectations about the worker's RTW were identified in the two-intercept model. Contrast analysis showed that there were no statistically significant differences between workers and significant others with regard to the intercepts, actor effects and partner effects. The average actor effect (B = -0.05, SD = 0.01, $t(168)$ = -5.80, p < .001) and average partner effect (B = -0.04, SD = 0.01, $t(171)$ = -5.58, p < .001) were both significantly associated with RTW expectations of workers and significant others. In other words, the illness perceptions of workers and significant others were significantly associated with a dyad member's own RTW expectations, as well as with the expectations of the other dyad member. In this context, more negative illness perceptions were related to more negative expectations about the worker's RTW. The effect sizes for the actor and partner effects were .37 and .35 respectively, reflecting medium sized effects. The final model is shown in Figure 2.

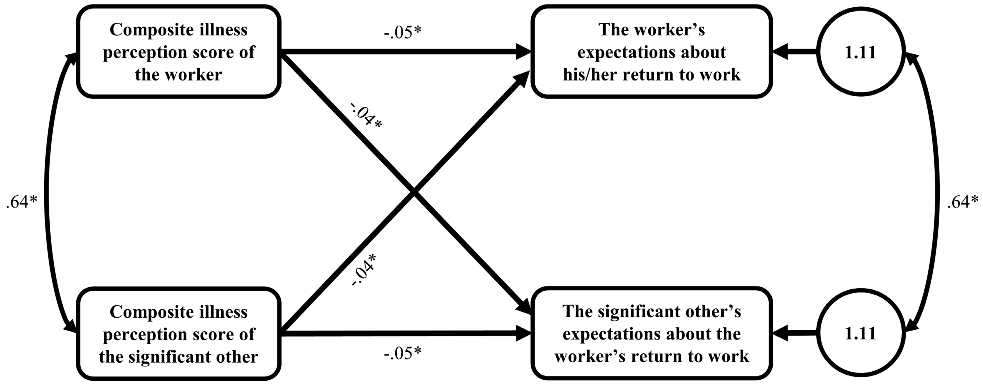


Figure 2. Final Actor-Partner Interdependence model with beta coefficients for the association between the illness perceptions score and expectations about the worker's full RTW. * p < .05. As there were no statistically significant differences in effects between workers and significant others, the average actor and partner effects were estimated in the final model.

Domains of illness perceptions

For most illness perception domains, we found small to moderate actor effects and partner effects on RTW expectations (r_d range: .23–.44). For the domain *personal control of the worker*, only perceptions of significant others were significantly associated with expectations of workers (B = 0.19, SD = 0.05, $t(87)$ = 3.61, p = .001) and significant others (B = 0.22, SD

= 0.05, *t*(91) = 4.41, *p* < .001) about the worker's RTW. For the domain *emotional response*, only a partner effect was found (*B* = -0.12, *SD* = 0.04, *t*(153) = -3.24, *p* = .001). There were no significant effects of dyad members' perceptions about the worker's *illness coherence* on expectations about RTW of the worker.

Table 3. Associations between illness perceptions and RTW expectations among dyads of workers and their significant others.

	Two-intercept model[a]					**Final model**[b]				
	B	SD	t	Sig.		B	SD	t	Sig.	r_d
Composite illness perceptions score (*N* = 94)										
Intercept worker	3.14	0.12	27.16	< .001**	Intercept	3.10	0.10	29.81	< .001**	
Intercept significant other	3.08	0.12	25.83	< .001**	Actor effect	-0.05	0.01	-5.80	< .001**	.37[c]
Actor effect worker	-0.06	0.01	-4.43	< .001**	Partner effect	-0.04	0.01	-5.58	< .001**	.35[c]
Actor effect significant other	-0.03	0.01	-1.74	.084						
Partner effect worker	-0.03	0.01	-2.03	.046*						
Partner effect significant other	-0.06	0.01	-4.02	< .001**						
Consequences (*N* = 94)										
Intercept worker	3.13	0.13	24.94	< .001**	Intercept	3.08	0.11	26.82	< .001**	
Intercept significant other	3.05	0.12	24.66	< .001**	Actor effect	-0.25	0.04	-5.92	< .001**	.43
Actor effect worker	-0.29	0.07	-3.96	< .001**	Partner effect	-0.16	0.04	-3.79	< .001**	.29
Actor effect significant other	-0.18	0.07	-2.63	.010*						
Partner effect worker	-0.11	0.07	-1.54	.127						
Partner effect significant other	-0.23	0.07	-3.18	.002*						
Illness duration (*N* = 92)										
Intercept worker	3.08	0.12	25.24	< .001**	Intercept	3.06	0.11	26.78	< .001**	
Intercept significant other	3.05	0.13	24.08	< .001**	Actor effect	-0.13	0.03	-4.26	< .001**	.29[c]
Actor effect worker	-0.16	0.06	-2.66	.010*	Partner effect	-0.11	0.03	-3.74	< .001*	.26[c]
Actor effect significant other	-0.11	0.06	-1.85	.067						
Partner effect worker	-0.08	0.06	-1.44	.155						
Partner effect significant other	-0.12	0.06	-1.85	.067						
Personal control of the worker (*N* = 94)										
Intercept worker	3.02	0.13	22.42	< .001**	Intercept	2.98	0.12	24.13	< .001**	

Table 3. Associations between illness perceptions and RTW expectations among dyads of workers and their significant others (continued).

	Two-intercept model^{a}					**Final model**^{b}				
	B	SD	t	Sig.		B	SD	t	Sig.	r_d
Intercept significant other	2.95	0.13	21.99	< .001**	Actor effect worker	0.03	0.06	0.42	.673	ns
Actor effect worker	0.02	0.06	0.30	.767	Actor effect significant other	0.22	0.05	4.41	< .001**	.44
Actor effect significant other	0.22	0.05	4.12	< .001**	Partner effect worker	0.19	0.05	3.61	.001**	.37
Partner effect worker	0.19	0.05	3.61	.001*	Partner effect significant other	-0.02	0.06	-0.33	.746	ns
Partner effect significant other	-0.02	0.06	-0.35	.728						
Treatment control (*N* = 94)										
Intercept worker	3.09	0.13	23.47	< .001**	Intercept	3.06	0.12	24.97	< .001**	
Intercept significant other	3.04	0.13	22.56	< .001**	Actor effect	0.15	0.04	3.82	< .001**	.26^{c}
Actor effect worker	0.16	0.08	2.13	.036*	Partner effect	0.13	0.04	3.38	.001**	.23^{c}
Actor effect significant other	0.15	0.07	2.08	.040*						
Partner effect worker	0.12	0.07	1.76	.082						
Partner effect significant other	0.11	0.08	1.43	.157						
Illness identity (*N* = 94)										
Intercept worker	3.13	0.14	23.05	< .001**	Intercept	3.10	0.12	24.85	< .001**	
Intercept significant other	3.08	0.13	23.44	< .001**	Actor effect	-0.17	0.05	-3.60	.005**	.30
Actor effect worker	-0.25	0.08	-3.18	.002*	Partner effect worker	-0.04	0.08	-0.51	.613	ns
Actor effect significant other	-0.08	0.07	-1.06	.294	Partner effect significant other	-0.27	0.07	-3.69	< .001**	.37
Partner effect worker	-0.04	0.07	-0.54	.589						
Partner effect significant other	-0.29	0.08	-3.77	< .001**						

Table 3. Associations between illness perceptions and RTW expectations among dyads of workers and their significant others (continued).

	Two-intercept model[a]					**Final model**[b]				
	B	SD	t	Sig.		B	SD	t	Sig.	r_d
Concern of the worker ($N = 93$)										
Intercept worker	3.06	0.13	23.61	< .001**	Intercept	3.01	0.12	25.19	< .001**	
Intercept significant other	2.98	0.13	23.22	< .001**	Actor effect	-0.14	0.04	-3.84	< .001**	.30
Actor effect worker	-0.22	0.06	-3.75	< .001**	Partner effect	-0.15	0.04	-4.02	< .001**	.32
Actor effect significant other	-0.04	0.07	-0.57	.567						
Partner effect worker	-0.08	0.07	-1.18	.242						
Partner effect significant other	-0.25	0.06	-4.38	< .001**						
Illness coherence ($N = 93$)										
Intercept worker	3.12	0.15	21.03	< .001**	Intercept	3.10	0.14	22.21	< .001**	
Intercept significant other	3.09	0.15	20.97	< .001**	Actor effect	-0.02	0.04	-0.43	.672	ns
Actor effect worker	0.05	0.06	0.82	.417	Partner effect	0.00	0.04	0.09	.930	ns
Actor effect significant other	-0.09	0.07	-1.18	.242						
Partner effect worker	-0.05	0.08	-0.67	.505						
Partner effect significant other	0.07	0.06	1.16	.250						
Emotional response of the worker ($N = 93$)										
Intercept worker	3.08	0.14	22.07	< .001**	Intercept	3.05	0.13	23.40	< .001**	
Intercept significant other	3.04	0.14	21.96	< .001**	Actor effect	-0.03	0.04	-0.71	.481	ns
Actor effect worker	-0.05	0.07	-0.71	.482	Partner effect	-0.12	0.04	-3.24	.001**	.23[c]
Actor effect significant other	0.01	0.07	0.22	.826						
Partner effect worker	-0.09	0.07	-1.31	.195						
Partner effect significant other	-0.16	0.07	-2.31	.023*						

[a] unadjusted beta coefficients; [b] beta coefficients adjusted for age; [c] adjusted effect size in accordance with recommendations from Kenny, Kashy and Cook [22]; * $p < .05$; ** $p < .01$; ns = non-significant; N = number of dyads included.

Discussion

The results of this study show that most illness perceptions and RTW expectations are moderately to strongly correlated between workers with chronic diseases and their significant others, indicating that dyad members' illness perceptions and RTW expectations are interdependent. Moreover, we found evidence that illness perceptions of workers and their significant others are associated with both their own and the other dyad member's expectations (i.e., intrapersonal and interpersonal effects) about full RTW of the worker with the chronic disease. More specifically, within dyads of workers and significant others, more negative illness perceptions were related to more negative expectations on whether the sick-listed worker would be fully back at work in six months.

Our results are in line with prior studies reporting that illness perceptions of patients and their spouses are often similar and strongly correlated [18,21,37,38]. For instance, Richardson et al. found positive correlations between cancer patients and caregivers for most illness perception domains [38]. Similar to our findings, other studies among patients and their spouses have found evidence of intrapersonal and interpersonal associations between illness perceptions and quality of life [38], perceptions of spouse undermining (i.e., negative reactions of the spouse towards the patient, such as criticism or anger) [37], and patients' well-being [18]. Moreover, our results support previous qualitative studies that have suggested that not only the worker's own perceptions and appraisals, but also the perceptions and appraisals of their significant others are important in the context of work participation and RTW [22,23].

Our findings highlight the importance of interpersonal and dyadic processes in the development of illness perceptions and expectations about RTW and add to the empirical evidence regarding the role of significant others in this context. While this study does not provide insight into how and why illness perceptions and RTW expectations of workers and significant others are interrelated, as mentioned before, interactions between the worker and the significant other have been shown to play an important role in the development of illness perceptions and in how the worker and significant other adapt to the chronic disease [15–18]. Regarding this study, workers and significant others sharing information and discussing issues related to the worker's illness and return to work could explain the strong interdependence between their illness perceptions and expectations about the worker's RTW. Similarly, the interpersonal associations between illness perceptions and RTW expectations within dyads might be driven by responses and interactions elicited by the worker's and significant other's illness perceptions. For example, triggered by negative perceptions about the disease, a significant other might respond solicitously toward the worker (e.g., encourage resting, discouraging RTW), which could in turn negatively affect the worker's RTW expectations. Similarly, a worker's negative illness perceptions could lead to maladaptive or unhelpful illness behaviors such as catastrophizing or withdrawing from activities [39,40], which can lead to negative RTW expectations of the significant other.

Strengths and limitations

The strength of this study is reflected in its dyadic design, which enabled us to extend previous literature on the intrapersonal associations between illness perceptions and RTW expectations to the interpersonal level. Applying the APIM framework allowed us to study both intrapersonal and interpersonal associations while taking the dyad members' interdependence into account. A limitation of this study is that no causal effects between illness perceptions and RTW expectations could be tested, as we used an observational cross-sectional design. Another limitation is that some selection bias seems to have occurred, possibly limiting the generalizability of our study findings. More specifically, compared to a representative cohort of workers with a chronic disease from Arbo Unie, the mean age in our sample was considerably higher, and a relatively high percentage of workers in our study was male and had a musculoskeletal disorder or a mental illness. In addition, most participants in our study rated the quality of their relationship with the other dyad member with an eight or above, which might indicate that workers and significant others who were less satisfied with their relationship were less inclined to participate in this study. This selection bias may have influenced our results if dyadic processes differ depending on the type of disease, relationship satisfaction, age or gender. For instance, as relationship satisfaction has been shown to be positively associated with similarity of illness representations of patients with chronic diseases and their partners [41], it is possible that the illness perceptions and RTW expectations were more similar in our study than among workers and significant others who are less satisfied with their relationship.

Practical implications

The findings of this study add to our understanding of the dyads' role in RTW by indicating that illness perceptions and RTW expectations are probably the result of a dyadic process between workers and their significant others. Our findings confirm the importance of addressing illness perceptions and RTW expectations of the sick-listed worker and suggest that occupational health professionals should also assess illness perceptions and RTW expectations of significant others. An assessment of RTW expectations of both workers and their significant others could help occupational health professionals to identify workers at risk of long-term sickness absence [42]. In addition, exploring whether illness perceptions of workers and their significant others play a role can provide insight into inadequate or maladaptive perceptions and coping strategies that may be modified to achieve more realistic RTW expectations and facilitate sustainable RTW. This might be especially useful in situations in which the RTW expectations are unrealistically positive or negative and markedly different from the expectations of the occupational health professional. In this context, occupational health professionals could use the revised or brief version of the IPQ to explore and discuss illness perceptions of workers and significant others [43,44]. Furthermore, occupational health professionals could consult with the worker and the significant other to assess their illness perceptions and RTW expectations and modify inadequate or maladaptive perceptions by providing information about the worker’s disease and RTW process [43–47]. If appropriate, occupational health professionals could refer the worker and significant other to other health care providers such as a psychologist, social worker, or medical specialist to intervene on inaccurate and maladaptive illness perceptions [43–47].

Recommendations for future research

While prior research has shown that a worker’s expectations about RTW is an important prognostic factor of RTW, more research is needed to investigate the intrapersonal and interpersonal associations of illness perceptions and RTW expectations of workers and their significant others with actual RTW. In addition, more research is needed to explore the pathways through which illness perceptions are related to RTW expectations and actual RTW. For instance, future research might investigate the relationship between illness perceptions within dyads and duration of sick leave, and whether this relationship is mediated by RTW expectations of workers and their significant others. Furthermore, additional research is needed to determine whether the interpersonal associations of illness perceptions with RTW expectations differ depending on the disease and the type of relationship between the worker and his or her significant other. For example, prior research suggests that living together with a partner and the way patients and their partners interact with each other in their shared daily life play an important role in the functioning of patients with chronic diseases [48]. It is therefore likely that the interpersonal associations between illness perceptions and RTW expectations are stronger for dyads in which the significant other is the worker’s partner rather than a family member or friend not living with the worker. In addition, more research is needed to obtain additional information on how and why illness perceptions and RTW expectations of workers and significant others are interrelated as this could provide valuable insight into how significant others could be involved in the RTW process of sick-listed workers. Such research might use a dyadic diary approach to gain insight into how verbal and non-verbal communication between workers and significant others relate to their illness perceptions and RTW expectations. Finally, future research should focus on the development and evaluation of interventions aimed at promoting adaptive illness perceptions and RTW expectations in dyads of workers with chronic diseases and their significant others.

Conclusion

This study adds to our understanding of the dyads’ role in the RTW process by indicating that illness perceptions and RTW expectations are likely to be the result of a dyadic process between workers and their significant others. When trying to facilitate adaptive illness perceptions and RTW expectations to support sustainable RTW, involving significant others may be more effective than an individualistic approach targeted at the worker only.

Abbreviations

RTW	Return to work
APIM	Actor-Partner Interdependence Model
OHS	Occupational health service
IPQ-B	Brief Illness Perception Questionnaire

Acknowledgements: We thank Arbo Unie for their contribution to the data collection.

References

1. European Chronic Disease Alliance. Joint Statement on “Improving the employment of people with chronic diseases in Europe”. 2017.https://ec.europa.eu/health/sites/health/files/policies/docs/2017_chronic_framingdoc_en.pdf
2. OECD/EU (2016). Health at a Glance: Europe 2016 - State of Health in the EU Cycle. OECD Publishing 2016. doi:http://dx.doi.org/10.1787/9789264265592-en
3. Hoving JL, van der Meer M, Volkova AY, *et al.* Illness perceptions and work participation: a systematic review. *Int Arch Occup Environ Health* 2010;**83**:595–605. doi:10.1007/s00420-010-0506-6
4. Løvvik C, Øverland S, Hysing M, *et al.* Association between illness perceptions and return-to-work expectations in workers with common mental health symptoms. *J Occup Rehabil* 2014;**24**:160–70. doi:10.1007/s10926-013-9439-8
5. Boot CRLL, Heijmans M, Gulden JWJJ, *et al.* The role of illness perceptions in labor participation of the chronically ill. *Int Arch Occup Environ Health* 2008;**82**:13–20. doi:10.1007/s00420-007-0298-5
6. Giri P, Poole J, Nightingale P, *et al.* Perceptions of illness and their impact on sickness absence. *Occup Med (Chic Ill)* 2009;**59**:550–5. doi:10.1093/occmed/kqp123
7. Løvvik C, Shaw W, Øverland S, *et al.* Expectations and illness perceptions as predictors of benefit recipiency among workers with common mental disorders: Secondary analysis from a randomised controlled trial. *BMJ Open* 2014;**4**:1–9. doi:10.1136/bmjopen-2013-004321
8. Heymans MW, De Vet HCWW, Knol DL, *et al.* Workers’ beliefs and expectations affect return to work over 12 months. *J Occup Rehabil* 2006;**16**:685–95. doi:10.1007/s10926-006-9058-8
9. Aasdahl L, Pape K, Vasseljen O, *et al.* Improved Expectations About Length of Sick Leave During Occupational Rehabilitation Is Associated with Increased Work Participation. *J Occup Rehabil* 2019;**29**:475–82. doi:10.1007/s10926-018-9808-4
10. Hallegraeff JM, Krijnen WP, van der Schans CP, *et al.* Expectations about recovery from acute non-specific low back pain predict absence from usual work due to chronic low back pain: A systematic review. *J Physiother* 2012;**58**:165–72. doi:10.1016/S1836-9553(12)70107-8
11. Hayden JA, Wilson MN, Riley RD, *et al.* Individual recovery expectations and prognosis of outcomes in non-specific low back pain: prognostic factor review. *Cochrane Database Syst Rev* 2019;**11**:1–133. doi:10.1002/14651858.CD011284.pub2
12. Sullivan V, Wilson MN, Gross DP, *et al.* Expectations for Return to Work Predict Return to Work in Workers with Low Back Pain: An Individual Participant Data (IPD) Meta-Analysis. J. Occup. Rehabil. 2022. doi:10.1007/s10926-022-10027-w
13. Laisné F, Lecomte C, Corbière M. Biopsychosocial predictors of prognosis in musculoskeletal disorders: A systematic review of the literature (corrected and republished). *Disabil Rehabil* 2012;**34**:1912–41. doi:10.3109/09638288.2012.729362
14. Snippen NC, Vries HJ de, Burg-Vermeulen SJ van der, *et al.* Influence of significant others on work participation of individuals with chronic diseases: a systematic review. *BMJ Open* 2019;**9**:1–13. doi:10.1136/BMJOPEN-2018-021742
15. Karademas EC. The psychological well-being of couples experiencing a chronic illness: A matter of personal and partner illness cognitions and the role of marital quality. *J Health Psychol* 2014;**19**:1347–57. doi:10.1177/1359105313488983

16. Falconier MK, Jackson JB, Hilpert P, *et al.* Dyadic coping and relationship satisfaction: A meta-analysis. *Clin Psychol Rev* 2015;**42**:28–46. doi:10.1016/j.cpr.2015.07.002
17. Badr H, Acitelli LK. Re-thinking dyadic coping in the context of chronic illness. *Curr Opin Psychol* 2017;**13**:44–8. doi:10.1016/j.copsyc.2016.03.001
18. Dimitraki G, Karademas EC. The association of type 2 diabetes patient and spouse illness representations with their well-being: A dyadic approach. *Int J Behav Med* 2014;**21**:230–9. doi:10.1007/s12529-013-9296-z
19. Berg CA, Upchurch R. A developmental-contextual model of couples coping with chronic illness across the adult life span. *Psychol Bull* 2007;**133**:920–54. doi:10.1037/0033-2909.133.6.920
20. Benyamini Y, Gozlan M, Kokia E. Women's and men's perceptions of infertility and their associations with psychological adjustment: A dyadic approach. *Br J Health Psychol* 2009;**14**:1–16. doi:10.1348/135910708X279288
21. Figueiras MMJ, Weinman J. Do similar patient and spouse perceptions of myocardial infarction predict recovery? *Psychol Health* 2003;**18**:201–16. doi:10.1080/0887044021000057266
22. Brooks J, McCluskey S, King N, *et al.* Illness perceptions in the context of differing work participation outcomes: Exploring the influence of significant others in persistent back pain. *BMC Musculoskelet Disord* 2013;**14**:1–11. doi:10.1186/1471-2474-14-48
23. McCluskey S, Brooks J, King N, *et al.* The influence of 'significant others' on persistent back pain and work participation: A qualitative exploration of illness perceptions. *BMC Musculoskelet Disord* 2011;**12**:236. doi:10.1186/1471-2474-12-236
24. Kenny DA, Kashy DA, Cook WL. *Dyadic Data Analysis*. Guilford Press 2006.
25. Broadbent E, Petrie KJ, Main J, *et al.* The Brief Illness Perception Questionnaire. *J Psychosom Res* 2006;**60**:631–7. doi:10.1016/j.jpsychores.2005.10.020
26. de Raaij EJ, Schröder C, Maissan FJ, *et al.* Cross-cultural adaptation and measurement properties of the Brief Illness Perception Questionnaire-Dutch Language Version. *Man Ther* 2012;**17**:330–5. doi:10.1016/j.math.2012.03.001
27. Sterba KR, DeVellis RF. Developing a spouse version of the Illness Perception Questionnaire-Revised (IPQ-R) for husbands of women with rheumatoid arthritis. *Psychol Heal* 2009;**24**:473–87. doi:10.1080/08870440701867788
28. Storheim K GA. Evaluation Of The Brief Illness Perception Questionnaire In Sub-Acute And Chronic Low Back Pain Patients: Data Quality, Reliability And Validity. *J Pain Reli* 2013;**2**:1–6. doi:10.4172/2167-0846.1000122
29. Chittem M, Norman P, Harris PR. Relationships between perceived diagnostic disclosure, patient characteristics, psychological distress and illness perceptions in Indian cancer patients. *Psychooncology* 2013;**22**:1375–80. doi:10.1002/pon.3149
30. Wu X. *Relationships between perceptions of barriers and self-management adherence, and differences in learning preferences of patients with chronic conditions.* Diss. Abstr. Int. Sect. A Humanit. Soc. Sci. 2014.http://search.ebscohost.com.proxy-ub.rug.nl/login.aspx?direct=true&db=psyh&AN=2014-99010-163&site=ehost-live&scope=site
31. Radat F, Lantéri-Minet M, Nachit-Ouinekh F, *et al.* The GRIM2005 study of migraine consultation in France. III: Psychological features of subjects with migraine. *Cephalalgia* 2009;**29**:338–50. doi:10.1111/j.1468-2982.2008.01718.x
32. Rottmann N, Hansen DG, Larsen PV, *et al.* Dyadic coping within couples dealing with breast cancer: A longitudinal, population-based study. *Heal Psychol* 2015;**34**:486–95. doi:10.1037/hea0000218

33. Kenny DA. Data To Text. 2014.http://davidakenny.net/dtt/datatotext.htm
34. Cook WL, Kenny DA. The actor-partner interdependence model: A model of bidirectional effects in developmental studies. *Int J Behav Dev* 2005;**29**:101–9. doi:10.1080/01650250444000405
35. Kenny DA. APIM with Distinguishable Dyads: MLM Estimation [Webinar]. http://davidakenny.net/webinars/Dyad/Standard/MLM_Distinguishable/MLM_Distinguishable.html
36. Hemphill JF. Interpreting the Magnitudes of Correlation Coefficients. *Am Psychol* 2003;**58**:78–9. doi:10.1037/0003-066X.58.1.78
37. Benyamini Y, Medalion B, Garfinkel D. Patient and spouse perceptions of the patient's heart disease and their associations with received and provided social support and undermining. *Psychol Heal* 2007;**22**:765–85. doi:10.1080/14768320601070639
38. Richardson AE, Morton RP, Broadbent EA. Changes over time in head and neck cancer patients' and caregivers' illness perceptions and relationships with quality of life. *Psychol Heal* 2016;**31**:1203–19. doi:10.1080/08870446.2016.1203686
39. Williams C. A cognitive model of dysfunctional illness behaviour. *Br J Health Psychol* 1997;**2**:153–65. doi:10.1111/j.2044-8287.1997.tb00531.x
40. Burns JW, Post KM, Smith DA, *et al.* Spouse and Patient Beliefs and Perceptions About Chronic Pain: Effects on Couple Interactions and Patient Pain Behavior. *J Pain* 2019;**20**:1176–86. doi:10.1016/j.jpain.2019.04.001
41. Szabó-Bartha A, Mirnics Z. Representations of chronic illness in patients and their partners. *Psychiatr Danub* 2021;**33**:432–40.
42. Sampere M, Gimeno D, Serra C, *et al.* Return to work expectations of workers on long-term non-work-related sick leave. *J Occup Rehabil* 2012;**22**:15–26. doi:10.1007/s10926-011-9313-5
43. Siemonsma PC, Stuive I, Roorda LD, *et al.* Cognitive Treatment of Illness Perceptions in Patients With Chronic Low Back Pain: A Randomized Controlled Trial. *Phys Ther* 2013;**93**:435–48. doi:10.2522/ptj.20110150
44. Broadbent E, Ellis CJ, Thomas J, *et al.* Can an illness perception intervention reduce illness anxiety in spouses of myocardial infarction patients? A randomized controlled trial. *J Psychosom Res* 2009;**67**:11–5. doi:10.1016/j.jpsychores.2008.11.006
45. Snippen NC, de Vries HJ, Bosma A, *et al.* Workers' views on involving significant others in occupational health services. A focus group study. *Disabil Rehabil* 2021;:1–12. doi:10.1080/09638288.2021.2011435
46. Broadbent E, Leggat A, McLachlan A, *et al.* Providing cardiovascular risk management information to acute coronary syndrome patients: A randomized trial. *Br J Health Psychol* 2013;**18**:83–94. doi:10.1111/j.2044-8287.2012.02081.x
47. Keogh KM, Smith SM, White P, *et al.* Psychological family intervention for poorly controlled type 2 diabetes. *Am J Manag Care* 2011;**17**:105–13.
48. Müller F, Hagedoorn M, Tuinman MA. Chronic multimorbidity impairs role functioning in middle-Aged and older individuals mostly when non-partnered or living alone. *PLoS One* 2017;**12**:1–14. doi:10.1371/journal.pone.0170525

Supplementary material

Online Resource 1. Syntax for the first three steps of the APIM analyses to determine the dyadic associations between illness perceptions and RTW expectations.

Analyses step	**Syntax**
Step 1: Estimating the full APIM	**MIXED** RTW_expectations_A **BY** partnum **WITH** IPQ_A IPQ_P age_A **/FIXED**=partnum partnum* IPQ_A partnum* IPQ_P partnum* age_A | NOINT **/PRINT=SOLUTION TESTCOV** **/REPEATED**=partnum | **SUBJECT**(DyadID) **COVTYPE**(CSH).
Step 2: Testing for differences between dyad members	**/TEST** 'Main Effect for partnum' partnum -1 1 **/TEST** 'Interaction Effect for Actor*partnum' partnum* IPQ_A -1 1 **/TEST** 'Interaction Effect for Partner*partnum' partnum* IPQ_P -1 1
Step 3: Estimating average intercepts and effects across dyad members	**/TEST** 'Average intercept' partnum .5 .5 **/TEST** 'Average Actor Effect' partnum* IPQ_A .5 .5 **/TEST** 'Average Partner Effect' partnum* IPQ_P .5 .5

RTW_expectations = return to work expectations; IPQ = illness perceptions score; A = actor; P = partner; partnum = identifier of the dyad member (i.e., worker vs. significant other).

Chapter 4

Interpersonal processes in the duration of sick leave of workers with chronic diseases: a dyadic analysis

Nicole C. Snippen, Haitze J. de Vries, Corné A.M. Roelen, Mariët Hagedoorn,

Sandra Brouwer

Submitted

Abstract

Objectives: Although there is increasing awareness that significant others' perceptions and behaviors can affect health outcomes, the role of interpersonal processes between sick-listed workers and significant others in sick leave and return to work (RTW) has hardly been studied. The aim of this study was to examine the associations between illness perceptions, RTW expectations, and behaviors of significant others (engagement, buffering and overprotection) with sick leave duration within dyads of sick-listed workers with chronic diseases and their significant others.

Methods: We used survey data linked with sick leave registry data of 90 dyads. Pearson correlations were used to study the interdependence within dyads. Multiple linear regression analyses were conducted to examine associations between survey data of both dyad members and sick leave duration.

Results: We found moderate to strong correlations between workers and significant others, indicating that illness perceptions, RTW expectations and significant other behaviors are interdependent within dyads. Dyad members' illness perceptions ($R^2 = .204$, $p = .001$) and RTW expectations ($R^2 = .326$, $p = <.001$) were associated with sick leave duration, explaining respectively 12.3% and 24.5% of the variance. We found no associations between sick leave duration and active engagement, protective buffering and overprotection.

Conclusions: This study indicates that negative illness perceptions and RTW expectations of both workers and their significant others are associated with a longer sick leave duration. A dyadic approach targeted at improving illness perceptions and RTWE of both workers and significant others might be more effective than an individualistic approach in preventing long-term sickness absence.

Introduction

Many workers with chronic diseases experience difficulties coping with the consequences of their disease and are prone to negative work outcomes such as prolonged sickness absence [1] and early exit from paid employment [2] into unemployment [3] and disability pension [4]. Significant others like partners, family members and friends can play a key role in the coping and adaptation processes through their interactions with the person with the disease [5–7]. There is strong evidence that perceptions, coping and interactions within dyads can both positively and negatively affect behavioral, psychological, health and relationship outcomes [6–8]. For example, patient and partner perceptions, beliefs and expectations about an illness have been shown to be related to both one’s own and each other’s well-being and quality of life [6]. In addition, it has been shown that patients and significant others actively engaging in conversations about the situation and joint problem solving is associated with better outcomes like less distress and better relationship satisfaction [6,7]. On the other hand, overprotectiveness and protective buffering (i.e., the efforts to deny or hide concerns or difficulties) of partners have been shown to be related to negative patient outcomes (e.g., decreased sense of control, more distress, worse physical well-being, lower adherence to medical advice) and worse relationship outcomes [6,7].

In the context of work, previous studies have indicated that negative illness perceptions of workers concerning the duration, consequences, emotional impact, treatment efficacy, personal control and understanding of the illness are associated with increased risks of involuntary early labor market exit across various chronic health conditions [9–11]. Furthermore, return to work (RTW) expectations of workers have been shown to be one of the strongest prognostic factors of work outcomes like RTW, sick leave duration and work disability [11–14]. There is strong evidence that workers with low RTW expectations are at increased risk for long-term work disability [14] and that workers who expect a shorter sick leave duration have a higher probability of sustainable RTW [13].

Previous studies investigated the associations between illness perceptions, RTW expectations and work outcomes using a single perspective, focusing only on the worker. These studies fail to consider that cognitions like illness perceptions and RTW expectations and behaviors take place within a context in which the worker and significant other reciprocally influence each other [15,16]. Only a few (mainly qualitative) studies have investigated the role of interpersonal processes between workers and their significant others in the RTW process. They suggest that negative illness perceptions and RTW expectations of significant others can also hinder RTW [8,17,18], and that active engagement of significant others (e.g., sharing information, discussing RTW, listening to patients) can facilitate RTW, job retention and staying at work [8,19–21]. In addition, protective or buffering behaviors from significant others (e.g., providing unnecessary assistance, encouraging or pressuring the worker to refrain from work, avoiding discussing the illness together) may negatively affect work outcomes [8,19,22].

To the best of our knowledge, only our recently published study on dyadic associations between illness perceptions and RTW expectations [23] has investigated the role of interpersonal processes in the RTW process. We used a dyadic cross-sectional research design, which allowed us to study both individual and interpersonal associations while taking the interdependence between dyad members into account [24]. We found that more negative illness perceptions of one member of the dyad were associated with more negative RTW expectations in both dyad members. For most illness perception domains, we found small to moderate actor and partner effects on RTW expectations. This study suggests that illness perceptions and RTW expectations should be considered at a dyadic level as workers and their significant others influence each other's beliefs. However, from that study it remains unclear to what extent illness perceptions, RTW expectations and significant other behaviors within dyads are associated with sick leave duration.

Therefore, the aim of the present study was to examine whether illness perceptions, RTW expectations and significant other behaviors within dyads of sick-listed workers and their significant others are associated with sick leave duration of workers with chronic diseases. It was hypothesized that more negative illness perceptions and more negative RTW expectations of workers and their significant others are associated with a longer sick leave duration. With regard to significant other behaviors, we hypothesized that a higher level of active engagement reported by dyad members is related to a shorter sick leave duration, whereas higher levels of protective buffering and overprotection are associated with a longer sick leave duration.

Methods

Study design and procedure

This study used survey data of sick-listed workers and their significant others linked to sick leave register data with a maximum follow-up period of two years after the first day of sick leave. We included dyads consisting of workers who were on sick leave for at least two weeks due to a chronic health condition, and one of their significant others (i.e., partner, relative or friend). To be eligible for participation, workers had to be between 18 and 65 years of age, be on sick leave due to chronic health problems, and have a significant other (self-chosen by the worker) who was willing to participate in the study. They both had to be proficient in written Dutch.

The inclusion period lasted from June 2019 until September 2020. We recruited participants through local offices of a large Dutch occupational health service (OHS). For this study, an extra paragraph was added to the invitation for the consultation with an occupational health physician within six weeks after reporting sick, informing sick-listed workers and their significant others about the study. A link was included to a dedicated webpage with detailed information about the study and the online questionnaires. Both the worker and significant other were asked to individually complete the questionnaire.

At the start of the questionnaire, participants were screened for eligibility and asked to give informed consent for both using questionnaire results and retrieving OHS sickness absence register data. Participants who did not meet the inclusion criteria or did not give informed consent were excluded from participation.

Measures

Sick leave duration

The outcome measure was the workers' sick leave duration, which was defined as the time between the first day of reporting sick and the day of full RTW (i.e., at equal work hours as before sickness absence). We used register data with a maximum follow-up period of two years after the first day of sick leave. Workers who had not returned within that timeframe were assigned the maximum duration of 730 sick leave days. The outcome measure was based on sick leave register data of the OHS.

Illness perceptions

Illness perceptions of workers and significant others were measured with respectively the Dutch version of the Brief Illness Perception Questionnaire (IPQ-B) [25,26] and a significant other version of the IPQ-B, which was adapted from the spouse version of the IPQ-R [27]. In this study, the first eight items of the IPQ-B were used, which were measured on an ordinal response scale ranging from zero to ten. The items assessed the worker's and significant other's illness perceptions about: (1) the influence of the illness on the worker's daily life (consequences), (2) the duration of the illness (illness duration), (3) the worker's control over the illness (personal control), (4) the extent to which treatment can help with controlling the illness (treatment control), (5) the severity of the symptoms experienced by the worker (illness identity), (6) the worker's concern about the illness (concern), (7) the worker's emotional response to the illness (emotional response), and (8) the worker's degree of understanding of the illness (illness coherence).

Higher scores on consequences, illness duration, illness identity, concern, and emotional response reflect more negative perceptions, while higher scores on personal control, treatment control, and illness coherence reflect more positive perceptions. A composite illness perceptions score was computed by summing the scores of the eight items, with a reverse scoring of the items on personal control, treatment control and illness coherence. For this composite score, we person-mean imputed data for participants with missing data on no more than three items. A higher composite score reflected more negative perceptions. In line with previous studies [28–30], the Cronbach's alpha of the IPQ-B composite score in this study was .71 for workers and .74 for significant others.

RTW expectations

Expectations about the worker's full RTW within 6 months were measured with the 'self-predicted certainty question' [12]: "How certain are you that you will be fully back at work in six months?". Workers answered the question on a 5-point scale: (1) "completely uncertain", (2) "a little uncertain", (3) "somewhat certain", (4) "certain", (5) "completely certain". Full RTW was defined as working the contracted working hours [12]. Significant others answered the question "How certain are you that the worker will be fully back at work in six months?" on the same 5-point scale.

Significant other behaviors

Significant other behaviors as perceived by the worker were measured with the Active engagement, Protective buffering, and Overprotection questionnaire (ABO) [31,32]. The significant other version of the ABO was used to assess the self-perceived behaviors of significant others. The ABO contains 19 items measured on a 5-point scale ranging from "Never" to "Very often". Three subscales are distinguished: active engagement, protective buffering, and overprotection.

Active engagement was measured with 5 items, e.g. for workers "My significant other tries to discuss it with me openly", and for significant others "I try to discuss it with the worker openly". Cronbach's alpha was .88 for workers and .90 for significant others.

Protective buffering was measured with 8 items, e.g. for workers and significant others respectively "My significant other tries to hide his or her worries about me", and "I try to hide my worries about the worker". Because internal consistency was low for both workers and significant others (Cronbach's alpha = .64 and .65), we deleted two items to improve this subscale. Cronbach's alpha of the final subscale with 6 items was .74 for workers and .73 for significant others.

Overprotection was measured with 6 items, e.g. for workers and significant others respectively "My significant other continuously keeps an eye on me", and "I continuously keep an eye on the worker". The internal consistency of the scale with all six items was low (Cronbach's alpha .65 for both workers and significant others). Two items were deleted from the scale. Cronbach's alpha of the final subscale with 4 items was .80 for workers and .77 for significant others.

Supplementary Table 1 provides an overview of the items in each of the subscales and the deleted items.

Covariates

Socio-demographic characteristics and data about workers' and significant others' perceived relationship quality was collected to describe the sample and potentially include as covariates. Socio-demographic characteristics included the workers' age (in years), gender, educational level (low, medium, or high), type of chronic disease (somatic, mental, mixed), and employment status (full-time vs. part-time). Likewise, data was collected about the significant others' age, gender, educational level, chronic disease (yes/no), and their relationship with the worker (i.e., partner, parent, adult child, sibling, friend). Finally, we collected data from both workers and significant others about their perceived relationship quality with the other dyad member, using a relationship quality rating scale from 0-10, with zero representing the worst possible and ten the best possible relationship [33].

Statistical analyses

Pearson correlations were calculated to study the interdependence within dyads [24]; correlations of $r = .1$, $r = .3$, and $r = .5$ were considered to be weak, moderate and strong, respectively [34]. As recommended by Kenny [35], we conducted multiple linear regression analyses with the dyad as the unit of analysis to examine associations between survey data and sick leave duration. In preparation for the analyses, data was formatted in a dyadic structure with each row comprising one dyad. Preliminary analyses were performed to ensure that there was no violation of the assumptions of normality and homogeneity of variance. A series of preliminary analyses using one-way ANOVA and Pearson correlations was conducted to examine which sociodemographic and relationship measures should be controlled for as covariates in the analyses. Only the worker's gender ($F(1, 88) = 4.91$, $p = .029$) and fulltime/part-time employment status ($F(1, 88) = 8.23$, $p = .005$) were significantly associated with sick leave duration and therefore included as covariates in all analyses. Separate multiple regression models were tested for illness perceptions, RTW expectations, active engagement, protective buffering and overprotection. Furthermore, in the case of significant results, additional overall models were tested including respectively (i) illness perceptions and RTW expectations, and (ii) the three types of significant other behaviors. IBM SPSS version 26 was used to perform the analyses, applying a significance level of .05.

Results

A total of $N = 166$ workers completed the questionnaire. For the analyses, only cases with available survey data from both the worker and significant other and register data about sick leave were included. The final study sample consisted of 90 dyads of workers and their significant others (Table 1). There were no statistically significant differences between in- and excluded workers (Supplementary Table 2).

The mean age of the workers was 53.5 years (*SD* = 10.1). About half of the workers was male (54.4%) and had a low or medium level of education (52.8%). Most workers (80.0%) indicated having a somatic disease, 36.7% of the workers had a mental illness, and almost half of the workers (42.2%) reported comorbid conditions. The mean age of significant others was 52.5 years (*SD* = 13.8), and the majority was the partner or spouse of the worker (90.0%).

To investigate the representativeness of the study sample, we compared our sample with a cohort retrieved from the same OHS, consisting of 3,729 workers with chronic diseases who were sick-listed between January 2020 and September 2021. The mean age of workers was considerably higher in our study (53.7 years, *SD* = 9.9) than in the comparison cohort (40.4 years, *SD* = 15.9). Furthermore, compared to workers in that cohort, a higher percentage of workers in our study sample was male (54.4% vs. 33.6%), had a musculoskeletal disorder (47.9% vs. 34.5%) or a mental illness (36.2% vs. 24.4%).

Table 1. Participant characteristics (*N* = 90 dyads).

Characteristic	Workers		Significant others	
Age in years (*SD*)	53.5	(10.1)	52.5	(13.8)
Gender				
Male	49	(54.4%)	38	(42.2%)
Female	41	(45.6%)	52	(57.8%)
Educational level				
Low	16	(17.8%)	16	(18.0%)
Medium	31	(34.4%)	43	(47.8%)
High	42	(46.7%)	30	(33.3%)
Missing	1	(1.1%)	1	(1.1%)
Relation to worker				
Partner/spouse	-		81	(90.0%)
Parent	-		4	(4.4%)
Adult child	-		4	(4.4%)
Friend	-		1	(1.1%)
Relationship quality, mean (range)	8.7	(6-10)	8.6	(5-10)
Type of chronic disease				
Somatic	56	(62.2%)	37	(39.4%)
Mental	17	(18.9%)	5	(5.3%)
Mixed	16	(17.8%)	6	(6.4%)
None	-		45	(47.9%)
Missing	1	(1.1%)	1	(1.1%)
Number of chronic diseases				
0	-		45	(47.9%)
1	51	(56.7%)	27	(28.7%)
>1	38	(42.2%)	21	(22.3%)
Employment status				
Fulltime (≥ 36 hours per week)	55	(61.1%)	24	(26.7%)
Part-time (12 – 35 hours per week)	35	(38.9%)	37	(41.1%)
Not employed (< 12 hours per week)	-		28	(26.7%)
Missing	-		1	(1.1%)

Table 1. Participant characteristics (*N* = 90 dyads) (continued).

Characteristic	Workers		Significant others	
Duration of sick leave, mean (range)	323	(5-730)		
1 – 3 months	19	(21.1%)		
4 – 6 months	18	(20.0%)		
6 – 12 months	22	(24.4%)		
>12 months	31	(34.4%)		
Mean scores (*SD*)				
RTW expectations (scale 1-5)	3.0	(1.3)	3.0	(1.4)
Composite illness perceptions score (scale 0-80)	48.5	(10.3)	46.1	(10.6)
Significant other active engagement (scale 1-5)	4.0	(0.8)	4.2	(0.7)
Significant other protective buffering (scale 1-5)	1.9	(0.6)	1.8	(0.6)
Significant other overprotection (scale 1-5)	1.4	(0.6)	1.4	(0.6)

SD = standard deviation
RTW = return to work

Interdependence within dyads

The correlations between workers' and significant others' illness perceptions, RTW expectations, and perceived significant other behaviors are shown in Table 2. We found strong correlations between workers' and significant others' illness perceptions scores (r = .64), their expectations about the worker's RTW (r = .80), and their perceptions of the significant other's active engagement (r = .52). There were moderate correlations between workers' and significant others' perceptions of protective buffering (r = .46) and overprotection (r = .48) by significant others.

Table 2. Intercorrelations of dyad members' illness perceptions, return to work expectations, and significant other engagement, buffering and overprotection (condensed table).

	RTW expectations	Illness perceptions	Active engagement	Protective buffering	Overprotection
RTW expectations	.80**	-.49**	-.09	.10	-.06
Illness perceptions	-.60**	.64**	-.02	.32**	.33**
Active engagement	.06	-.01	.52**	-.44**	-.19*
Protective buffering	-.07	.23*	-.53**	.46**	.38**
Overprotection	.06	.10	-.16	.26*	.48**

Correlations among workers are below the diagonal (light grey); correlations among significant others are above the diagonal (dark grey); the diagonal depicts the correlations between workers and significant others (white). * $p < .05$; ** $p < .01$.

Associations with sick leave duration

An overview of the multiple regression models is provided in Table 3.

Model 1: Associations of illness perceptions with sick leave duration

When entered separately in regression models, the illness perceptions of both workers (B = 8.58, p = .001) and significant others (B = 6.46, p = .008) were significantly associated with the worker's sick leave duration, with more negative illness perceptions being associated with a longer sick leave duration.

The regression model 1c, including covariates and the illness perceptions of both dyad members, was statistically significant (F(4, 85) = 5.44, R^2 = .204, p = .001). The illness perceptions of workers and significant others explained 12.3% of the variation in sick leave duration. When including dyad members' illness perceptions simultaneously, only the coefficient associated with the worker's illness perceptions remained statistically significant (B = 7.32, p = .021).

Model 2: Associations of RTW expectations with sick leave duration

When entered separately in regression models, the RTW expectations of workers (B = -76.87, $p < .001$) and significant others (B = -92.47, $p < .001$) were both significantly associated with sick leave duration. More positive RTW expectations of dyad members were associated with a shorter sick leave duration.

The regression model 2c, including covariates and the RTW expectations of both dyad members, was statistically significant (F(4, 80) = 9.66, R^2 = .326, p = <.001). The RTW expectations of workers and significant others accounted for 24.5% of the variance in sick leave duration. When including dyad members' RTW expectations simultaneously, only the coefficient associated with the significant other's RTW expectations remained significant (B = -90.95, p = .002).

Model 3: Associations of illness perceptions and RTW expectations with sick leave duration

The regression model including covariates, both dyad members' illness perceptions and their RTW expectations was statistically significant (F(6, 78) = 6.42, R^2 = .331, p = <.001). Illness perceptions and RTW expectations accounted for 25.0% of the variation in sick leave duration. In this model, only the coefficient associated with RTW expectations of the significant other significantly contributed to the model (B = -86.21, p = .005).

Models 4, 5, and 6: Associations of significant other behaviors with sick leave duration

There were no significant associations with sick leave duration for workers' and significant others' perceptions about the significant other's active engagement, protective buffering and overprotection. As the assumption of normality for the variable overprotection was violated among both workers and significant others, we performed sensitivity analyses with median-split dummy variables. No significant associations were found. Because no significant associations with sick leave duration were found for dyad members' perceptions about the significant other's behaviors, no multiple linear regressions were performed including both dyad members' perceptions simultaneously.

Table 3. Results of the multiple linear regression models predicting duration of sick leave (adjusted for worker's gender and fulltime/part-time employment).

	B	95% CI	t	Sig
Model 1: Illness perceptions (*n* = 90*)*				
Model 1a: Workers only				
(Intercept)	124.15	[-175.85, 423.85]	0.82	.412
Worker effect	8.58	[3.83, 12.34]	3.59	.001**
Model 1b: Significant others only				
(Intercept)	250.91	[-41.00, 542.83]	1.71	.091
Significant other effect	6.46	[1.71, 11.22]	2.70	.008**
Model 1c: Both dyad members				
(Intercept)	96.29	[-217.05, 409.64]	0.61	.543
Worker effect	7.32	[1.12, 13.53]	2.35	.021*
Significant other effect	1.91	[-4.12, 7.94]	0.63	.530
Model 2: Return to work expectations (*n* = 85)				
Model 2a: Workers only				
(Intercept)	755.80	[555.90, 955.70]	7.52	<.001**
Worker effect	-76.87	[-113.78, -39.96]	-4.14	<.001**
Model 2b: Significant others only				
(Intercept)	840.29	[650.73, 1029.85]	8.81	<.001**
Model 2c: Both dyad members				
(Intercept)	840.62	[643.63, 1037.61]	8.49	<.001**
Worker effect	-1.94	[-60.61, 56.73]	-0.07	.95
Significant other effect	-90.95	[-148.09, -33.81]	-3.17	.002**
Model 3: Return to work expectations and illness perceptions (*n* = 85)				
(Intercept)	701.94	[246.25, 1157.62]	3.07	.003**
Return to work expectations worker effect	4.13	[-57.71, 65.98]	0.13	.895
Return to work expectations significant other effect	-86.21	[-145.43, -26.98]	-2.90	.005**
Illness perceptions worker effect	2.34	[-4.28, 8.96]	0.70	.484
Illness perceptions significant other effect	-0.21	[-6.13, 5.71]	-0.07	.943
Model 4: Active engagement (*n* = 90)				
Model 4a: Workers only				
(Intercept)	577.40	[277.71, 877.10]	3.83	<.001**
Worker effect	-4.79	[-76.06, 66.49]	-0.13	.894
Model 4b: Significant others only				
(Intercept)	461.81	[114.01, 809.60]	2.64	.010*
Significant other effect	27.42	[-52.78, 107.63]	0.68	.499

Table 3. Results of the multiple linear regression models predicting duration of sick leave (adjusted for worker's gender and fulltime/part-time employment) (continued).

	B	95% CI	t	Sig
Model 5: Protective buffering (*n* = 90)				
Model 5a: Workers only				
(Intercept)	472.59	[153.83, 791.35]	2.95	.004**
Worker effect	31.89	[-60.07, 123.84]	0.69	.492
Model 5b: Significant others only				
(Intercept)	716.95	[451.84, 982.06]	5.38	<.001**
Significant other effect	-73.41	[-162.81, 15.98]	-1.62	.106
Model 6: Overprotection (*n* = 90)				
Model 6a: Workers only				
(Intercept)	596.66	[361.98, 831.33]	5.05	<.001**
Worker effect	-24.00	[-120.12, 72.13]	-0.50	.621
Model 6b: Significant others only				
(Intercept)	618.40	[390.60, 846.21]	5.40	<.001**
Significant other effect	-38.19	[-124.98, 48.59]	-0.88	.384

*$p < .05$ **$p < .01$

Discussion

The findings of this study add to our understanding of the role of interpersonal processes in sick leave duration of workers with chronic diseases. The moderate to strong correlations between workers and significant others found in this study, indicate that dyad members' illness perceptions, RTW expectations and perceptions about significant other behaviors are interdependent. More negative illness perceptions and more negative RTW expectations of both dyad members were associated with a longer sick leave duration. No significant associations were found between workers' and significant others' perceptions about the significant other's active engagement, protective buffering and overprotection and sick leave duration.

The findings on the associations of illness perceptions and RTW expectations with sick leave duration confirm that interpersonal processes within dyads play a role in sick leave duration of workers with chronic diseases. In line with our hypotheses, we found that more negative illness perceptions and RTW expectations within dyads are related to a longer sick leave duration. These findings are in line with previous studies, which showed that workers' illness perceptions and RTW expectations affect work participation, sick leave and RTW [9–14]. In addition, our results confirm findings from the prior qualitative studies that negative illness perceptions and RTW expectations of significant others can hinder RTW [8,17,18]. When including independent variables of both dyad members, we found that in the illness perceptions model only the coefficient of workers (i.e., actor effect) remained significant, whereas in the RTW expectations model only the coefficient of significant others (i.e., partner effect) remained significant. This might suggest that the illness perceptions of the worker have a stronger influence on sick leave duration than the significant other's illness perceptions, whereas the RTW expectations of the significant other have a stronger influence than those of the worker. Kenny et al. [24] describe different dyadic patterns that can occur in relationships research, including an actor-only pattern (i.e., actor effect $\neq 0$, partner effect $= 0$), a partner-only pattern (i.e., actor effect $= 0$, partner effect $\neq 0$), and a couple pattern (i.e., actor effect = partner effect). Our findings suggest an actor-only pattern for illness perceptions and a partner-only pattern for RTW expectations. However, the correlations between dyad members' perceptions and their RTW expectations were rather high, possibly resulting in either a significant actor effect or partner effect by chance, while in fact the actor effect and partner effect for these factors do not differ significantly.

In contrast to our hypotheses and previous research [36], no significant associations were found between dyad members' perceptions about the significant other behaviors (i.e., active engagement, protective buffering, and overprotection) and sick leave duration. A possible explanation for this might be that we used generic measures of significant other behaviors whereas Kong et al. [36] used specific measures regarding family members' attitude to RTW and support for RTW. As context specific measures have been found to be more sensitive for the detection of associations and effects than generic measures [37], it is likely that measures specifically on work-related responses from significant others are more predictive of sick leave duration than generic measures as used in this study.

Strengths and limitations

This study has several strengths and limitations. First, the dyadic design allowed us to study both individual and interpersonal associations while taking the dyad members' interdependence into account. As such, in this study we explicitly acknowledge that illness perceptions, RTW expectations and responses take place within an interpersonal context in which dyad members reciprocally influence each other. Other strengths are the use of validated patient- and significant other-versions of the questionnaires to measure illness perceptions and perceived significant other behaviors. Moreover, sick leave duration as outcome measure was based on register data, which restricts recall bias.

A limitation is that the study sample included more workers of older age, men and workers with a musculoskeletal- or mental condition in comparison to a representative cohort of the OHS. This selection bias may have influenced our results in case dyadic processes differ depending on age, gender, or type of disease. However, we do not expect this to be the case, as preliminary analyses indicated that it was not necessary to control for age or type of chronic disease and we included both dyad members' gender as covariates. Second, our findings indicate the presence of nonresponse bias, with an overrepresentation of workers and significant others who were highly satisfied with their relationship, and who reported high levels of active engagement and low levels of protective buffering and overprotection by the significant other. Nonresponse bias is not uncommon, and it is a known phenomenon that individuals who are more satisfied with their relationship are often overrepresented in dyadic study samples [38–40]. Therefore, while the findings of this study apply to dyads who are highly satisfied with their relationship and in which significant others exhibit high levels of active engagement and low levels of protective buffering and overprotection, they may not generalize to dyads that are less satisfied with their relationship.

Implications

This study shows that illness perceptions and RTW expectations of workers and their significant others are interdependent and associated with sick leave duration of workers with chronic diseases. This finding can contribute to early identification of workers who are at higher risk of long-term sick leave, and provide insight into inadequate or maladaptive perceptions and expectations that may need to be modified to facilitate RTW [41]. Considering the interdependence within dyads, dyadic approaches in RTW processes could be of particular importance when dyad members' illness perceptions or RTW expectations are inadequate or maladaptive. In that case, significant others should be involved in occupational health care to modify illness perceptions and RTW expectations of both dyad members in order to facilitate RTW. Further research is needed to investigate whether the present results reproduce in other study populations and whether the interpersonal associations between illness perceptions, RTW expectations and sick leave duration differ depending on the worker's disease and relationship satisfaction of dyad members.

Conclusion

The findings of this study indicate that illness perceptions and RTW expectations of workers and their significant others are interdependent and associated with sick leave duration of workers with chronic disease. More negative illness perceptions and more negative RTW expectations of both workers and their significant others were found to be associated with a longer sick leave duration. Perceived active engagement, protective buffering and overprotection by significant others were not associated with workers' sick leave duration. Considering the interdependence within dyads, involving significant others when intervening on maladaptive or inadequate illness perceptions and RTW expectations may be more effective than targeting only the worker's perceptions and expectations.

Abbreviations

RTW	return to work
OHS	occupational health services
IPQ-B	brief illness perception questionnaire
ABO	active engagement, protective buffering, and overprotection questionnaire

Acknowledgements: We thank Arbo Unie for their contribution to the data collection.

References

1. Schuring M, Burdorf L, Kunst A, et al. The effects of ill health on entering and maintaining paid employment: Evidence in European countries. J Epidemiol Community Health 2007;61:597–604. doi:10.1136/jech.2006.047456
2. Van Rijn RM, Robroek SJW, Brouwer S, et al. Influence of poor health on exit from paid employment: A systematic review. Occup Environ Med 2014;71:295–301. doi:10.1136/oemed-2013-101591
3. Yildiz B, Burdorf A, Schuring M. The influence of chronic diseases and multimorbidity on entering paid employment among unemployed persons – a longitudinal register-based study. Scand J Work Environ Heal 2021;47:208–16. doi:10.5271/sjweh.3942
4. Robroek SJW, Schuring M, Croezen S, et al. Poor health, unhealthy behaviors, and unfavorable work characteristics influence pathways of exit from paid employment among older workers in Europe: A four year follow-up study. Scand J Work Environ Heal 2013;39:125–33. doi:10.5271/sjweh.3319
5. Whitehead L, Jacob E, Towell A, et al. The role of the family in supporting the self-management of chronic conditions: A qualitative systematic review. J Clin Nurs 2018;27:22–30. doi:10.1111/jocn.13775
6. Karademas EC. A new perspective on dyadic regulation in chronic illness: the dyadic regulation connectivity model. Health Psychol Rev 2022;16:1–21. doi:10.1080/17437199.2021.1874471
7. Falconier MK, Kuhn R. Dyadic coping in couples: A conceptual integration and a review of the empirical literature. Front Psychol 2019;10:1–23. doi:10.3389/fpsyg.2019.00571
8. Snippen NC, Vries HJ de, Burg-Vermeulen SJ van der, et al. Influence of significant others on work participation of individuals with chronic diseases: a systematic review. BMJ Open 2019;9:1–13. doi:10.1136/BMJOPEN-2018-021742
9. Hoving JL, van der Meer M, Volkova AY, et al. Illness perceptions and work participation: a systematic review. Int Arch Occup Environ Health 2010;83:595–605. doi:10.1007/s00420-010-0506-6
10. Boot CRLL, Heijmans M, Gulden JWJJ, et al. The role of illness perceptions in labor participation of the chronically ill. Int Arch Occup Environ Health 2008;82:13–20. doi:10.1007/s00420-007-0298-5
11. Løvvik C, Shaw W, Øverland S, et al. Expectations and illness perceptions as predictors of benefit recipiency among workers with common mental disorders: Secondary analysis from a randomised controlled trial. BMJ Open 2014;4:1–9. doi:10.1136/bmjopen-2013-004321
12. Heymans MW, De Vet HCWW, Knol DL, et al. Workers' beliefs and expectations affect return to work over 12 months. J Occup Rehabil 2006;16:685–95. doi:10.1007/s10926-006-9058-8
13. Aasdahl L, Pape K, Vasseljen O, et al. Improved Expectations About Length of Sick Leave During Occupational Rehabilitation Is Associated with Increased Work Participation. J Occup Rehabil 2019;29:475–82. doi:10.1007/s10926-018-9808-4
14. Sullivan V, Wilson MN, Gross DP, et al. Expectations for Return to Work Predict Return to Work in Workers with Low Back Pain: An Individual Participant Data (IPD) Meta-Analysis. J. Occup. Rehabil. 2022. doi:10.1007/s10926-022-10027-w
15. Badr H, Acitelli LK. Re-thinking dyadic coping in the context of chronic illness. Curr Opin Psychol 2017;13:44–8. doi:10.1016/j.copsyc.2016.03.001

16. Berg CA, Upchurch R. A developmental-contextual model of couples coping with chronic illness across the adult life span. Psychol Bull 2007;133:920–54. doi:10.1037/0033-2909.133.6.920
17. McCluskey S, Brooks J, King N, et al. The influence of 'significant others' on persistent back pain and work participation: A qualitative exploration of illness perceptions. BMC Musculoskelet Disord 2011;12:236. doi:10.1186/1471-2474-12-236
18. Brooks J, McCluskey S, King N, et al. Illness perceptions in the context of differing work participation outcomes: Exploring the influence of significant others in persistent back pain. BMC Musculoskelet Disord 2013;14:1–11. doi:10.1186/1471-2474-14-48
19. Nilsson M, Olsson M, Wennman-Larsen A, et al. Return to work after breast cancer: Women's experiences of encounters with different stakeholders. Eur J Oncol Nurs 2011;15:267–74. doi:10.1016/j.ejon.2011.03.005
20. Tamminga SJ, de Boer AGEM, Verbeek JH, et al. Breast cancer survivors' views of factors that influence the return-to-work process - a qualitative study. Scand J Work Environ Heal 2012;38:144–54. doi:10.5271/sjweh.3199
21. Auerbach ES, Richardson P. The long-term work experiences of persons with severe and persistent mental illness. Psychiatr Rehabil J 2005;28:267–73. doi:10.2975/28.2005.267.273
22. Duijts SFA, van Egmond MP, Gits M, et al. Cancer survivors' perspectives and experiences regarding behavioural determinants of return to work and continuation of work. Psychooncology 2017;39:2164–72. doi:10.1080/09638288.2016.1219924
23. Snippen NC, de Vries HJ, Roelen CAM, et al. The Associations Between Illness Perceptions and Expectations About Return to Work of Workers With Chronic Diseases and Their Significant Others: A Dyadic Analysis. J Occup Rehabil 2022;:1–12. doi:10.1007/s10926-022-10062-7
24. Kenny DA, Kashy DA, Cook WL. Dyadic Data Analysis. Guilford Press 2006.
25. Broadbent E, Petrie KJ, Main J, et al. The Brief Illness Perception Questionnaire. J Psychosom Res 2006;60:631–7. doi:10.1016/j.jpsychores.2005.10.020
26. de Raaij EJ, Schröder C, Maissan FJ, et al. Cross-cultural adaptation and measurement properties of the Brief Illness Perception Questionnaire-Dutch Language Version. Man Ther 2012;17:330–5. doi:10.1016/j.math.2012.03.001
27. Sterba KR, DeVellis RF. Developing a spouse version of the Illness Perception Questionnaire-Revised (IPQ-R) for husbands of women with rheumatoid arthritis. Psychol Heal 2009;24:473–87. doi:10.1080/08870440701867788
28. Storheim K GA. Evaluation Of The Brief Illness Perception Questionnaire In Sub-Acute And Chronic Low Back Pain Patients: Data Quality, Reliability And Validity. J Pain Reli 2013;2:1–6. doi:10.4172/2167-0846.1000122
29. Chittem M, Norman P, Harris PR. Relationships between perceived diagnostic disclosure, patient characteristics, psychological distress and illness perceptions in Indian cancer patients. Psychooncology 2013;22:1375–80. doi:10.1002/pon.3149
30. Radat F, Lantéri-Minet M, Nachit-Ouinekh F, et al. The GRIM2005 study of migraine consultation in France. III: Psychological features of subjects with migraine. Cephalalgia 2009;29:338–50. doi:10.1111/j.1468-2982.2008.01718.x
31. Buunk BP, Berkhuysen MA, Sanderman R, et al. Actieve betrokkenheid, beschermend bufferen en overbescherming. Meetinstrumenten voor de rol van de partner bij hartrevalidatie. [The role of the partner in heart disease: Active engagement, protective buffering, and overprotection]. Gedrag Gezondh Tijdschr voor Psychol en Gezondh 1996;24:304–13.https://psycnet.apa.org/record/1997-02697-001 (accessed 10 Jun 2022).

32. Kuijer RG, Ybema JF, Buunk BP, et al. Active engagement, protective buffering, and overprotection: Three ways of giving support by intimate partners of patients with cancer. J Soc Clin Psychol 2000;19:256–75. doi:10.1521/jscp.2000.19.2.256
33. Rottmann N, Hansen DG, Larsen PV, et al. Dyadic coping within couples dealing with breast cancer: A longitudinal, population-based study. Heal Psychol 2015;34:486–95. doi:10.1037/hea0000218
34. Hemphill JF. Interpreting the magnitudes of correlation coefficients. Am Psychol 2003;58:78–9. doi:10.1037/0003-066X.58.1.78
35. Kenny DA. APIM with Between- and Within Dyads Outcomes [PowerPoint slides]. 2014;:1–12. https://slideplayer.com/slide/5336670/
36. Kong W, Tang D, Luo X, et al. Prediction of Return to Work Outcomes Under an Injured Worker Case Management Program. J Occup Rehabil 2012;22:230–40. doi:10.1007/s10926-011-9343-z
37. Churruca K, Pomare C, Ellis LA, et al. Patient-reported outcome measures (PROMs): A review of generic and condition-specific measures and a discussion of trends and issues. Heal Expect 2021;24:1015–24. doi:10.1111/hex.13254
38. Hagedoorn M, Hein FL, Schulz T, et al. Are patient and relationship variables associated with participation of intimate partners in couples research? Heal Psychol 2015;34:270–3. doi:10.1037/hea0000141
39. Barton AW, Lavner JA, Stanley SM, et al. 'Will You Complete This Survey Too?' Differences Between Individual Versus Dyadic Samples in Relationship Research. J Fam Psychol 2019;34:196–203. doi:10.1037/fam0000583
40. Wittenborn AK, Dolbin-Macnab ML, Keiley MK. Dyadic Research in Marriage and Family Therapy: Methodological Considerations. J Marital Fam Ther 2013;39:5–16. doi:10.1111/J.1752-0606.2012.00306.X
41. Sampere M, Gimeno D, Serra C, et al. Return to work expectations of workers on long-term non-work-related sick leave. J Occup Rehabil 2012;22:15–26. doi:10.1007/s10926-011-9313-5

Supplementary material

Supplementary Table 1. Overview of items included and deleted items for the significant other behavior scales.

	Original scale				Final scale			
	Workers		Significant others		Workers		Significant others	
Items	α if item deleted	α	α if item deleted	α	α if item deleted	α	α if item deleted	α
Active engagement		.88		.90				
My partner tries to discuss it [the fact that I am ill] with me openly	.84		.88					
My partner asks me how I feel.	.85		.89					
When something bothers me, my partner tries to discuss the problem.	.84		.85					
My partner is full of understanding towards me.	.87		.88					
My partner makes me feel that I'm not alone in this.	.88		.88					
Protective buffering		.65		.64		.74		.73
With the best intentions, my partner makes up excuses to persuade me to follow the doctor's instructions.	.66		.60		.79		.72	
My partner tries to hide his or her worries about me.	.58		.60		.70		.74	
My partner tries to act as if nothing is the matter.	.56		.57		.65		.66	
My partner gives in when I make an issue of something.	.61		.56		.74		.67	
My partner just waves my worries aside.	.59		.59		.68		.68	
My partner does everything to prevent me from thinking about my disease.	.68		.69		Deleted		Deleted	
My partner can't endure me being concerned and acts as if he or she doesn't notice my worries.	.53		.57		.64		.68	

Supplementary Table 1. Overview of items included and deleted items for the significant other behavior scales (continued).

	Original scale				Final scale			
	Workers		Significant others		Workers		Significant others	
Items	α if item deleted	α	α if item deleted	α	α if item deleted	α	α if item deleted	α
My partner takes over as much of my work as possible.	.68		.63		Deleted		Deleted	
Overprotection		.65		.65		.80		.77
My partner treats me like a baby.	.62		.61		.79		.80	
My partner continuously keeps an eye on me.	.63		.64		Deleted		Deleted	
My partner takes care that I follow the doctor's instructions.	.70		.66		Deleted		Deleted	
When it comes down to it, my partner seems to think that he or she can't leave my recovery to me.	.55		.60		.69		.68	
When it comes down to it, my partner seems to think that when he or she is not constantly around, I will not follow the doctor's instructions.	.56		.57		.77		.68	
When it comes down to it, my partner seems to think that I don't know what's right for me.	.58		.58		.71		.67	

Bold items were included in the final scale

Supplementary Table 2. Comparison baseline characteristics of in- and excluded workers.

Characteristic	**Included workers** (*n* = 90)		**Excluded workers** (*n* = 76)		**Sig**
Age in years (*SD*)	53.5	(10.1)	52.5	(14.4)	.605
Gender					.475
Male	49	(54.4%)	44	(57.9%)	
Female	41	(45.6%)	31	(40.8%)	
Educational level					.235
Low	16	(17.8%)	16	(21.1%)	
Medium	31	(34.4%)	34	(44.7%)	
High	42	(46.7%)	26	(34.2%)	
Relationship quality, mean (*SD*)	8.7	(1.0)	8.3	(1.9)	.075
Type of chronic disease					.634
Somatic	56	(62.2%)	40	(52.6%)	
Mental	17	(18.9%)	16	(21.1%)	
Mixed	16	(17.8%)	16	(21.1%)	
Number of chronic diseases					.461
1	51	(56.7%)	46	(60.5%)	
>1	38	(42.2%)	27	(35.5%)	
Employment status					.373
Fulltime (≥ 36 hours per week)	55	(61.1%)	39	(43.4%)	
Part-time (12 – 35 hours per week)	35	(38.9%)	33	(51.3%)	
Duration of sick leave (max 730 days), mean (*SD*)	323	(254)	282	(216)	.314
Mean scores (*SD*)					
RTW expectations (scale 1-6)	3.0	(1.3)	3.1	(1.3)	.780
Composite illness perceptions score (scale 0-80)	48.5	(10.3)	47.2	(11.4)	.374
Significant other active engagement (scale 1-5)	4.0	(0.8)	3.9	(0.7)	.961
Significant other protective buffering (scale 1-5)	1.9	(0.6)	2.0	(0.6)	.708
Significant other overprotection (scale 1-5)	1.4	(0.6)	1.6	(0.6)	.190

SD = standard deviation

RTW = return to work

Chapter 5

Assessing significant others' cognitions and behavioral responses in occupational health care for workers with a chronic disease

Nicole Snippen, Haitze de Vries, Mariska de Wit, Sylvia van der Burg-Vermeulen,

Sandra Brouwer, Mariët Hagedoorn

Disability and Rehabilitation, 2021, DOI: 10.1080/09638288.2020.1711536

Abstract

Purpose: To examine current practices of occupational health professionals in assessing significant others' cognitions and behavioral responses that may influence work outcomes of workers with a chronic disease.

Methods: A survey study among occupational health professionals, focusing on the assessment of illness perceptions, work-related beliefs and expectations, and behavioral responses of significant others of workers with a chronic disease. We performed linear regression analyses to investigate which factors are related to occupational health professionals' assessment practices. We used thematic analysis to analyze qualitative data on occupational health professionals' reasons to assess or overlook significant others' cognitions and behavioral responses.

Results: Our study sample included 192 occupational health professionals. Most seldom asked about significant others' cognitions and behavioral responses. Organizational norms and occupational health professionals' self-efficacy were related to reported assessment practices. Reasons to assess significant others' cognitions and behavioral responses included recognizing their influence on work participation, and occurrence of stagnation. However, occupational health professionals indicated some doubt whether such assessment would always contribute to better care.

Conclusions: It is not common practice for occupational health professionals to assess significant others' cognitions and behavioral responses, although they recognize the influence of these factors on work outcomes. More research is needed as to how occupational health professionals can best address the role of significant others, and apply these new insights in their daily practice.

Introduction

Significant others (SOs), like partners, family members or friends, can play an important role in work and health outcomes of individuals with a chronic disease [1–4]. SOs can be an important resource to help individuals cope effectively with a chronic disease and to manage their working life [1,4–6], and may therefore be important facilitators of work participation. However, they can also be an important barrier, for example when SOs believe that return to work will worsen the condition and they pressure the worker to refrain from work [7,8].

Various models have been used to explain how an individual's coping can be influenced by a SO. For example, both the developmental-contextual model and the Systemic Transactional Model are based on the assumption that stressors, such as a chronic illness of one partner, affect both the patient and the partner and that there is interdependence between their stress and coping processes [9]. Both models highlight the importance of appraisals about the stressor and the behavior of both members of the couple under stress to understand individual and dyadic coping processes. This is in line with prior research that indicates that SOs' cognitions (e.g. illness perceptions, beliefs and attitudes) and behavioral responses (e.g. social support and negative or solicitous responses) can influence how workers cope with chronic disease [10–15]. More specifically, in a recent systematic review we found that SOs' positive and encouraging attitudes regarding work participation, encouragement and motivating behavior and open communication with workers can facilitate work participation [4]. On the other hand, SO's positive attitudes towards sickness absence and advice, encouragement or pressure to refrain from work can hinder work participation of workers with a chronic disease. As there is evidence that clinical health care interventions in which SOs are involved are more effective than care in which SOs are not involved [16–19], this may also be beneficial in occupational health care.

The recent shift from a predominantly medical to a biopsychosocial approach indicates that occupational health professionals (OHPs) need to be aware of environmental factors as well as medical and personal factors, as the interaction between these factors has been found to influence functioning and disability [20–23]. Moreover, various multidisciplinary and clinical guidelines advise health professionals to address environmental factors and to involve SOs such as family members in treatment and care [16,17,24–28]. For example, the Scottish guideline "Management of chronic pain" recommends that health professionals assess the influence of family on pain behavior [25], and the Dutch multidisciplinary occupational health guideline "Chronically ill and work" enjoins OHPs to take into account the influence of social support and overprotection by SOs [24].

Until now, the extent to which such guideline recommendations are implemented in daily practice is unclear. In particular, little is known about how often OHPs assess the cognitions and behavioral responses of SOs of workers with a chronic disease, whether they assess particular cognitions or behavioral responses more frequently than others, and what motivates them to assess or overlook these cognitions and behavioral responses. Gaining insight into current practices could provide an empirical basis to improve involvement of SOs in occupational health care and to develop effective interventions to deal with SOs' influences on workers with chronic illnesses.

The first aim of this study was thus to examine to what extent OHPs assess cognitions and behavioral responses of SOs of workers with a chronic disease in their daily practice, and whether they assess certain cognitions or behavioral responses more frequently than others. Secondly, we aimed to determine which factors are related to the assessment of SOs' cognitions and behavioral responses. Third, we aimed to explore why OHPs' either assess or overlook these cognitions and behavioral responses.

Materials and methods

Context

Internationally, various types of OHPs are involved in occupational health care to assess work ability, prevent sickness absence, and promote work participation. In the Netherlands, two main types of OHPs play an important role in occupational health care: occupational physicians and insurance physicians [18]. Occupational physicians are generally involved in the first two years of sick leave, during which they provide support and guidance to help employees retain or return to work. When employees have been on sick leave for over two years, they can claim a disability benefit at the Dutch Social Security Institute: the Institute for Employee Benefits Scheme (UWV). For this claim, insurance physicians assess the functional limitations of the employee due to illness or disability. Self-employed workers cannot claim a disability benefit at the Dutch Social Security Institute, but can choose to insure themselves against occupational disability risks at private insurance companies. For these workers, insurance physicians working in the private sector (medical advisors) assess the functional limitations due to illness or disability, assess disability claims, and provide medical advice regarding injury or illness in relation to work.

Design and procedure

We conducted a mixed-method cross-sectional survey study among OHPs in the Netherlands, involving a sample of occupational and insurance physicians. In total, 1,719 occupational physicians and 964 insurance physicians were registered on December 31st 2017 by the Registration Committee Medical Specialists of the Royal Dutch Society for the Advancement of Medicine (KNMG) [19]. For distribution of the survey we cooperated with the Dutch Association of Occupational Medicine (NVAB), the Dutch Association for Insurance Medicine (NVVG) and the Dutch Association of Medical Advisers in Private Insurance (GAV). An invitation letter to participate in this study was distributed by email to all occupational physicians who were members of the NVAB (1,350 occupational physicians) and insurance physicians who were member of the NVVG (668 insurance physicians) and the GAV (231 insurance physicians). The letter included information on the study aim and time needed to complete the survey, as well as privacy, confidentiality, and anonymous processing of the data. It also included a link to the online survey. Approximately three weeks later a reminder was sent. Participants were offered no compensation or reward. The first invitation offered a 2-month response time, after which the survey was closed.

Informed consent was obtained at the start of the survey. Inclusion criteria for study participation were: 1. being an occupational or insurance physician, and 2. being involved in return to work or work disability procedures of workers with a chronic disease. Physicians who failed to give informed consent or were not eligible to participate were automatically excluded from further participation. Moreover, participants who indicated working in more than one profession were asked to select one profession, for which they would answer the remaining survey questions. This was because assessment of SOs' cognitions and behavioral responses might differ between professions, for example due to a different task (i.e. supporting workers to retain or return to work versus assessment of functional limitations due to illness or disability) or phase in the return-to-work process in which they were involved. The survey included both multiple choice and open questions and took approximately 20 to 30 minutes to complete.

The Medical Ethics Review Committee of the University Medical Center Groningen confirmed that because the Medical Research Involving Human Subjects Act (WMO) did not apply to this study official approval by this committee was not required (METc 2017/486, M17.218841).

Measures

As we were interested in assessment practices of OHPs concerning SOs of workers, we specified SOs as a partner, family members or friends at the start of the survey. To measure OHPs' current assessment practices we used three constructs, derived from our recently published systematic review [4], namely assessment of SOs' *(i) illness perceptions*, *(ii) work-related beliefs and expectations*, and *(iii) supportive and unsupportive behavioral responses*. For all three constructs, items were derived from existing questionnaires and adapted to the purpose of this survey. To reduce the length of the survey, we selected only those items corresponding to SOs' cognitions or behavioral responses which had previously been reported to be related to work participation of workers with a chronic disease [4]. In some cases we combined multiple items into one. The items for each of the constructs are included in Supplementary Table S1 1. Moreover, to measure all items of the constructs we used a 5-point Likert scale (never, rarely, sometimes, often, or always).

We measured OHPs' assessment of SOs' *illness perceptions* using four items on a 5-point Likert scale. We included items regarding perceptions about the subscales "cause" and "control" of the Dutch version of the Brief Illness Perceptions Questionnaire [29] and the subscales “perseverance” and “avoidance” of the Extended Illness Cognition Questionnaire [30]. The internal consistency of the construct was high, with a Cronbach's alpha of .90.

We measured OHPs’ assessment of SOs’ *work-related beliefs and expectations*, using four items on a 5-point Likert scale. Three items were based on items from the Return-To-Work Self-Efficacy questionnaire (RTWSE-19) [31] and one item was derived from the Work-Related Recovery Expectations Questionnaire [32]. The internal consistency of the construct was high, with a Cronbach's alpha of .90.

We measured OHPs’ assessment of SOs’ *supportive and unsupportive behavioral responses* towards the worker, using eight items on a 5-point Likert scale. We derived the questions from items of the Sources of Social Support Scale [33] and the Spouse Response Inventory (SRI). The internal consistency of the construct was high, with a Cronbach's alpha of .88.

We also collected descriptives of OHPs (age, gender, profession, employment status, years in practice, and core tasks). We measured OHPs’ self-efficacy to address SOs’ cognitions and behavioral responses in daily practice using six items on a 5-point Likert scale ranging from strongly disagree to strongly agree. Three items related to OHPs’ self-perceived knowledge, skills, and availability of tools to assess SOs’ cognitions and behavioral responses The other three items measured OHPs’ self-perceived knowledge, skills and availability of tools to respond effectively to cognitions and behavioral responses of SOs. The internal consistency of the construct was high, with a Cronbach's alpha of .92. In addition, we measured the organizational norm for assessing SOs’ cognitions and behavioral responses by asking OHPs whether they were expected to assess (i) beliefs and expectations or (ii) responses, behaviors and involvement of SOs according to the social norm in their organization. Only OHPs who indicated that they were in paid employment were asked to answer these items, as self-employed OHPs are not employed at an organization with colleagues working in the same profession and these items therefore did not apply to these OHPs.

Finally, using four open-ended questions we collected data on OHPs’ reasons to assess or not to assess SOs’ cognitions and behavioral responses. Two questions asked for participants’ reasons to assess: (i) SOs’ beliefs and expectations and (ii) SOs’ responses, behaviors and involvement. The other two questions asked participants to state their reasons for not assessing these factors.

The survey was piloted by five OHPs (both occupational and insurance physicians). They were asked to read the invitation letter, complete the survey, and think about strategies to enhance participation in the survey study. Based on their feedback we made some small linguistic adaptations in the invitation letter and the survey.

Data analysis

Quantitative data were analyzed using SPSS version 25 [34]. Descriptive statistics (e.g. frequencies, percentages, means, standard deviations) were used to describe the study sample and to indicate how often professionals address each of the constructs (SOs' illness perceptions, work-related beliefs and expectations, or behavioral responses). The Friedman test was used to determine whether physicians assess certain constructs more frequently than others. Post hoc analyses with Wilcoxon signed-rank tests were conducted to determine where the differences occurred. Sensitivity analyses were performed to determine whether assessment practices differed between occupational and insurance physicians.

To investigate which factors related to OHPs' assessment of SOs' cognitions and behavioral responses, univariate and backwards multiple linear regression analyses were performed for each construct. The three constructs were entered as dependent variables. We performed preliminary analyses for each construct to ensure that there was no violation of the assumptions of normality, multicollinearity and homoscedasticity. The independent variables entered in the models were: (i) gender, (ii) profession, (iii) employment status, (iv) years in practice, (v) core task of the professional, (vi) self-efficacy, and (vii) organizational norm to assess SOs' cognitions (for the two cognitive constructs) or behavioral responses (for the behavioral construct). Dummy variables were created for all variables, except for self-efficacy (continuous variable). To prevent interpretation difficulties, dummy variables belonging to the same variable were entered as a block. After performance of the univariate linear regressions for each construct, we performed backwards multiple linear regressions, entering only those independent variables that were significantly associated with the dependent variable in the univariate regressions ($p < .05$). We entered a block of dummy variables in the multiple regressions when at least one dummy variable in the block was significant in the univariate regressions ($p < .05$).

To analyze OHPs' responses on the four open-ended questions regarding why they did or did not assess SOs' cognitions and behavioral responses, we used thematic analysis, following the six recommended phases for conducting such analysis [35]. In the first phase we read and re-read transcripts to become familiar with the data (NCS, HdV). In the second phase, initial codes were generated and data were systematically collated to each code across the entire data (NCS, HdV). In the third phase codes were collated into potential themes (NCS, HdV). In the fourth phase, the potential themes were reviewed and refined, first on the level of the coded extracts, after which the process was repeated on the level of the entire data set (NCS, HdV). The fifth phase involved generating a definition and name for each theme, and with two additional members of the research team (MH, SB) we checked the final themes. In the final phase we selected examples of quotes for each theme and described the findings (NCS).

Results

A total of 241 OHPs agreed to participate in the study (response rate of 10.7%). OHPs who did not respond to all items of at least one of the three constructs (SOs' illness perceptions, work-related beliefs and expectations, or behavioral responses) were excluded from the analyses (*n* = 49). The final study sample consisted of 192 OHPs (79.7%). In the group of non-responders, a higher percentage of OHPs were female (53.1% vs. 39.6%) and self-employed (41.5% vs. 31.3%) than in the final study sample. In addition, in the non-response group, a higher percentage worked as insurance physicians and indicated that providing medical advice was their core task (34.7% vs. 27.1%). The majority of the final study sample were male (60.6%) and worked in paid employment (64.8%). Seventy-three percent were occupational physicians and 84 percent indicated having had at least 16 years of work experience, a percentage comparable to the general population of OHPs in the Netherlands [36]. More detailed demographic information of the participants is provided in Table 1.

Table 1. Characteristics of participating occupational health professionals (*N* = 192).

Characteristics	**Total sample** (*N* = 192) *n* (%)	
Gender		
Male	116	(60.4)
Female	76	(39.6)
Age in years mean (*M, SD*)	56	(7.6)
Profession		
Occupational physician	140	(72.9)
Insurance physician	52	(27.1)
Core task(s)		
Supporting workers to retain or return to work	58	(30.2)
Assessment of functional limitations due to illness or disability	24	(12.5)
Providing medical advice regarding issues of injury or illness in relation to work	4	(2.1)
Supporting workers and providing medical advice	25	(13.0)
Assessment of functional limitations and providing medical advice	6	(3.1)
Supporting workers and assessment of functional limitations	15	(7.8)
Supporting workers, assessment of functional limitations, and providing medical advice	24	(12.5)
Missing	36	(18.8)

Table 1. Characteristics of participating occupational health professionals ($N = 192$) (continued).

Characteristics	**Total sample** ($N = 192$) n (%)	
Work experience (years in practice)		
< 5	9	(4.7)
5 - 10	8	(4.2)
11 - 15	13	(6.8)
16 - 20	39	(20.3)
> 20	123	(64.1)
Employment status		
In paid employment	125	(65.1)
Self-employed	60	(31.3)
Both self-employed and in paid employment	7	(3.6)
Self-efficacy to assess and respond to cognitions and behavioral responses of significant others (*M, SD*)	3.39	(.88)
Organizational norm		
Is it customary within your organization for someone in your profession to assess significant others' responses, behaviors and involvement?		
Yes	54	(28.1)
No	55	(28.6)
Not applicable (self-employed)	60	(31.3)
Missing	23	(12.0)
Is it customary within your organization for someone in your profession to assess significant others' beliefs and expectations?		
Yes	40	(20.8)
No	70	(36.5)
Not applicable (self-employed)	60	(31.3)
Missing	22	(11.5)

M = mean
SD = standard deviation

Assessment of SOs' cognitions and behavior

Most OHPs reported that they did not frequently ask about SOs' *(i) illness perceptions* (Figure 1), *(ii) work-related beliefs and expectations* (Figure 2), and *(iii) behavioral responses* (Figure 3). They (70.4%) reported frequently (often or always) assessing only practical support, while 8.9 to 36.5 percent of OHPs frequently assessed the other items. More detailed information about the response distribution within the three constructs is provided in

Supplementary Table S1. Sensitivity analyses showed no significant differences between assessment practices of occupational versus insurance physicians.

Comparison of the assessment frequencies of the three constructs indicated a statistically significant difference ($\chi^2(2) = 99.54$, $p < .001$). Post hoc analyses showed that OHPs more frequently reported asking about SOs' *behavioral responses* than about their *illness perceptions* ($Z = -7.12$, $p < .001$) and *work-related beliefs and expectations* ($Z = -8.02$, $p < .001$). Moreover, they more frequently reported asking about SOs' *illness perceptions* than about their *work-related beliefs and expectations* ($Z = -2.68$, $p < .007$).

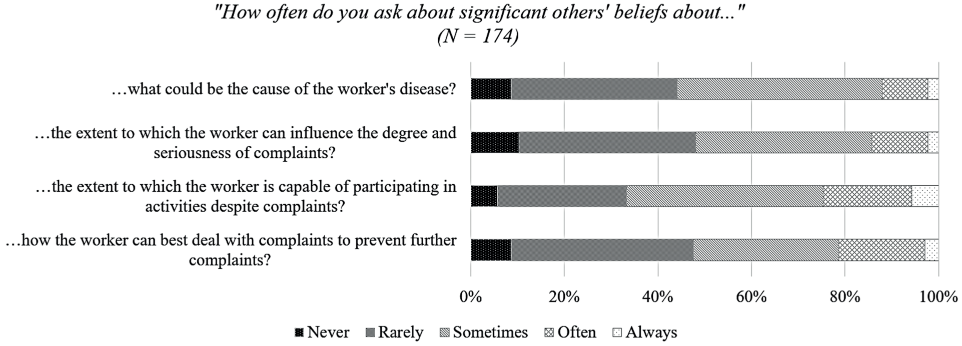


Figure 1. Distribution of responses for assessment of significant others' illness perceptions by occupational health professionals (Median = 2.8, IQR = 2.0-3.0).

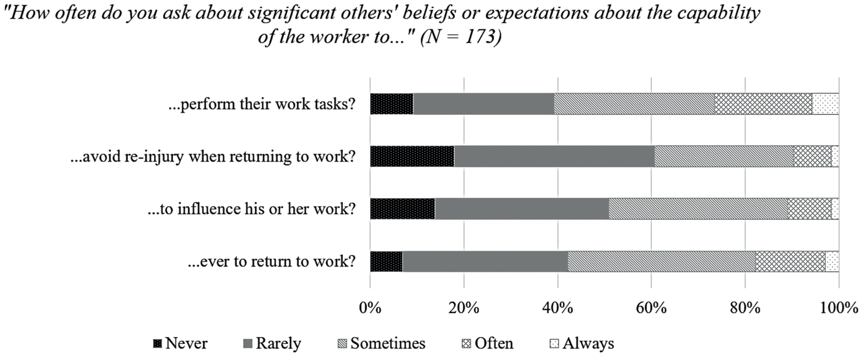


Figure 2. Distribution of responses for assessment of significant others' work-related beliefs and expectations by occupational health professionals (Median = 2.5, IQR = 2.0-3.0).

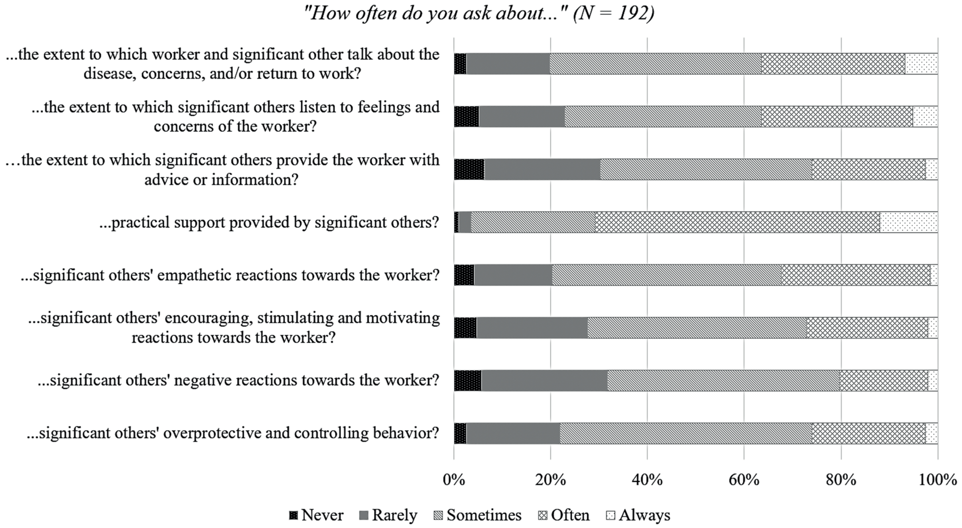


Figure 3. Distribution of responses for assessment of significant others' behavioral responses by occupational health professionals (Median = 3.0, IQR = 2.9-3.5).

Factors associated with OHPs' assessment practices

Table 2 shows the results of the univariate and multiple linear regression analyses for OHPs' assessment of the three constructs.

With regard to the construct assessment of SOs' *illness perceptions,* only the variable organizational norm remained in the final multiple regression model, explaining 17.2 percent of the variance ($F(1, 116) = 24.02$, $R^2 = .172$, $p < .001$). OHPs who regarded it customary within their organization for someone of their profession to ask about SOs' cognitions were more likely to do so themselves.

For the construct assessment of SOs' *work-related beliefs and expectations,* the variables organizational norm, profession and self-efficacy remained in the final multiple regression model, explaining 19.3 percent of the variance ($F(3, 114) = 9.07$, $R^2 = .193$, $p < .001$). The presence of an organizational norm to assess SOs' cognitions was positively associated with OHPs' reported assessment of SOs' work-related beliefs and expectations. In addition, insurance physicians reported asking less frequently about SOs' work-related beliefs and expectations than occupational physicians. Furthermore, OHPs' showed a trend of a positive relation between self-efficacy to address cognitions and behavioral responses of SOs and reported assessment practices. However, this trend was not statistically significant.

With regard to the construct assessment of SOs' *behavioral responses*, the variables organizational norm and years in practice remained in the final multiple regression model, explaining 29.8 percent of the variance ($F(5, 119) = 10.09$, $R^2 = .298$, $p < .001$). Both variables were positively associated with OHPs' reported assessment of SOs' behavioral responses.

In the final multiple regression models, the presence of an organizational norm was the only variable that significantly contributed to OHPs' assessment practices across all three constructs. However, inclusion of the organizational norm in the regression analyses considerably reduced our study sample because participating self-employed OHPs did not complete the items on the organizational norm as these items did not apply to them ($n = 60$). We therefore conducted additional multivariate regression analyses excluding the variable organizational norm (Table 2, 3rd column). In the additional analyses, OHPs' self-efficacy was the only variable that significantly contributed to OHPs' assessment practices for all three constructs. OHPs who felt more competent to ask about and effectively respond to SOs' beliefs and expectations or behavioral responses were more likely to assess these factors. Aside from the inclusion of the variable self-efficacy instead of the organizational norm, the final multiple regression models of the additional analyses resembled those of the initial analyses with regard to those variables that remained in the final models. However, the final multiple regression models of the additional analyses explained less of the variance (8.0-15.3%) than did the final multiple regression models of the initial analyses, in which the variable organizational norm was included (17.2-29.8%).

Table 2. Univariate and Multiple Regression Analyses for variables predicting OHPs' assessment of significant others' illness perceptions, work-related beliefs and expectations, and behavioral responses.

Variable	**Univariate regression**			**Final regression model (incl. organizational norm)**			**Final regression model (excl. organizational norm)**[1]		
	B (95% CI)	t	Sig	B (95% CI)	t	Sig	B (95% CI)	t	Sig
Assessment of significant others' illness perceptions (dependent variable)									
(Constant)				2.43 (2.27, 2.60)	28.80	< .001**	2.27 (1.63, 2.90)	7.05	<.001**
Gender									
Female	-.26 (-.51, -.02)	-2.09	.04*	-	-	-	-.24 (-.48, .01)	-1.92	.06
Male (reference group)	Ref.	Ref.	Ref.	-	-	-	Ref.	Ref.	Ref.
Years in practice									
< 5 years	-.52 (-1.08, .03)	-1.86	.07	-	-	-	-	-	-
5 - 10 years	-.02 (-.65, .60)	-.08	.94	-	-	-	-	-	-
11 - 15 years	-.30 (-.81, .21)	-1.15	.25	-	-	-	-	-	-
16 - 20 years	-.16 (-.47, .16)	-.98	.33	-	-	-	-	-	-
> 20 years (reference group)	Ref.	Ref.	Ref.	-	-	-	-	-	-
Profession									
Insurance physician	-.21 (-.49, .06)	-1.55	.12	-	-	-	-	-	-
Occupational physician (reference group)	Ref.	Ref.	Ref.	-	-	-	-	-	-
Employment status									
Self-employed	.11 (-.16, .38)	.82	.41	-	-	-	-	-	-
Both self-employed and in paid employment	.46 (-.16, 1.09)	1.46	.15	-	-	-	-	-	-
In paid employment (reference group)	Ref.	Ref.	Ref.	-	-	-	-	-	-
Core task									
Supporting workers to retain or return to work	.12 (-.10, .53)	.55	.58	-	-	-	-	-	-
Providing medical advice regarding issues of injury or illness in relation to work	-.08 (-1.07, .92)	-.15	.88	-	-	-	-	-	-

Table 2. Univariate and Multiple Regression Analyses for variables predicting OHPs' assessment of significant others' illness perceptions, work-related beliefs and expectations, and behavioral responses (continued).

Variable	Univariate regression			Final regression model (incl. organizational norm)			Final regression model (excl. organizational norm)[1]		
	B (95% CI)	t	Sig	B (95% CI)	t	Sig	B (95% CI)	t	Sig
Supporting workers and providing medical advice	-.13 (-.60, .35)	-.54	.59	-	-	-	-	-	-
Assessment of functional limitations and providing medical advice	.59 (-.29, 1.47)	1.33	.19	-	-	-	-	-	-
Supporting workers and assessment of functional limitations	.14 (-.41, .70)	.52	.61	-	-	-	-	-	-
Supporting workers, assessment of functional limitations and providing medical advice	.32 (-.17, .81)	1.29	.20	-	-	-	-	-	-
Assessment of functional limitations due to illness or disability (reference group)	Ref.	Ref.	Ref.	-	-	-	-	-	-
Presence of an organizational norm to assess significant others' beliefs and expectations									
Yes	.71 (.43, .99)	4.93	< .001**	.71 (.42, 1.00)	4.90	< .001**	-	-	-
No (reference group)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	-	-	-
Occupational health professionals' self-efficacy	.24 (.09, .38)	3.28	.001**	-	-	-	.22 (.08, .36)	3.10	.002**
Assessment of significant others' work-related beliefs and expectations (dependent variable)									
(Constant)				1.84 (1.24, 2.45)	6.00	< .001**	1.26 (.59, 1.94)	3.72	<.001**
Gender									
Female	-.19 (-.44, .07)	-1.44	.15	-	-	-	-	-	-
Male (reference group)	Ref.	Ref.	Ref.	-	-	-	-	-	-
Years in practice							-	-	-
< 5 years	-.83 (-1.38, -.27)	-2.92	.004**	-	-	-	-	-	-
5 - 10 years	.06 (-.57, .68)	.18	.86	-	-	-	-	-	-
11 - 15 years	-.23 (-.74, .28)	-.88	.38	-	-	-	-	-	-

Table 2. Univariate and Multiple Regression Analyses for variables predicting OHPs' assessment of significant others' illness perceptions, work-related beliefs and expectations, and behavioral responses (continued).

Variable	**Univariate regression**			**Final regression model (incl. organizational norm)**			**Final regression model (excl. organizational norm)**[1]		
	B (95% CI)	t	Sig	B (95% CI)	t	Sig	B (95% CI)	t	Sig
16 - 20 years	-.06 (-.38, .25)	-.39	.70	-	-	-	-	-	-
> 20 years (reference group)	Ref.	Ref.	Ref.	-	-	-	-	-	-
Profession							-	-	-
Insurance physician	-.33 (-.61, -.05)	-2.36	.02*	-.36 (-.66, -.05)	-2.32	.02*	-	-	-
Occupational physician (reference group)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	-	-	-
Employment status							-	-	-
Self-employed	.01 (-.26, .29)	.11	.92	-	-	-	-	-	-
Both self-employed and in paid employment	.21 (-.43, .85)	.64	.52	-	-	-	-	-	-
In paid employment (reference group)	Ref.	Ref.	Ref.	-	-	-	-	-	-
Core task									
Supporting workers to retain or return to work	.49 (.08, .90)	2.38	.02*	-	-	-	.56 (.16, .95)	2.79	.006**
Providing medical advice surrounding issues on injury or illness in relation to work	.11 (-.88, 1.10)	.22	.83	-	-	-	.09 (-.86, 1.03)	.18	.86
Supporting workers and providing medical advice	.19 (-.28, .66)	.82	.42	-	-	-	.18 (-.27, .63)	.78	.44
Assessment of functional limitations and providing medical advice	.94 (.07, 1.82)	2.14	.03*	-	-	-	.92 (.08, 1.75)	2.16	.032*
Supporting workers and assessment of functional limitations	.23 (-.32, .78)	.83	.41	-	-	-	.32 (-.21, .85)	1.21	.23
Supporting workers, assessment of functional limitations and providing medical advice	.51 (.03, 1.00)	2.09	.04*	-	-	-	.44 (-.02, .91)	1.89	.06
Assessment of functional limitations due to illness or disability (reference group)	Ref.	Ref.	Ref.	-	-	-	Ref.	Ref.	Ref.
Presence of organizational norm to assess significant others' beliefs and expectations									

Table 2. Univariate and Multiple Regression Analyses for variables predicting OHPs' assessment of significant others' illness perceptions, work-related beliefs and expectations, and behavioral responses (continued).

Variable	**Univariate regression**			**Final regression model (incl. organizational norm)**			**Final regression model (excl. organizational norm)**^{1}		
	B (95% CI)	t	Sig	B (95% CI)	t	Sig	B (95% CI)	t	Sig
Yes	.66 (.34, .97)	4.12	<.001**	.49 (.16, .81)	2.94	.004**	-	-	-
No (reference group)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	-	-	-
Occupational health professionals' self-efficacy	.29 (.15, .43)	3.99	<.001**	.21 (-.03, .39)	2.30	.02*	.30 (.13, .46)	3.51	.001**
Assessment of significant others' behavioral responses (dependent variable)									
(Constant)				3.07 (2.92, 3.22)	39.98	< .001**	2.65 (2.30, 3.01)	14.64	<.001**
Gender									
Female	.11 (-.07, .29)	1.17	.24	-	-	-	-	-	-
Male (reference group)	Ref.	Ref.	Ref.	-	-	-	-	-	-
Years in practice									
< 5 years	-.50 (-.92, -.09)	-2.40	.02*	-.54 (.-.93, -16)	-2.77	.006*	-.52 (-.92, -.11)	-2.50	.01*
5 - 10 years	-.64 (-1.08, -.21)	-2.90	.004**	-.73 (-1.17, -.29)	-3.32	.001**	-.67 (-1.10. -.24)	-3.06	.003**
11 - 15 years	-.29 (-.64, .06)	-1.64	.10	-.44 (-.91, .03)	-1.87	.06	-.25 (-.61, .11)	-1.37	.17
16 - 20 years	-.29 (-.51, -.07)	-2.55	.01*	-.33 (-.60, -.07)	-2.48	.01	-.28 (-.50, -.06)	2.51	.01*
> 20 years (reference group)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Profession									
Insurance physician	-.15 (-.35, .05)	-1.45	.15	-	-	-	-	-	-
Occupational physician (reference group)	Ref.	Ref.	Ref.	-	-	-	-	-	-
Employment status							-	-	-
Self-employed	.02 (-.18, .22)	.20	.84	-	-	-	-	-	-
Both self-employed and in paid employment	.21 (-.27, .70)	.86	.39	-	-	-	-	-	-
In paid employment (reference group)	Ref.	Ref.	Ref.	-	-	-	-	-	-
Core task							-	-	-

Table 2. Univariate and Multiple Regression Analyses for variables predicting OHPs' assessment of significant others' illness perceptions, work-related beliefs and expectations, and behavioral responses (continued).

Variable	**Univariate regression**			**Final regression model (incl. organizational norm)**			**Final regression model (excl. organizational norm)**[1]		
	B (95% CI)	t	Sig	B (95% CI)	t	Sig	B (95% CI)	t	Sig
Supporting workers to retain or return to work	.30 (-.002, .61)	1.96	.05	-	-	-	-	-	-
Providing medical advice regarding issues on injury or illness in relation to work	.38 (-.31, 1.06)	1.09	.28	-	-	-	-	-	-
Combination of supporting workers and providing medical advice	.28 (-.09, .64)	1.51	.13	-	-	-	-	-	-
Combination of assessment of functional limitations and providing medical advice	.06 (-.51, .64)	.22	.83	-	-	-	-	-	-
Combination of supporting workers and assessment of functional limitations	.38 (-.04, .79)	1.79	.08	-	-	-	-	-	-
Combination of supporting workers, assessment of functional limitations and providing medical advice	.33 (-.04, .69)	1.78	.08	-	-	-	-	-	-
Assessment of functional limitations due to illness or disability (reference group)	Ref.	Ref.	Ref.	-	-	-	-	-	-
Presence of an organizational norm to assess significant others' behaviors, reactions and involvement									
Yes	.53 (.32, .73)	5.05	<.001**	.51 (.31, .71)	5.00	< .001**	-	-	-
No (reference group)	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	-	-	-
Occupational health professionals' self-efficacy	.18 (.08, .29)	3.52	.001**	-	-	-	.18 (.08, .28)	3.53	.001**

*$p < .05$

**$p < .01$

[1] Model summary assessment of significant others' illness perceptions is $F(2, 169) = 7.30$, $R^2 = .080$, $p = .001$; model summary assessment of significant others' work-related beliefs and expectations is $F(7, 132) = 3.40$, $R^2 = .153$, $p = .002$; model summary assessment of significant others' behavioral responses is $F(5, 178) = 6.41$, $R^2 = .153$, $p < .001$.

Reasons (not) to ask about SOs' cognitions or behavioral responses

We defined six themes regarding OHPs' reasons to ask about SOs' cognitions and behavioral responses, and ten themes regarding OHPs' reasons *not* to ask about this. Table 3 provides an overview of the themes, including theme descriptions and illustrative quotes.

A frequently reported reason *to ask* about SOs' cognitions or behavioral responses was to understand the worker's social context and how SOs support or influence him/her, because these OHPs already presume that these persons can influence the worker, the recovery, and/or the re-integration process (theme 1). For example, an occupational physician indicated:

> *"It can be an important supportive factor, but it can also play a role in negative cognitions or stagnation of recovery, for example when a significant other is fearful or has many concerns"*

OHPs also reported asking about SOs' cognitions or behavioral responses to get additional information, for instance about the worker's complaints, functioning and coping (theme 2). OHPs reported being able to use this information as hetero anamneses or as a starting point for more in-depth discussion during consultations, for example to mobilize the support of SOs or intervene if SOs showed overprotective behavior. For instance, an insurance physician answered:

> *"If the client himself cannot sufficiently put it into words"*

OHPs further reported asking about significant others' views and reactions in cases of stagnation of some kind (theme 3). To illustrate, an occupational physician stated:

> *"If there is inadequate behavior, recurrent setbacks, and clients are not able or afraid to change their behavior"*

Moreover, the presence of mental health problems, severe complaints, or coping issues (theme 4) and the presence of an SO during the consultation (theme 5) could lead OHPs to ask about the SOs' cognitions and behavioral responses. For example, an insurance physician answered:

> *"In the presence of mental complaints or obvious mourning because of changed life perspective due to the illness"*

Finally, OHPs reported asking more in-depth about the views and reactions of SOs if the topic was raised in the natural course of the conversation or mentioned by the worker himself (theme 6). To illustrate, an occupational physician reported:

> *"When I get the impression from the conversation (for example after asking about social support or when people indicate something about this themselves) that something is going on here"*

One reason for OHPs ***not to ask*** about SOs' views and reactions was that they do not always consider these relevant or likely to improve care (theme 7). For example, when a worker seems to be coping adequately and re-integration is proceeding as expected, OHPs are less inclined to ask about SOs' cognitions and behavioral responses. For example, an occupational wrote:

> *"If there is no reason to do so or if the clinical picture is clear and re-integration is proceeding well"*

OHPs also reported not asking about this due to lack of time (theme 8) or because of giving priority to the worker's perspective instead of that of SOs (theme 9). For instance, an insurance physician stated:

> *"I primarily want to know about the experience of the person concerned"*

Some OHPs also indicated feeling that a SO would be a disruptive factor in the conversation (theme 10), and that it would be a breach of the worker's privacy to ask about SOs' views and reactions and, moreover, a difficult or sensitive topic to discuss (theme 11). For example, an insurance physician wrote:

> *"When it is expected that the significant other wants to take over the conversation from the person concerned"*

Furthermore, OHPs reported not asking about the views and reactions of SOs if the latter were not present during the consultation (theme 12). To illustrate, an occupational physician indicated:

> *"In my opinion, you can only ask that to the significant other him- or herself, not to the person concerned. Therefore, in my opinion this is only possible if the significant other is present, and this is more often not the case"*

In addition, OHPs reported not always needing to ask specific questions because certain topics were sometimes raised naturally (theme 13). Others reported not asking unless the topic was brought up during the consultation (theme 14). Finally, OHPs reported not always thinking of asking about SOs' views and reactions (theme 15), and not always having a specific or conscious reason not to ask about these factors (theme 16). For example, an insurance physician answered:

> *“Never a conscious reason not to do it, actually”*

Table 3. Description of qualitative data on occupational health professionals’ reasons whether or not to ask about significant others’ cognitions and behavioral responses.

Theme	Theme description	Illustrative quotes from occupational physicians (OP) and insurance physicians (IP)
A. Occupational health professionals’ reasons to ask about cognitions and behavioral responses of significant others[1]		
1. Significant others as influential factor	To gain insight into the worker’s illness, functioning and social context, because additional information is needed or because of a general awareness or observation that significant others influence the worker, and his/her recovery and re-integration.	*“Because this can co-determine the prognosis” (OP)* *“If I have the impression that significant others slow the worker down in his resumption of work” (OP)* *“If you notice that they have an obvious influence, for example when discussing a plan to resume work” (OP)* *“It can be an important supportive factor, but it can also play a role in negative cognitions or stagnation of recovery, for example when a significant other is fearful or has many concerns” (OP)* *“To get an impression of the extent to which the person concerned is influenced in his or her recovery and re-integration process” (OP)* *“Because it is known that significant others have a very great influence on absenteeism and the recovery behavior of people” (OP)* *“Because they can contribute to recovery and participation, but can also inhibit this process” (IP)*
2. Significant other as conversation partner	To get additional information about the situation, complaints, coping, and social context of the worker, or to use this information as starting point for more in- depth discussion during the consultation.	*“That gives extra information. Hetero anamnesis. Especially when I observe that the significant other has a different opinion than that of the client. This way I receive additional information about: illness insight, level of functioning, degree of support, understanding, interactions at home” (IP)*

Table 3. Description of qualitative data on occupational health professionals' reasons whether or not to ask about significant others' cognitions and behavioral responses (continued).

Theme	Theme description	Illustrative quotes from occupational physicians (OP) and insurance physicians (IP)
		"If I get insufficient information directly from the worker" (OP) *"If the client himself cannot sufficiently put it into words" (IP)* *"Once in a while, if they can give clarification during the consult" (OP)* *"To gain insight into the social context" (IP)* *"To check whether expressions of employees are recognized by the partner or significant other. 'Do you also think it is going better with the person concerned?' 'Do you also notice that…" (OP)*
3. In response to stagnation of recovery or re-integration	To investigate observed stagnation of recovery, re-integration, or behavioral change.	*"If there is inadequate behavior, recurrent setbacks, and clients are not able or afraid to change their behavior" (OP)* *"Presence of expressions of avoidance and stagnation in recovery and re-integration" (OP)* *"Because of stagnation in recovery" (OP)*
4. Depending on disease characteristics and coping	Because of the characteristics of the disease (e.g. health conditions like mental health or cognitive problems, high complexity or severity), consequences of the disease or coping issues.	*"This depends on the disease. With certain diseases, for example after a myocardial infarction, concern of significant others can influence how a sick employee copes with his complaints. Or with an employee with a burnout, because significant others sometimes have an outspoken opinion. In general when it concerns work-related complaints" (OP)* *"In the presence of mental complaints or obvious mourning because of changed life perspective due to the illness" (IP)*

Table 3. Description of qualitative data on occupational health professionals’ reasons whether or not to ask about significant others’ cognitions and behavioral responses (continued).

Theme	**Theme description**	**Illustrative quotes from occupational physicians (OP) and insurance physicians (IP)**
		“If someone has complaints to the extent that extra support at home could be helpful for recovery or perseverance” (OP) *“To assess the coping mechanisms of the insured worker” (IP)* *“If there are complex problems” (OP)* *“...more often with psychological complaints, because then the beliefs of significant others have more influence” (OP)*
5. Presence of significant other during consultation	Occupational health professional takes advantage of the presence of significant others at consultations.	*“If they are present during the consult and I have the feeling that some of the not-helpful thoughts originate from the partner” (OP)* *“Primarily when someone has low work ability or is vulnerable and the partner is present and I check with that person if he sees it the same way” (OP)*
6. Topic raised within natural course of the conversation	To discuss significant others’ cognitions and behavioral responses more in-depth if the topic is raised in the natural course of the conversation or is mentioned by the worker.	*“I incidentally ask about this if someone raises this topic themselves, but usually this already becomes clear from the behavior of the significant others (I often do ask about this)” (IP)* *“When this is brought forward in a negative sense” (OP)* *“I ask about it if an employee comes to me with advice from his or her partner. This can be positive, or very protective” (OP)* *“When I get the impression from the conversation (for example after asking about social support or when people indicate something about this themselves) that something is going on here” (OP)*

Table 3. Description of qualitative data on occupational health professionals' reasons whether or not to ask about significant others' cognitions and behavioral responses (continued).

Theme	Theme description	Illustrative quotes from occupational physicians (OP) and insurance physicians (IP)
B. Occupational health professionals' reasons *not* to ask about cognitions and behavioral responses of significant others[2]		
7. No contribution to better care or assessment	Would not contribute to better care or assessment, or not considered a relevant topic.	*"If it is clear that they give adequate support" (OP)* *"If recovery is going well, in line with expectations" (OP)* *"This is not relevant for assessment of functional capacity of an employee" (OP)* *"If the client himself is sufficiently capable to put it into words" (IP)* *"This might cause confusion. If you get this information, what do you do with it as insurance physician? How do you weigh this information? Why would you ask about this if you do not plan to do anything with it. You can write down: illness-sustaining factors in the home environment. Which you cannot influence as insurance physician" (IP)* *"If this does not contribute to re-integration or is not necessary for achieving re-integration goals" (OP)* *"In case of uncomplicated recovery or obvious adequate coping" (OP)*
8. Lack of time	Not enough time to ask about significant others' cognitions and behavioral responses in addition to other topics to be discussed during the consult.	*"If I lack time for it or forget it" (OP)* *"No time, not of first interest" (IP)* *"It is not yet in my system. In part it is due to lack of time" (OP)* *"Lack of time" (OP)*

Table 3. Description of qualitative data on occupational health professionals' reasons whether or not to ask about significant others' cognitions and behavioral responses (continued).

Theme	Theme description	Illustrative quotes from occupational physicians (OP) and insurance physicians (IP)
9. Focusing primarily on the worker's perspective	Giving priority to other topics related to experiences and perspectives of the worker.	*"Because I want to know the opinion of the person concerned" (IP)* *"I primarily want to know about the experience of the person concerned" (IP)* *"In particular, own motivation is important, significant others do not accompany employees to work" (IP)* *"I do not think those perceptions and expectations in itself influence the employee, rather how the employee him- or herself experiences it" (IP)*
10. Disruptive or hindering influence of significant others	Expectations or fear that asking about significant others' cognitions and behavioral responses would disrupt the conversation and have negative consequences for the worker and re-integration.	*I initially rely on what the person involved says. If that fits within an activating approach, then I don't see much added value from inquiring about the response from the environment. (OP)* *"They are often overly concerned" (OP)* *"Sometimes a significant other is involved in a "wrong" way. Too dominant, disrupting the conversation; a significant other can be a causal factor in the disease process. Then I have already seen the interaction between those two. In that case, the significant other only disrupts the conversation and reduces the quality of the information from the client (e.g. is afraid to speak openly)" (IP)* *"When it is expected that the significant other wants to take over the conversation from the person concerned" (IP)* *"If I think this would only uncover more claim behavior, without actual information. Then it would be better if I delve deeper into the underlying emotion instead of focusing on the content" (IP)*

Table 3. Description of qualitative data on occupational health professionals' reasons whether or not to ask about significant others' cognitions and behavioral responses (continued).

Theme	**Theme description**	**Illustrative quotes from occupational physicians (OP) and insurance physicians (IP)**
11. Sensitive or difficult topic to discuss	Feelings that cognitions and behavioral responses of significant others might be a sensitive topic for workers or that this is a difficult topic to discuss.	*"To preserve good relations with the sick worker" (OP)* *"When this is too sensitive" (IP)* *"If the employee is not open to this" (OP)* *"Sometimes I do not ask, to avoid discussion or conflict" (IP)* *"… sometimes also because it is painful if there is no significant other available" (OP)* *"Privacy, if it does not matter" (IP)* *"Resistance or discomfort of the client" (OP)*
12. Absence of significant others	Lack of opportunity due to absence of significant others during consultations or because workers do not always have a significant other.	*"In my opinion, you can only ask that of the significant other him- or herself, not of the person concerned. Therefore, in my opinion this is only possible if the significant other is present, and this is more often not the case" (OP)* *"Because significant others are often not present during the conversation" (OP)* *"If a sick worker is single" (OP)* *"They are not always present" (IP)*
13. Topic is discussed without the need to ask specific questions	Significant others' cognitions and behavioral responses are discussed in some other way, without the professional specifically asking about them.	*"It is often spontaneously discussed, and I more consciously ask about it if there are signals" (OP)* *"If the sick employee has already brought it up" (OP)* *"I invite clients to tell something about their private situation, but do not explicitly ask about reactions,*

Table 3. Description of qualitative data on occupational health professionals' reasons whether or not to ask about significant others' cognitions and behavioral responses (continued).

Theme	Theme description	Illustrative quotes from occupational physicians (OP) and insurance physicians (IP)
		behaviors and involvement of significant others" (OP)
14. Topic is not brought up	Significant others' cognitions and behavioral responses are not brought up by the worker nor does this topic arise spontaneously during the consult.	*"Sometimes it is already clear or spontaneously reported" (IP)* *"Sometimes it just does not come up" (OP)* *"If it does not come to it" (IP)* *"If the person concerned never tells something about his significant others" (OP)*
15. Asking about cognitions and behavioral responses of significant others does not come to mind	Professionals do not think to ask about significant others' cognitions and behavioral responses during consults, or it has never occurred to professionals to ask about this.	*"I don't always think about it" (OP)* *"I don't think about it" (OP)* *"There are already so many things to ask. It never occurred to me to ask this as well" (OP)* *"Did not come up with the idea before and often there is already sufficient information from the person concerned" (OP)*
16. No reason	No specific or conscious reason.	*"No idea. I do not pay enough attention to this" (OP)* *"No specific reason" (IP)* *"No good reason actually; I should do this more often" (OP)* *"Never a conscious reason not to do it, actually" (IP)* *"Not with any particular reason" (OP)*

[1] Total of 122 OHPs responded to open question about reasons to ask about *significant others' beliefs and expectations*. 131 OHPs responded to open question about reasons to ask about *significant others' responses, behaviors and involvement.*

[2] Total of 119 OHPs responded to open question about reasons not to ask about *significant others' beliefs and expectations*. 104 OHPs responded to open question about reasons not to ask about *significant others' responses, behaviors and involvement*.

Discussion

In this mixed-method survey study we aimed to examine current practices of OHPs in the assessment of SOs' cognitions and behavioral responses that could influence work outcomes of workers with a chronic disease. Our findings indicate that most OHPs do not commonly ask about SOs' illness perceptions, work-related beliefs and expectations, and behavioral responses, despite the possible influence of these factors on work outcomes, as well as guideline recommendations to address social factors in occupational health care. Although OHPs did report to frequently assess practical support by SOs, this was not the case for other behavioral responses and cognitions of significant others. These reported assessment practices were related to both organizational norms and OHPs' self-efficacy to address these factors. Furthermore, OHPs reported multiple reasons for asking or not asking about these issues; their answers to the open-ended questions indicate that they do not always find it necessary to ask, either because recovery and re-integration are going well or because they see no indication that SOs have a strong influence. However, in the presence of mental health problems, severe complaints, coping issues and stagnation of the re-integration process, OHPs do seem more inclined to inquire about SOs' cognitions and behavioral responses.

There are several possible explanations for most OHPs' low assessment frequency of SOs' cognitions and behavioral responses. First, OHPs may often feel that asking about this would not contribute to better care, and indeed our results indicate that OHPs feel that this is beneficial only under certain circumstances. Studies in other fields have also suggested that the effectiveness of involving SOs in interventions may depend on circumstances or conditions such as gender, illness severity, and whether or not the significant other is unsupportive prior to intervention [37–39]. This could also be the case for occupational health care. However, more research on this is needed.

Moreover, our results indicate a relationship between OHPs' assessment practices and their self-efficacy to assess and effectively respond to SOs' cognitions and behavioral responses. Although family interventions and education and training programs on involvement of SOs are available for mental health care professionals [40,41], this is not the case for OHPs. Moreover, no tools or instruments are currently available for OHPs to assess and intervene on SOs' illness perceptions, work-related beliefs and expectations, and behavioral responses. This lack of available education, interventions, tools, and clear guidelines may thus partly explain OHPs' lack of attention to these factors.

Barriers within OHPs' organizations may also partially explain why OHPs do not frequently assess SOs' cognitions and behavioral responses. Several OHPs reported lack of time and the absence of a significant other during the consultation as reasons not to ask about this. Moreover, the organizational norm appears to play an important role, which is in line with other studies that indicate that perceived social norms can influence intentions, decision-making and behaviors of health professionals [42–45]. Organizations could facilitate involvement of SOs by making it common practice to invite them to attend one or more consultations and by providing OHPs with more time and resources. It is thus important for organizations to recognize the importance of involving SOs in occupational health care.

Barriers in the occupational health care system may be another explanation for the low assessment frequencies. For example, although multiple Dutch occupational health guidelines recommend that OHPs address factors in the social environment [17,24,46,47], each guideline specifies only a few relevant factors (e.g. overprotection, social support, irrational fears or beliefs that hinder recovery). This might be due to lack of quantitative evidence on the influence of specific cognitions and behavioral responses of SOs on work outcomes, as most research available on this topic is qualitative. Therefore, a higher level of evidence requires more quantitative research [4].

Strengths and Limitations

A strength of this study is our use of a mixed-method design to collect both quantitative and qualitative data in a representative population of OHPs. The invitation letter and link to the survey were distributed through the three largest professional associations for occupational and insurance physicians in the Netherlands, potentially reaching more than 80 percent of Dutch OHPs [36,48]. Although the estimated response rate of this study was low (10.7%), our sample appears to be a good reflection of the total population of Dutch OHPs registered as of January 1st 2016, with regard to age, gender, and proportion of occupational versus insurance physicians [36]. Moreover, we derived the items of our survey from validated questionnaires, and all constructs had high internal consistencies.

As this study took place within the Dutch occupational health care system and was explorative in nature, the generalizability of our results is limited. To the best of our knowledge, similar studies have not been conducted in other countries; as a result the extent to which OHPs in other countries pay attention to SOs' cognitions and behavioral responses remains unknown. Our results can therefore not be compared to other findings

Furthermore, as OHPs' self-reported practices may not accurately represent their actual practices, a social desirability bias must also be considered. Although our results indicate that OHPs seldom assess SOs' cognitions and behavioral responses, an even smaller frequency may be possible. However, our survey focused on specific illness perceptions, work-related beliefs and expectations, and behavioral responses of SOs that could influence work participation; while many OHPs may not ask about these specific factors, they may address social factors in other ways, for example, by asking more in general about a worker's social context.

Implications and recommendations for future research and occupational health practice

This study provided insight into OHPs' practices and their perspectives as to the involvement of SOs in occupational health care, including a number of implications for occupational health practice. In addition, we have several recommendations for future research.

First, it is important to better understand the perspectives of different stakeholders on involving SOs in occupational health care, and methods to implement SO involvement in daily practice. Such insight can provide an empirical basis for recommendations on how to involve SOs in occupational health care. Such information could also be used in the development of training programs and tools for this purpose. Future research should therefore focus on gaining more insight into this topic from the perspective of OHPs, as well as that of workers with a chronic disease and their SOs.

Our findings furthermore suggest that the benefits of assessing SOs' cognitions and behavioral responses may depend on various contextual and case-specific factors (e.g. re-integration versus claim assessment, complexity of the case, and re-integration progress). These findings are in line with prior research in other fields which has also pointed to possible other factors influencing the effectiveness of involving SOs in interventions: factors like gender, illness severity, and lack of support [37–39]. However, more research on this question is needed. Moreover, because of important implications for practice, such future research should focus on exploring which factors determine the relevance of involving SOs.

Conclusions

Our study shows that OHPs do not commonly assess SOs' cognitions and behavioral responses, despite recognizing that these factors can influence work outcomes. Both the organizational norm and OHPs' self-efficacy appear to play a role in their choices. Qualitative data showed that one important reason for OHPs not to ask about SOs' cognitions and behavioral responses is that recovery and re-integration are going well. Nevertheless, OHPs are more inclined to ask about this when perceiving mental health problems, severe complaints, coping issues and/or stagnation of the re-integration process. Our findings indicate that OHPs may be able to better support workers with a chronic disease in their self-management and ability to work by paying more attention to the influence of SOs. However, more research is needed on how to address SOs' cognitions and behavioral responses and to determine which circumstances influence the effectiveness of involving others in occupational health care.

Abbreviations

SO	Significant other
OHP	Occupational health physician

Acknowledgements: We would like to thank Marion Bloemendal, Arjen Ras, Jan Timmer, Cora Westland and Jan Zwagemakers for their contribution to the development of the survey. We would also like to thank Daniël Bossen, the Dutch Association of Occupational Medicine (NVAB), the Dutch Association for Insurance Medicine (NVVG) and the Dutch Association of Medical Advisers in Private Insurance (GAV) for their contribution to the distribution of the survey.

References

1. Berg CA, Upchurch R. A developmental-contextual model of couples coping with chronic illness across the adult life span. *Psychol Bull* 2007;**133**:920–54. doi:10.1037/0033-2909.133.6.920
2. Cano A, Leong L. Significant Others in the Chronicity of Pain and Disability. In: Hasenbring M, Rusu A, Turk D, eds. *From Acute to Chronic Back Pain: Risk Factors, Mechanisms, and Clinical Implications*. Oxford, England: : Oxford University Press 2012. 339–54.http://replace-me/ebraryid=10581482
3. White C, Green RA, Ferguson S, *et al.* The influence of social support and social integration factors on return to work outcomes for individuals with work-related injuries: a systematic review. *J Occup Rehabil* 2019;:1–24.
4. Snippen NC, Vries HJ de, Burg-Vermeulen SJ van der, *et al.* Influence of significant others on work participation of individuals with chronic diseases: a systematic review. *BMJ Open* 2019;**9**:1–13. doi:10.1136/BMJOPEN-2018-021742
5. Helgeson VS, Zajdel M. Adjusting to Chronic Health Conditions. 2017. doi:10.1146/annurev-psych-010416-044014
6. Gallant MP. The influence of social support on chronic illness self-management: A review and directions for research. Heal. Educ. Behav. 2003. doi:10.1177/1090198102251030
7. Frederiksen P, Karsten MM V, Indahl A, *et al.* What Challenges Manual Workers' Ability to Cope with Back Pain at Work, and What Influences Their Decision to Call in Sick? *J Occup Rehabil* 2015;**25**:707–16. doi:10.1007/s10926-015-9578-1
8. Dorland HF, Abma FI, Roelen CAM, *et al.* Factors influencing work functioning after cancer diagnosis: a focus group study with cancer survivors and occupational health professionals. *Support Care Cancer* 2016;**24**:261–6. doi:10.1007/s00520-015-2764-z
9. Bodenmann G, Randall AK, Falconier MK. Coping in couples: the systemic transactional model (STM). In: Falconier MK, Randall AK, Bodenmann G, eds. *Couples Coping With Stress: A cross-Cultural Perspective.* 2016. 5–22.
10. Brooks J, McCluskey S, King N, *et al.* Illness perceptions in the context of differing work participation outcomes: Exploring the influence of significant others in persistent back pain. *BMC Musculoskelet Disord* 2013;**14**. doi:10.1186/1471-2474-14-48
11. McCluskey S, de Vries H, Reneman M, *et al.* 'I think positivity breeds positivity': a qualitative exploration of the role of family members in supporting those with chronic musculoskeletal pain to stay at work. *BMC Fam Pract* 2015;**16**:1–7. doi:10.1186/s12875-015-0302-1
12. Gagnon A, Lin J, Stergiou-Kita M. Family members facilitating community re-integration and return to productivity following traumatic brain injury - motivations, roles and challenges. *Disabil Rehabil* 2016;**38**:433–41. doi:10.3109/09638288.2015.1044035
13. Tamminga SJ, de Boer AGEM, Verbeek JH, *et al.* Breast cancer survivors' views of factors that influence the return-to-work process - a qualitative study. *Scand J Work Environ Heal* 2012;**38**:144–54. doi:10.5271/sjweh.3199
14. Kong W, Tang D, Luo X, *et al.* Prediction of Return to Work Outcomes Under an Injured Worker Case Management Program. *J Occup Rehabil* 2012;**22**:230–40. doi:10.1007/s10926-011-9343-z
15. Sandstrom J, Esbjornsson E. Return to work after rehabilitation. The significance of the patient's own prediction. *Scand J Rehabil Med* 1986;**18**:29–33.http://www.ncbi.nlm.nih.gov/htbin-post/Entrez/query?db=m&form=6&dopt=r&uid=2940677

16. National Institute for Health and Clinical Excellence (NICE). Rehabilitation after critical illness. Clinical guideline [CG83]. 2009.https://www.nice.org.uk/guidance/cg83/resources/rehabilitation-after-critical-illness-in-adults-pdf-975687209413
17. van Dijk JL, Bekedam MA, Brouwer W, *et al.* Richtlijn Ischemische Hartziekten [Guideline Ischemic Heart Disease]. Utrecht: 2007. www.nvab-online.nl (accessed 21 Feb 2019).
18. Vooijs IM. *Supporting work participation of people with a chronic disease*. 2018.
19. De Koninklijke Nederlandsche Maatschappij tot bevordering der Geneeskunst (KNMG). KNMG RGS Overzicht aantal geregistreerde specialisten / profielartsen 2008-2018 [Royal Dutch Society for the Advancement of Medicine, Registration Committee for Medical Specialists. Overview number of registered specialists / profile doctors 2008-2018.]. 20-02-2018. 2018.https://www.knmg.nl/opleiding-herregistratie-carriere/rgs/registers/aantal-registraties-specialistenaois.htm (accessed 30 Oct 2018).
20. McDougall J, Wright V, Rosenbaum P. The ICF model of functioning and disability: Incorporating quality of life and human development. *Dev Neurorehabil* 2010;**13**:204–11. doi:10.3109/17518421003620525
21. World Health Organization. *ICF : international classification of functioning, disability and health.* Geneva: : World Health Organization 2001.
22. Kant I, Van Amelsvoort LGPM. Applying a biopsychosocial perspective in occupational health: Easier said than done! Work. 2017. doi:10.3233/WOR-172550
23. Boonen A. Werk en sociale zekerheid [Work and social security]. In: Bijlsma JWJ, Lems WF, Wildervanck-Dekker CMJ, eds. *Reumatologie*. Houten: : Bohn Stafleu van Loghum 2015. 361–71. doi:10.1007/978-90-368-0612-1_26
24. Vooijs M, van der Heide I, Leensen MCJ, *et al.* Richtlijn Chronisch Zieken en Werk [Guideline ’The chronically ill and work’]. Amsterdam: 2016. https://www.psynip.nl/wp-content/uploads/2017/03/Richtlijn_chronisch_zieken_en_werk_2016.pdf
25. Scottish Intercollegiate Guidelines Network (SIGN). Management of chronic pain. A national clinical guideline. Sign. 2019.https://www.sign.ac.uk/media/1108/sign136_2019.pdf
26. Scottish Intercollegiate Guidelines Network (SIGN). Brain injury rehabilitation in adults. A national clinical guideline. 2013.http://www.sign.ac.uk/assets/sign130.pdf
27. National Institute for Health and Care Excellence (NICE). Stroke rehabilitation in adults. Clinical guideline [CG162]. 2013;:44.https://www.nice.org.uk/guidance/qs2/resources/stroke-in-adults-pdf-58292707525%0Ahttps://www.nice.org.uk/guidance/cg162
28. National Institute for Health and Clinical Excellence (NICE). Depression in Adults: recognition and Management. Clinical guideline [CG90]. 2009.https://www.nice.org.uk/guidance/cg90/resources/depression-in-adults-recognition-and-management-975742636741
29. de Raaij EJ, Schröder C, Maissan FJ, *et al.* Cross-cultural adaptation and measurement properties of the Brief Illness Perception Questionnaire-Dutch Language Version. *Man Ther* 2012;**17**:330–5. doi:10.1016/j.math.2012.03.001
30. van Driel D, Hanssen D, Hilderink P, *et al.* Illness cognitions in later life: Development and validation of the extended Illness Cognition Questionnaire (ICQ-Plus). *Psychol Assess* 2016;**28**:1119–27. doi:10.1037/pas0000303
31. Shaw WS, Reme SE, Linton SJ, *et al.* 3rd place, PREMUS 1 best paper competition: Development of the return-to-work self-efficacy (RTWSE-19) questionnaire - psychometric properties and predictive validity. *Scand J Work Environ Heal* 2011;**37**:109–19. doi:10.5271/sjweh.3139

32. Gross DP, Battié MC. Work-related recovery expectations and the prognosis of chronic low back pain within a workers' compensation setting. *J Occup Environ Med* 2005;**47**:428–33. doi:10.1097/01.jom.0000158706.96994.a5
33. Kinsinger SW, Laurenceau JP, Carver CS, *et al.* Perceived partner support and psychosexual adjustment to breast cancer. *Psychol Heal* 2011;**26**:1571–88. doi:10.1080/08870446.2010.533771
34. IBM. IBM SPSS Statistics for Windows, Version 25. IBM Corp. 2017.
35. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;**3**:77–101. doi:10.1191/1478088706qp063oa
36. Capaciteitsorgaan. Capaciteitsplan 2016. Deelrapport 4. Sociaal Geneeskundigen. [Capacity plan 2016. Sub-report 4. Social Medicine]. Utrecht: 2016.
37. Shields CG, Finley MA, Chawla N, *et al.* Couple and Family Interventions in Health Problems. J. Marital Fam. Ther. 2012. doi:10.1111/j.1752-0606.2011.00269.x
38. Martire LM, Schulz R. Involving family in psychosocial interventions for chronic illness. *Curr Dir Psychol Sci* Published Online First: 2007. doi:10.1111/j.1467-8721.2007.00482.x
39. Martire LM, Lustig AP, Schulz R, *et al.* Is it beneficial to involve a family member? A meta-analysis of psychosocial interventions for chronic illness. Heal. Psychol. 2004. doi:10.1037/0278-6133.23.6.599
40. Netwerk Kwaliteitsontwikkeling GGZ. Generieke module: Samenwerking en ondersteuning naasten van mensen met psychische problematiek [Generic module: Collaboration with and support of significant others of people with psychological problems]. 2016. https://www.ggzstandaarden.nl/generieke-modules/samenwerking-en-ondersteuning-naasten-van-mensen-met-psychische-problematiek/achtergronddocumenten (accessed 5 Feb 2019).
41. American Psychological Association. Public Interest Directorate report: Family Interventions. 2011.https://www.apa.org/pi/about/publications/caregivers/practice-settings/intervention/family (accessed 13 Feb 2019).
42. Pittet D, Simon A, Hugonnet S, *et al.* Hand hygiene among physicians: Performance, beliefs, and perceptions. *Ann Intern Med* 2004;**141**:1–8. doi:10.7326/0003-4819-141-1-200407060-00008
43. Askelson NM, Campo S, Lowe JB, *et al.* Factors related to physicians' willingness to vaccinate girls against HPV: The importance of subjective norms and perceived behavioral control. *Women Heal* Published Online First: 2010. doi:10.1080/03630241003705094
44. Kretzer EK, Larson EL. Behavioral interventions to improve infection control practices. *Am J Infect Control* Published Online First: 1998. doi:10.1016/S0196-6553(98)80008-4
45. Smith M, Higgs J, Ellis E. Factors influencing clinical decision making. *Clin Reason Heal Prof* 2008.
46. van Son MAC, Hulshof, C.T.J. Bruinvels DJ, Brouwer T, *et al.* Richtlijn Kanker en Werk [Guideline Cancer and Work]. Utrecht: 2017. doi:10.1007/s12498-017-0069-5
47. Verschuren CM, Nauta AP, Bastiaanssen MHH, *et al.* Richtlijn 'Eén lijn in de eerste lijn bij overspanning en burnout' [Guideline 'On one line in the first line in case of nervous exhaustion or burnout']. 2012. doi:10.1007/s13170-010-0091-0
48. Fortuin F. NVAB, the Netherlands Society of Occupational Medicine. 2014.https://www.nvab-online.nl/english/english (accessed 26 Feb 2019).

Supplementary material

Table S1. Distribution of responses within the constructs: assessment of significant others' illness perceptions, work-related beliefs and expectations, and behavioral responses.

Construct	**Sample** *(N=192)* *n (%)*
Assessment of significant others' illness perceptions by occupational health professionals	
Item 1: How often do you ask about significant others' beliefs about what could be the cause of the disease?	
Never	15 (7.8)
Rarely	62 (32.3)
Sometimes	76 (39.6)
Often	17 (8.9)
Always	4 (2.1)
Missing	18 (9.4)
Item 2: How often do you ask about significant others' beliefs about the extent to which the worker can influence the degree and seriousness of complaints?	
Never	18 (9.4)
Rarely	66 (34.4)
Sometimes	65 (33.9)
Often	21 (10.9)
Always	4 (2.1)
Missing	18 (9.4)
Item 3: How often do you ask about significant others' beliefs about the extent to which the worker is capable of participating in activities despite complaints?	
Never	10 (5.2)
Rarely	48 (25.0)
Sometimes	73 (38.0)
Often	33 (17.2)
Always	10 (5.2)
Missing	18 (9.4)
Item 4: How often do you ask about significant others' beliefs about how the worker can best deal with complaints to prevent further complaints?	
Never	15 (7.8)
Rarely	68 (35.4)
Sometimes	54 (28.1)
Often	32 (16.7)
Always	5 (2.6)
Missing	19 (9.4)

Table S1. Distribution of responses within the constructs: assessment of significant others' illness perceptions, work-related beliefs and expectations, and behavioral responses (continued).

Construct	**Sample** *(N=192)* *n (%)*
Assessment of significant others' work-related beliefs and expectations by occupational health professionals	
Item 1: How often do you ask about significant others' beliefs or expectations about the capability of the worker to perform his or her work tasks?	
Never	16 (8.3)
Rarely	52 (27.1)
Sometimes	60 (31.3)
Often	36 (18.8)
Always	10 (5.2)
Missing	18 (9.4)
Item 2: How often do you ask about significant others' beliefs or expectations about the capability of the worker to avoid re-injury when returning to work?	
Never	31 (16.1)
Rarely	74 (38.5)
Sometimes	51 (26.6)
Often	14 (7.3)
Always	3 (1.6)
Missing	19 (9.9)
Item 3: How often do you ask about significant others' beliefs or expectations about the capability of the worker to influence his or her work? (e.g. with regard to work tasks, work pressure, help from colleagues, changes in work tasks or workplace factors)	
Never	24 (12.5)
Rarely	64 (33.3)
Sometimes	66 (34.4)
Often	16 (8.3)
Always	3 (1.6)
Missing	19 (9.9)
Item 4: How often do you ask about significant others' beliefs or expectations about the capability of the worker ever to return to work?	
Never	12 (6.3)
Rarely	61 (31.8)
Sometimes	69 (35.9)
Often	26 (13.5)
Always	5 (2.6)
Missing	19 (9.9)

Table S1. Distribution of responses within the constructs: assessment of significant others' illness perceptions, work-related beliefs and expectations, and behavioral responses (continued).

Construct	**Sample** *(N=192)* *n (%)*
Assessment of significant others' behavioral responses by occupational health professionals	
Item 1: How often do you ask about the extent to which worker and significant other talk about the disease, concerns and/or return to work?	
Never	5 (2.6)
Rarely	33 (17.2)
Sometimes	84 (43.8)
Often	57 (29.7)
Always	13 (6.8)
Missing	-
Item 2: How often do you ask about the extent to which significant others listen to feelings and concerns of the worker?	
Never	10 (5.2)
Rarely	34 (17.7)
Sometimes	78 (40.6)
Often	60 (31.3)
Always	10 (5.2)
Missing	-
Item 3: How often do you ask about the extent to which significant others provide the worker with advice and information?	
Never	12 (6.2)
Rarely	46 (23.8)
Sometimes	85 (44.0)
Often	45 (23.3)
Always	5 (2.6)
Missing	-
Item 4: How often do you ask about practical support provided by significant others?	
Never	2 (1.0)
Rarely	5 (2.6)
Sometimes	49 (25.5)
Often	113 (58.9)
Always	23 (12.0)
Missing	-

Table S1. Distribution of responses within the constructs: assessment of significant others' illness perceptions, work-related beliefs and expectations, and behavioral responses (continued).

Construct	**Sample** *(N=192)* *n (%)*
Item 5: How often do you ask about significant others' empathetic reactions towards the worker?	
Never	8 (4.2)
Rarely	31 (16.1)
Sometimes	91 (47.4)
Often	59 (30.7)
Always	3 (1.6)
Missing	-
Item 6: How often do you ask about significant others' encouraging, stimulating and motivating reactions towards the worker	
Never	9 (4.7)
Rarely	44 (22.9)
Sometimes	87 (45.3)
Often	48 (25.0)
Always	4 (2.1)
Missing	-
Item 7: How often do you ask about significant others' negative reactions towards the worker?	
Never	11 (5.7)
Rarely	50 (26.0)
Sometimes	92 (47.9)
Often	35 (18.2)
Always	4 (2.1)
Missing	-
Item 8: How often do you ask about significant others' overprotective and controlling behavior?	
Never	5 (2.6)
Rarely	37 (19.3)
Sometimes	100 (52.1)
Often	45 (23.4)
Always	5 (2.6)
Missing	-

Chapter 6

Workers' views on involving significant others in occupational health care: a focus group study among workers with a chronic disease

Nicole Snippen, Haitze de Vries, Astrid Bosma, Sylvia van der Burg-Vermeulen, Mariët

Hagedoorn, Sandra Brouwer

Disability and Rehabilitation, 2022, DOI: 10.1080/09638288.2021.2011435

Abstract

Purpose: To explore workers' views and considerations on involving their significant others (SOs) in occupational health care.

Methods: Four focus group interviews in the Netherlands, with 21 workers who had visited an occupational health physician (OHP) due to work absence caused by a chronic disease. Data was analyzed using thematic analysis.

Results: We distinguished four main themes: (i) attitudes towards involving SOs, (ii) preferences on how to involve SOs, (iii) benefits of involving SOs, and (iv) concerns with regard to involving SOs. Workers expressed both positive and critical opinions about involving SOs in occupational health care. Benefits mentioned included provision of emotional and informational support by SOs before, during, and after consultations. According to workers, support from SOs can be enhanced by informing SOs about re-integration plans and involving them in decision making. However, workers were concerned about overburdening SOs, and receiving unwanted support from them.

Conclusions: According to interviewed workers, engagement of SOs in occupational health care can help workers with a chronic disease in their recovery and return to work. However, they felt it is important to take SO characteristics and the worker's circumstances and preferences into account, and to balance the potential benefits and drawbacks of involving SOs.

Introduction

Within the working population, the number of people with one or more chronic diseases will continue to rise due to various reasons, such as an aging population and unhealthy lifestyles [1]. Although many individuals with a chronic disease are able to work, work participation rates among people with chronic diseases are still lower than those of the general population [1,2]. Significant others (SOs) like partners, family members, or friends, can play an important role in how workers cope with having a chronic disease, thereby influencing their work and health outcomes [3–6]. In this context, SOs can be a valuable source of support to enable individuals to cope effectively with their chronic disease and manage their working life [6,7]. However, SOs may also hinder functioning and recovery, as, for example, when their illness perceptions result in overprotective behavior [4,8].

In clinical health care, research has demonstrated that family-oriented interventions involving SOs are more effective than care in which SOs are not involved [6,9–12]. It is therefore not surprising that various clinical and multidisciplinary guidelines advise health professionals to involve SOs in treatment and care and also to intervene when SOs exhibit detrimental cognitions and behaviors [13–19]. In line with these guideline recommendations, SOs are frequently involved in medical consultations, mental health care, and rehabilitation [20–22]. Nevertheless, it is currently not common practice to involve SOs in occupational health care [21]. A recent survey study among occupational and insurance physicians (OHPs) showed that OHPs recognize the potential influence of SOs on recovery and work outcomes of workers with a chronic disease, but they also reported potential risks and barriers of SO involvement [23].

Despite recommendations in occupational health guidelines to involve SOs to better support workers in their recovery and re-integration into work, as yet OHPs receive only limited guidance on how to manage such involvement. It is therefore not surprising that prior research suggests that a lack of self-efficacy of OHPs can partly explain why they often do not pay attention to the influence of SOs or involve them in treatment and care [23]. These observations underline the need for more insight into the views of OHPs, workers, and SOs themselves, in order to develop clear guidelines and training for OHPs so that they can successfully implement SO involvement in worker recovery and re-integration into work [24,25].

Prior research among OHPs has already provided some insight into their views regarding this issue [23,26]. One study indicated that OHPs felt that the necessity and benefits of assessing the influence of SOs and involving them in treatment depended on factors such as the severity of the complaints, and the level of progress of recovery and re-integration [23]. Furthermore, some OHPs expressed concerns that their questions about the cognitions and behaviors of SOs would be a breach of the SO's and worker's privacy.

To our knowledge, only one prior study has explored workers' views about occupational health care consultations with a spouse, family member, or friend present [26]. In that study, workers who had brought a companion to their consultation reported various reasons for doing this, one being the perception that their companion could provide additional information and support. However, the study did not explore workers' ideas as to specific ways in which involvement of their SOs could better support them in recovery and re-integration. Moreover, as that study included only workers who brought a companion to their consultation [26], including workers who did not bring a companion could yield other views and considerations. Therefore, the aim of the present study was to expand our knowledge of workers' views and considerations regarding involvement of their SOs in occupational health care.

Materials and methods

Dutch context of occupational health care

In the Netherlands, OHPs are the primary providers of work-related care while other health care providers such as general practitioners and medical specialists are not expected to offer work-related support. Dutch employers are legally obliged to contract an OHP, who provides support in re-integrating sick employees during the first two years of sick leave. While occupational health services are paid by the employer, OHPs are independent advisors and work for employers as well as employees. They give independent advice and guidance, are bound by medical professional secrecy and have to comply with various privacy regulations. While workers can access an OHP for various issues related to work and health, consultations between workers and OHPs mostly take place in the context of longer lasting sickness absence. As employers are legally obligated to provide access to OHPs, consultations with OHPs mostly take place with employees. However, while less common, it is possible for self-employed workers with private disability insurance to receive counseling and return to work guidance from an OHP. In addition, sick-listed non-permanent workers, including unemployed workers, temporary agency workers and workers with an expired fixed-term contract, can apply for sickness benefits at the Dutch Social Security Agency and receive sickness absence counseling from an insurance physician.

Study design

For this study, we chose a qualitative approach, using semi-structured focus group interviews to explore the perspectives of workers. We chose this format because it enabled an in-depth exploration of workers' experiences, feelings, opinions and beliefs, and it allowed for interaction and discussion among participants. We conducted the focus group sessions between November 2018 and January 2019, and used the consolidated criteria for reporting qualitative research (COREQ) to guide our reporting of the findings [27].

Inclusion criteria

We included workers between the ages of 18 and 64, who had visited an OHP at least once due to work absence caused by a chronic disease, defined as a somatic or mental illness with a duration of at least three months or causing more than three illness periods a year [28]. We did not restrict participation to a certain timeframe with regard to when workers had to have last visited an OHP. We included both employees and self-employed workers. In addition, both workers with and without experience of involving SOs in occupational health care were eligible for participation. As all sessions were held in Dutch, eligibility was restricted to Dutch speaking workers.

Recruitment

We recruited participants through the Patient panel of the Netherlands Patients Federation, and through 15 OHPs who agreed to help with recruitment of participants. Panel members with a chronic disease received an online invitation from the Netherlands Patients Federation, an umbrella organization representing more than 200 patient organizations. Panel members who expressed interest in participating in the study were approached by a representative of the Netherlands Patients Federation to confirm their eligibility, give them the opportunity to ask questions, and check their availability for the planned sessions. After panel members had agreed to participate in one of the sessions, their contact information was sent to the main researcher (NS).

Fifteen OHPs of HumanTotalCare, a holding company which operates two large nationwide operating Occupational Health Services in the Netherlands, informed eligible workers about the study, gave them a flyer explaining the aim of the study, and asked their permission to be contacted by the researchers. Workers who agreed signed a form granting consent to share their contact information with NS. After receiving the consent forms and contact information, the researcher contacted the workers to confirm whether they wanted to participate in the study, to invite them to ask questions, and to check their availability for the planned sessions.

For all workers who agreed to participate in one of the focus group sessions, NS checked whether they met the inclusion criteria before confirming their participation.

Data collection

Group interviews were held at different locations to facilitate participation by workers from different regions in the Netherlands. We aimed to have six to eight participants in each group, but for each session up to nine participants were included to allow for possible dropouts. Groups were mixed with regard to participant characteristics and recruitment method (Table 1).

Each focus group met for a duration of approximately two hours, including a short break halfway through the session. Before the start of each session, participants were asked to complete a brief questionnaire regarding their demographics and work situation. An experienced independent moderator led the sessions. Two researchers (NS, HdV) were also present during all sessions to help the moderator to monitor group interaction, ask follow-up questions, and take notes.

We used a semi-structured interview guide to ensure comparability of the focus groups and to aid the moderator. We used an iterative approach. After each session, we reflected on the data gathered and, where necessary, adapted the interview guide to better explore new insights during the following sessions. At the start of each session we briefly introduced the topic and explained the aim of the study. Subsequently, we discussed the following topics: opinions on and experiences with involving SOs in occupational health care, possible goals of involving SOs, relevant topics to discuss with SOs, considerations regarding whether or not to involve SOs, and specific ways in which to involve SOs. At the end of each session, each participant received a gift certificate of €20 and was offered reimbursement of travel costs.

Data collection continued until the point of saturation was reached. The data was considered saturated when no new codes occurred in the focus group data and analyses did not lead to any new emergent themes compared to the previous focus group sessions.

Sample characteristics

Through OHPs, we received contact information of ten workers. In response to the online invitation through the Patient Federation, initially about 150 panel members indicated to be interested in participation. After receiving additional information about the study and the dates, times and locations of the sessions, participation was confirmed by six of the workers recruited through OHPs and 19 panel members. No purposive sampling was performed due to the limited number of workers who were able to participate in one of the scheduled sessions. Four of the 27 participants who agreed to take part in the study were unable to participate due to other appointments, health problems or travel issues. One participant did not attend because she forgot about the focus group session and one participant did not attend for reasons unknown. In total, 21 workers participated in this study, divided over four focus groups (Table 1).

Table 2 presents an overall summary of participants' demographic and work characteristics. Participants' mean age was 55 years (age range: 38-65 years). The majority of participants were men (66.7%), and highly educated (66.7%). Participants had a wide variety of types of chronic diseases, and 38.1% had one or more comorbidity. Seven participants (33.3%) indicated during the focus group sessions to have experience with involving a SO in health care. Five participants (23.8%) stated to have no experience with involving SOs, while nine participants (42.9%) did not indicate whether or not they had any experience with SO involvement.

Table 1. Participant characteristics per focus group session (*N* = 21).

	Focus group session 1 (*n* = 5)	**Focus group session 2** (*n* = 9)	**Focus group session 3** (*n* = 2)	**Focus group session 4** (*n* = 5)
Gender				
Male	4	6	-	4
Female	1	3	2	1
Age, mean (range)	55 (42-63)	54 (38-61)	52 (48-55)	59 (47-65)
Type of chronic disease				
Somatic	3	8	1	5
Mental	2	-	1	-
Mixed	-	1	-	-
Recruitment method				
Patient panel	4	7	1	5
Occupational health physicians	1	2	1	-

Table 2. Characteristics of participating workers ($N = 21$).

Participant ID	Gender	Age	Type of chronic disease(s)	Educational level[1]	Current profession or work status	Duration of sick leave	Work resumption	Prior experience with involving significant others
M1	Male	38	Autism spectrum disorder, autonomic disorder	Medium	Administrative assistant	< 3 months	Full	Unknown
M2	Male	56	Respiratory or autoimmune disorder, musculoskeletal disorder, gastrointestinal disorder, sleep disorder	High	Unemployed	> 24 months	No	Unknown
M3	Male	49	Musculoskeletal disorder	Medium	Seeking employment	Unknown	Unknown	No
M4	Male	61	Common endocrine disorder, musculoskeletal disorder	High	Chief product officer	Unknown	No	Unknown
M5	Male	61	Neurological or sensory disorder	High	Notary clerk	3 – 6 months	Partial	Yes, partner attended consultations with the OHP
M6	Male	56	Neurological or sensory disorder	High	Advisor	3 – 6 months	Full	Unknown
M7	Male	54	Neurological or sensory disorder	Medium	Disability benefit recipient	7 – 12 months	No	Yes, partner attended consultations with the OHP
M8	Male	42	Mental illness	High	Insurance actuary	3 – 6 months	Full	Yes, partner attended consultations with a psychologist
M9	Male	58	Respiratory or autoimmune disorder, gastrointestinal disorder, infectious disease, musculoskeletal disorder, cancer	Low	Bus driver	Unknown	Partial	Yes, partner attended consultations with the OHP and with medical specialists
M10	Male	63	Mental illness	High	Seeking employment	3 – 6 months	No	Unknown
M11	Male	59	Neurological or sensory disorder	High	Unemployed	3 – 6 months	Full	Yes, adult child living at home attended consultations with the OHP
M12	Male	65	Musculoskeletal disorder	Low	Mail carrier	< 3 months	Full	Unknown

Table 2. Characteristics of participating workers ($N = 21$) (continued).

Participant ID	Gender	Age	Type of chronic disease(s)	Educational level[1]	Current profession or work status	Duration of sick leave	Work resumption	Prior experience with involving significant others
M13	Male	63	Respiratory or autoimmune disorder, musculoskeletal disorder, neurological or sensory disorder, cardiovascular disorder	High	Unemployed	3 – 6 months	No	No
M14	Male	62	Musculoskeletal disorder, common endocrine disorder	Medium	Sales manager	3 – 6 months	Full	Unknown
F1	Female	57	Neurological or sensory disorder	High	Unemployed	13 – 24 months	No	Yes, partner attended consultations with the OHP
F2	Female	53	Musculoskeletal disorder	High	Self-employed	13 – 24 months	Partial	Unknown
F3	Female	58	Musculoskeletal disorder, respiratory or autoimmune disorder	High	Education and training institute employee	7 – 12 months	Partial	No
F4	Female	48	Musculoskeletal disorder	High	Nurse	7 – 12 months	Full	Unknown
F5	Female	55	Mental illness	High	Disability benefit recipient	Unknown	Unknown	Yes, a good acquaintance attended consultations with the OHP
F6	Female	59	Musculoskeletal disorder	Medium	Customer service advisor	13 – 24 months	Partial	No
F7	Female	47	Respiratory or autoimmune disorder, neurological or sensory disorder	High	University teacher	> 24 months	Partial	No

[1] Low educational level = primary education, pre-vocational secondary education (VMBO); Medium educational level = senior general secondary education (HAVO), pre-university education (VWO), secondary vocational education (MBO); High educational level = higher professional education (HBO), university education (WO), doctorate (PhD).

Data analysis

All sessions were audio recorded and transcribed verbatim. For each session, we made a summary of the main findings of the topics discussed and sent it to the participants for member checking, inviting participants to respond when they had additional comments or disagreed with the content. We received no comments in response to the summaries. Two researchers (NS, AB) independently analyzed the data. Both researchers have a background in health sciences, and AB has substantial experience with qualitative research.

In the first stage of analysis, we closely read the transcripts to become familiar with the data. To analyze the data we used thematic analysis [28]. We applied an inductive approach, starting with line-by-line coding of the transcripts. During this open coding process, we used qualitative data indexing software (ATLAS.ti) to assist the process and to produce an initial list of codes. Next, the two researchers sifted through the data, searched for similarities and discrepancies, and ultimately grouped and combined codes into subthemes in an iterative manner. We discussed disagreements regarding the coding and grouping process until reaching consensus. We then clustered subthemes into main themes, and discussed these with all members of the research team (NS, HdV, AB, SvdB, MH, SB) until reaching consensus regarding the final themes. The varied backgrounds and expertise of members of the research team augmented interpretation of the data and minimization of bias. Finally, we selected and translated appropriate quotations to illustrate each theme (NS) and had the translated quotes checked by a native English speaking editor. With these quotes we used the following transcript conventions:

...	Short pause
(...)	Words omitted to shorten quote
[text]	Explanatory information included by the author
F/M(number)	Identifier of participant providing the quote

Ethical considerations

Participants received written information regarding the confidentiality and anonymity of the study results and were given an opportunity to ask questions. All participants signed a consent form at the start of the focus group session. The Medical Ethics Review Committee of the University Medical Center Groningen confirmed that their official approval was not required, as the Medical Research Involving Human Subjects Act (WMO) did not apply to this study (METc 2017/486, M17.218841).

Results

With regard to the perspectives of workers on involving SOs in occupational health care, we distinguished the following main themes: (i) attitudes towards involving SOs, (ii) preferences on how to involve SOs, (iii) benefits of involving SOs, and (iv) concerns and potential drawbacks with regard to involving SOs. These themes and their subthemes are presented in Figure 1 and will be discussed in more detail in the four main sections below.

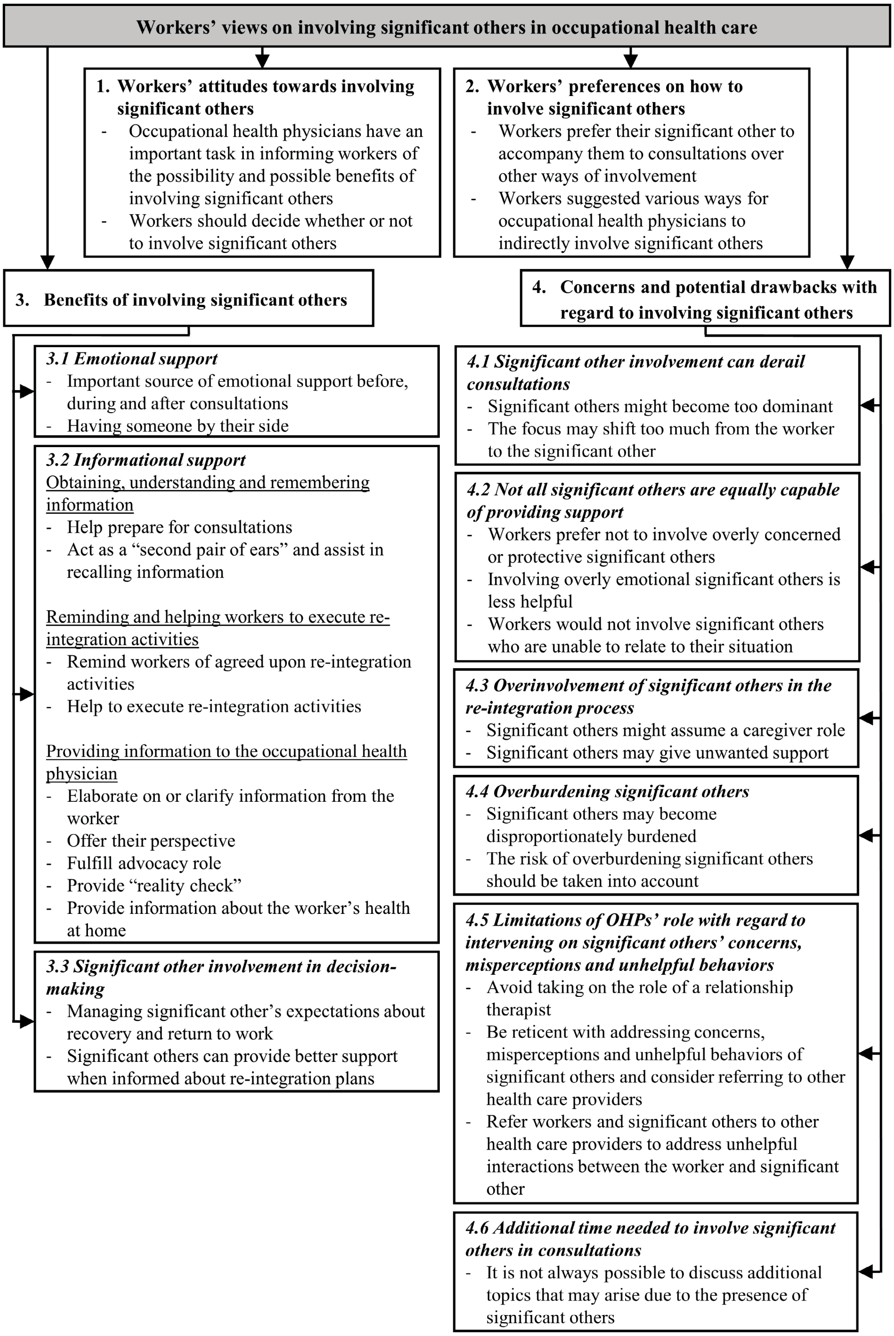
1. Workers' attitudes toward involving SOs

Participants generally expressed positive views when asked how they felt about involving SOs in occupational health care. They would appreciate being offered the opportunity to involve their SOs, although their personal preferences varied with regard to this involvement. Workers felt that OHPs have an important task in informing workers of this possibility and explaining its potential benefits, after which the worker should decide whether or not to use this opportunity. One worker explained:

> *"Do you know what I would like best? If they would ask people at the beginning, and that you can just say yes or no. Because look, I can imagine that you might not feel the need at all. That you think like… I also hear you [other participants] say that sometimes you just prefer to do it alone. I recognize that too" (M8, 42 years, experience with partner involvement).*

2. Workers' preferences on how to involve SOs

When involving SOs, most workers would prefer their SO to accompany them to consultations with the OHP. However, if this is not feasible, for example due to SOs' other obligations, workers indicated that SOs can be involved in other ways, such as using video conferencing to enable SOs to participate in consultations. Workers also suggested various ways for OHPs to involve SOs indirectly: by having SOs fill out a short form with questions at home, by advising workers to discuss certain topics with their SOs, or by providing workers with information to discuss with their SOs.



Workers’ views on involving significant others in occupational health care

1. Workers’ attitudes towards involving significant others
- Occupational health physicians have an important task in informing workers of the possibility and possible benefits of involving significant others
- Workers should decide whether or not to involve significant others

2. Workers’ preferences on how to involve significant others
- Workers prefer their significant other to accompany them to consultations over other ways of involvement
- Workers suggested various ways for occupational health physicians to indirectly involve significant others

3. Benefits of involving significant others

3.1 Emotional support
- Important source of emotional support before, during and after consultations
- Having someone by their side

3.2 Informational support

<u>Obtaining, understanding and remembering information</u>
- Help prepare for consultations
- Act as a “second pair of ears” and assist in recalling information

<u>Reminding and helping workers to execute re-integration activities</u>
- Remind workers of agreed upon re-integration activities
- Help to execute re-integration activities

<u>Providing information to the occupational health physician</u>
- Elaborate on or clarify information from the worker
- Offer their perspective
- Fulfill advocacy role
- Provide “reality check”
- Provide information about the worker’s health at home

3.3 Significant other involvement in decision-making
- Managing significant other’s expectations about recovery and return to work
- Significant others can provide better support when informed about re-integration plans

4. Concerns and potential drawbacks with regard to involving significant others

4.1 Significant other involvement can derail consultations
- Significant others might become too dominant
- The focus may shift too much from the worker to the significant other

4.2 Not all significant others are equally capable of providing support
- Workers prefer not to involve overly concerned or protective significant others
- Involving overly emotional significant others is less helpful
- Workers would not involve significant others who are unable to relate to their situation

4.3 Overinvolvement of significant others in the re-integration process
- Significant others might assume a caregiver role
- Significant others may give unwanted support

4.4 Overburdening significant others
- Significant others may become disproportionately burdened
- The risk of overburdening significant others should be taken into account

4.5 Limitations of OHPs’ role with regard to intervening on significant others’ concerns, misperceptions and unhelpful behaviors
- Avoid taking on the role of a relationship therapist
- Be reticent with addressing concerns, misperceptions and unhelpful behaviors of significant others and consider referring to other health care providers
- Refer workers and significant others to other health care providers to address unhelpful interactions between the worker and significant other

4.6 Additional time needed to involve significant others in consultations
- It is not always possible to discuss additional topics that may arise due to the presence of significant others

Figure 1. Overview of themes and subthemes.

3. Benefits of involving SOs

Participants mentioned various benefits of involving SOs in occupational health care; these are described below.

3.1 Emotional support

Workers stated that SOs could be an important source of emotional support before, during and after consultations with the OHP. They noted that the presence of an SO during consultations could be reassuring and reduce worries one might have about visiting an OHP, as having someone by their side can provide a sense of security. Furthermore, workers felt that the importance of emotional support is amplified when workers are particularly anxious or distressed about visiting the OHP. One worker said,

> *"And when I talk to my fellow patients [about visiting the OHP], they often feel (...) enormous agitation. And I think the moment that you add a significant other, in a conversation like that alone ... that that ... uh .. yes, can give a huge boost" (F7, 47 years, no experience with SO involvement).*

3.2 Informational support

Many workers stated that SOs could provide various kinds of informational support during the re-integration process (i.e. before, during and after consultations with the OHP). They described that SOs could help them obtain, understand, and remember important information, but they could also help with providing information to the OHP.

Obtaining, understanding and remembering information. Workers described how their SOs had helped them prepare for consultations by talking about questions and issues that were important to discuss with the OHP. They also appreciated their SOs' help with raising these issues during the consultation. One worker recalled,

> *"Then I think before [the consultation]: 'write it down, and then when you see that doctor, you can say it'. [But then I think:] 'that is nonsense, I will remember it'. But then you sit there and then you really don't remember it. Because that man [doctor] starts talking about this, you start talking about that, and he asks about something else, and then you're done again. And... my wife is like, if she were there, she would remember it and she would say 'you wanted to ask that and that and that'" (M9, 58 years, experience with partner involvement).*

Some workers also mentioned that SOs could act as a "second pair of ears". Workers indicated that SOs would be able to assist in recalling information provided by the OHP after the consultation had finished. In this context, workers explained that the worker and SO could supplement each other's recalled information, as each person might have remembered different aspects of the consultation or interpreted information differently. One worker said,

> *"Yes, if someone does indeed come with you (...) you could then talk about that together [after the consultation], like 'gosh, we did talk about it, but how would we do it again?'" (F4, 48 years, unknown whether the participant had experience with SO involvement).*

Another worker stated,

> *"It has simply been proven that with every conversation you have, a somewhat longer conversation, you may only really remember 20-30% [of what has been discussed]. And if you have someone with you, they may remember just that other 30%" (M4, 61 years, unknown whether the participant had experience with SO involvement).*

Someone else explained,

> *"And precisely because we were with the three of us [worker, wife and OHP] every time, those conversations were useful. Because I always only heard that she [OHP] said: 'Well your re-integration to your own work'. ... And my wife then said, 'Yes, but she did also say that this will take a year'. And then I think 'Oh yes, that's also true'" (M5, 61 years, experience with partner involvement).*

Such informational support appeared to be especially important for workers who felt unable to remember questions they wanted to ask, or absorb information given during the consultation. A worker recalled,

> *"... That he [significant other], for example, says what you have to do, or what new appointments have to be made, that sort of thing. [Or] information that you should receive from the OHP that I just couldn't remember myself. My partner then remembered that [for me]. And then I don't have to do that myself. Because I couldn't do that at all at the time" (F1, 57 years, experience with partner involvement).*

Reminding and helping workers to execute re-integration activities. Aside from recalling and discussing information after consultations, workers felt that SOs could support them by reminding them of agreed upon re-integration activities or helping them to execute these activities. One worker remarked,

> *"Yes, and then my wife is an extension of the OHP. Because if I don't feel like doing anything in the morning, then I get a kick [from her] and she says 'You have to walk for an hour', and then she does, when she's home, she puts on her shoes and then we go walk together" (M5, 61 years, experience with partner involvement).*

Providing information to the OHP. Another observation was that SOs can help workers to provide information to the OHP. Although workers felt that they themselves should always remain the main source of information, they stated that SOs could elaborate on or clarify this information. Furthermore, they can offer their perspective on the worker's functioning at home, for example, regarding the worker's energy level during the day, or the amount of time needed to recover after a workday. In this context, SOs can also fulfill an advocacy role during consultations, to defend workers' rights and ensure that their best interests are being served. One worker stated:

> *"But a significant other is also very capable to emphasize what the consequences are. That if you've done something, worked or whatever, that you can't do anything more during the weekend" (F3, 58 years, no experience with SO involvement).*

Some workers also mentioned that SOs could ensure that workers provided accurate or relevant information, and that information from SOs can serve as a "reality check". One worker explained:

> *"You always pretend to be bigger than you are, and to… to nuance that a bit in shades of gray… Of course, you are good at mentioning your good sides... but the less positive sides [difficulties, health complaints] ... you just don't mention them. Period. You're not going to talk about that. Come on! But a significant other can shed more light on that. Not to discredit you, but to add nuances [to what you tell the OHP]" (M10, 63 years, unknown whether the participant had experience with SO involvement).*

However, some controversy arose about having SOs fulfill this role, as it could trigger frustration or anger in the worker. One worker explained that he had initially been furious when his wife had told the OHP that he was not able to do everything that he used to do, but that he later recognized that she was right in telling this, and he appreciated her having done it. Other workers stated that they would not appreciate having their SOs provide a reality check during a consultation with their OHP, and that this could be a reason not to bring their SO.

Finally, workers felt that a SO could provide information about the worker’s health at home. One worker said,

> *“Yes, and thát is what your significant other can tell, like, well, ‘when you come home, you don't do anything at all anymore, you are exhausted, barely approachable'. Look, and that is information that the significant other provides and not the patient himself. Because he [patient] wants to work and says ‘yes, but I’m fine’” (F3, 58 years, no experience with SO involvement).*

3.3 SO involvement in decision-making

Some workers stated that it could be beneficial to involve SOs in making decisions regarding re-integration goals and how to achieve these goals. They felt that this could help in managing SOs’ expectations with regard to the expected duration and different stages of the re-integration process. Furthermore, it might make SOs more supportive of re-integration plans and better aware of why certain decisions or recommendations had been made. Another observation was that SOs will be better able to provide support outside of consultations when they are informed about the re-integration plans. In this context, some workers felt that it would be helpful to discuss explicitly what SOs could do to support the worker, or how the worker and SO could work together to deal with the disease, execute plans, and achieve re-integration goals. One worker said,

> *“I can imagine that in some situations it is very pleasant to actually involve the partner, or the person who is present, actively in the conversation. Because perhaps, (...) such a partner can also be actively involved in a bit of the re-integration, or in a bit of guidance during such a disease process. So that agreements can also be made or proposals can be made like, 'Indeed, go walk for an hour with your wife', but that that opportunity is also discussed. Or... discussing ways on how you can proceed together” (M6, 56 years, unknown whether the participant had experience with SO involvement).*

4. Concerns and potential drawbacks with regard to involving SOs

In spite of the perceived benefits of involving SOs in occupational health care, some workers also expressed concerns and potential drawbacks regarding the issue. These concerns and potential drawbacks are described below. According to workers, it is important that OHPs, workers and SOs balance the potential benefits and drawbacks of SO involvement.

4.1 SO involvement can derail consultations

Some workers were concerned that the presence of SOs might negatively affect the interaction between the worker and the OHP. SOs might become too dominant in the consultation, at the expense of the worker's involvement. Furthermore, workers expressed concern that the focus may shift too much from the worker to the SO. They indicated that situations could arise in which OHPs engaged primarily with the SO during consultations, at the expense of the worker. One worker said,

> *"(…) someone sitting next to you should not take over the conversation" (F5, 55 years, experience with involving a good acquaintance).*

Workers felt that OHPs have an important task in balancing the benefits of actively involving SOs and the potential negative effects this can have on the consultation and interaction with the worker. For example, although workers felt it was important for OHPs to recognize misperceptions, anxiety and concerns on the part of SOs, they stressed that the consultation should always remain focused on supporting the worker's return to work.

4.2 Not all SOs are equally capable of providing support

Participants also felt that not all SOs were equally capable of providing support during the re-integration process. Several workers noted that they preferred not to involve a SO who was overly concerned or protective. One worker explained,

> *"I wouldn't take anyone with me who is overprotective. Because when this happens, you have the chance that, if you are in a rehabilitation period, that this might have an inhibiting effect. And you don't want that either. You do want to move forward" (M6, 56 years, unknown whether the participant had experience with SO involvement).*

In addition, SOs who were likely to become overly emotional during a consultation were considered less helpful. Someone said,

> *"(…) If I had had my father there, he would have dragged that man across the table. Well, you don't want that, I'm afraid" (M3, 49 years, no experience with SO involvement).*

Some workers also indicated that they would not involve SOs who were unable to relate to their situation. One explained,

> *"And especially my daughter, who is also unemployed at the moment, doesn't understand. She says 'You get your money easily'. So, when I talk about that, yes, what my motive is [to work from home two days a week], yes, that does not come across" (M14, 62 years, unknown whether the participant had experience with SO involvement).*

4.3 Overinvolvement of SOs in the re-integration process

Workers spoke of the risk that SOs could become overinvolved in the re-integration process. Several workers expressed the concern that SOs might assume a caregiver role, and try to assume part of the control over the worker's life. Furthermore, SOs may give unwanted support or start to act as a surrogate for the OHP at home. Although well-intended, this could cause the worker frustration, and lead to conflict. A worker explained,

> *"Yes, what I am always a bit afraid of, and I do also say that [to my wife]: 'Yes I married you, but I am not married to a caregiver', you know. That is awfully essential. I do want help from her, but yeah ... yeah, also not too much, you know. It's a bit ... otherwise you are so dependent, right?" (M8, 42 years, experience with partner involvement).*

4.4 Overburdening SOs

Workers explained that their disease had consequences not only for themselves, but also for their SOs, and that they did not want to burden them more than necessary. They stressed the importance of preventing SOs from becoming overburdened, and of not losing sight of how the disease affected the SOs. One worker explained that by involving them, SOs may become disproportionately burdened:

> *"And if you as an OHP say, 'We want to have the partner there to allow the person who is ill to re-integrate', then you have to realize that you can really disproportionally burden the partner. With all the love that everyone has for their own partner, that you think like 'yes, but they [partner] will pay the bill twice'. I would also watch out for that" (M5, 61 years, experience with partner involvement).*

There was consensus that the risk of overburdening SOs should be taken into account when considering whether, when, and how to involve them in occupational health care.

4.5 Limitations of OHPs' role with regard to intervening on significant others' concerns, misperceptions and unhelpful behaviors

Although workers were generally positive about involving SOs in occupational health care, opinions differed on what this involvement should entail and what topics the OHP should address with the worker and SO. More specifically, some controversy arose about whether it would be appropriate for OHPs to address cognitions and behaviors of SOs, and interactions between the worker and SO, that seemed to hinder the worker's coping and re-integration process. Some workers felt that OHPs could to some extent address concerns, misperceptions about the illness and behavior of SOs, if it were to contribute to the worker's re-integration process. One worker stated,

> *"Yes if it helps, if he [OHP] can provide information so that the partner or the accompanying person gains a better understanding and is better able to help, and this indeed helps towards the main goal [of return to work], then I certainly think it can help" (F4, 48 years, unknown whether the participant had experience with SO involvement).*

However, others firmly stated that such issues should not be addressed by OHPs, but rather be discussed with other health care providers (e.g. a psychologist or medical specialist) or someone from a patient organization. Similarly, some workers allowed that OHPs might, to a limited extent, try to facilitate positive interactions between the worker and SO, while others felt that this was not the OHP's responsibility. One worker said,

> *"But the OHP you know, and conveying that overprotectiveness, yes then I would like, if he [OHP] would also say something like, 'listen, also trust him [the worker] a bit'" (M7, 54 years, experience with partner involvement).*

Although opinions differed regarding which topics the OHP could address, workers agreed that OHPs should avoid taking on the role of a relationship therapist. About this, one worker said,

> *"And whether we have marital problems or not, the OHP doesn't have to go fishing about that. Because I choose to bring someone that I trust at that moment. (...) But it's not my therapist, that OHP" (M5, 61 years, experience with partner involvement).*

Overall, most workers felt that when issues surrounding SOs' concerns, misperceptions, behavior, or interactions appeared to hinder the worker in his or her coping and re-integration, it would be better to refer workers and SOs to other appropriate health care providers or a patient organization.

4.6 Additional time needed to involve SOs during consultations

Some workers expressed doubts as to whether sufficient time is available during consultations to actively involve SOs in the conversation, for example to provide them with additional information or ask about their perspective. Workers had had different experiences with the duration of consultations, with available time ranging from ten minutes up to an hour. Consultations with a duration of ten minutes were considered too short for discussing additional topics that could arise because of the presence of SOs. However, some workers stated that OHPs could easily schedule an additional or double appointment to allow for more time. One worker said,

> *"Perhaps you could include that in the protocol, like 'Instead of having a standard consultation of ten minutes, schedule, for example, half an hour for those people [workers who take a significant other with them]'" (F2, 53 years, unknown whether the participant had experience with SO involvement).*

Discussion

In this focus group study, we aimed to better understand how workers with chronic diseases feel about involving their SOs in occupational health care, and how this should be implemented to best meet their needs. The workers participating in this study reported that SOs can play an important role in supporting workers with chronic diseases in the re-integration process, both in daily life and during consultations. They generally had positive views about involving SOs in occupational health care, and felt that this can benefit the work re-integration process. Although their personal preferences regarding its implementation varied, most said they would appreciate the opportunity to involve their SOs. They indicated that benefits of involving SOs are that they can provide emotional and informational support (e.g., reducing anxiety, and providing and recalling information) before, during, and after consultations with the OHP. Moreover, they felt that involving SOs in decision-making could help workers to better manage their expectations about recovery and return to work; a well-informed SO could better support the worker's re-integration plans.

Nevertheless, aside from identifying the potential benefits of involving SOs in occupational health care, workers also expressed some concerns and potential drawbacks. Some pointed out that the presence of SOs could derail the consultation, negatively affecting the interaction between the worker and the OHP. Others were concerned that SOs might assume a caregiver role, give unwanted support, or become overburdened. Still others mentioned that the limited time available during consultations could also present challenges for actively involving SOs. Finally, opinions differed on what involving SOs should entail, and what topics should be addressed by the OHP. For example, when issues surrounding SOs' concerns, misperceptions, or interactions were likely to hinder the worker in his or her coping and re-integration, most workers felt that it would be better to refer workers and SOs to other appropriate health care providers or a patient organization.

Our findings are largely in line with clinical studies exploring how individuals with a chronic disease view involvement of SOs in medical consultations. Some of these studies also found that patients generally hold favorable views towards involvement of a spouse, family member or friend [21,29]. Moreover, other studies confirm that SOs can offer important emotional and informational support before, during, and after consultations [20,21,30]. Prior studies also confirm our finding that the involvement of SOs can present some challenges, such as their overinvolvement, and possibly needing extra time during consultations [29–31].

However, our findings differ in some respects from those of other clinical studies. In our study, we found that most workers were less inclined to involve unsupportive or overprotective SOs, as they felt that this could hinder the re-integration process. In contrast, prior research indicated that it could be helpful to involve unsupportive SOs in health care interventions, as this could enhance support, helpful behaviors, effective communication, and joint problem solving [20,32], which could in turn lead to better health, relationships and work outcomes [4,20,30,33]. This difference may in part be explained by the view of workers in our study that enhancing support by SOs is not among the core tasks of OHPs, and could be better addressed by other health professionals with more expertise in counseling people on interpersonal matters. The position of OHPs in the health care system may also play a role in this matter. For instance, in the Netherlands, since 1994 occupational health services (OHS) have been provided by commercial enterprises, with the market dominated by a few major organizations [34]. Most OHS employ OHPs and other occupational health experts. Employers are legally obliged to contract an OHP to assist them in guiding sick employees during the first two years of sick leave. OHPs providing support and guidance to help employees retain or return to work are thus hired by employers, which has led to discussions about their independence and impartiality. In this context, OHPs are often seen by employees as acting mostly on behalf of the employer, whose best interest is to have sick-listed employees return to work as quickly as possible, rather than as care providers whose task it is to protect and promote the health of employees in relation to their work, and to support sick-listed employees in their recovery and re-integration process. This perception could in turn influence workers' views on the role of OHPs in eliciting support from SOs. Our findings regarding the benefits and reasons for involving SOs in occupational health care strongly resemble findings in a prior study on workers' views about occupational health care consultations with a spouse, family member, or friend present [26]. In both studies, workers mentioned emotional support as an important reason to bring someone to consultations, and indicated that having an SO present can be helpful for recalling information and providing extra information to the physician. Furthermore, as in our study, workers in that study mentioned that the presence of their SO at the consultation enabled them to discuss its outcomes afterwards [26].

When comparing views on involving SOs in occupational health care of workers in our study with those of OHPs [23,26], we found both similarities and discrepancies. Both workers and OHPs highlighted that SOs can play an important role in providing OHPs with greater insight into a worker's illness and functioning. Both stakeholders also agreed that it is not always necessary to involve SOs in occupational health care, mentioning that the necessity and benefits of such involvement depend on factors such as the worker's coping, capability to provide sufficient information, and disease characteristics [23]. In addition, both workers interviewed in this study and OHPs participating in other studies [23,26] indicated that the characteristics of SOs should be taken into account when deciding whether or not to involve someone. For example, some workers and OHPs [23] indicated that they would not involve an overprotective SO, as they felt that this might hinder the worker's re-integration process or disrupt consultations.

There were, however, some discrepancies between the views of workers and those of OHPs. For instance, to some extent workers and OHPs gave different reasons to involve SOs. Workers in this study emphasized mainly practical reasons for wanting to involve SOs, such as reducing their own anxiety about visiting the OHP, and having support in recalling and providing information. In contrast, in a prior survey study, one of the main reasons OHPs gave for involving SOs was to gain more insight into the social context of the worker, and the influence of SOs on the worker's coping, recovery, and re-integration process [23]. Furthermore, OHPs in that study indicated involving SOs not only to mobilize their support, but also to be able to intervene when SOs' cognitions and behaviors appear to be an obstacle. While some workers in our study also indicated that OHPs might, to a limited extent, address hindering cognitions and behaviors of SOs when this would benefit the return-to-work process, they generally felt that OHPs should show restraint in intervening on such cognitions and behaviors. This difference in opinions between workers and OHPs may in part be explained by the way the role of OHPs is regulated in the Netherlands. Discussion regarding the independence of OHPs strikes at the core of the physician-patient relationship, namely trust. Patients must trust their physicians to work in their best interests to achieve optimal health and functioning outcomes. In addition, SO involvement in occupational health care means that SOs are involved not just in the worker's health, but also in the worker's work context. Therefore, privacy concerns of workers might also be an issue and influence their views on what topics should be addressed when involving SOs. This is especially so when SOs assume an active role in providing information to the OHP, which could in turn affect the worker's return to work. In this context, our findings indicate that the workers interviewed in this study generally felt that the OHP's role in supporting recovery and re-integration is limited to addressing topics directly related to the worker and his/her work. While concerns about the worker's privacy can be a reason for OHPs to be reticent in addressing topics that are not directly related to the worker and his/her work, there is also some evidence that OHPs feel that their role does include addressing environmental factors outside of work that hinder the worker's recovery and re-integration [23].

Strengths and limitations

A strength of this study is the diversity of our sample with regard to chronic diseases, age, sex, duration of sick leave, work status, and experience with involving SOs. This resulted in a wide range of views and considerations regarding involving SOs in occupational health care. Furthermore, we used an iterative data collection approach, which allowed us to better explore new topics that were introduced in previous sessions.

A limitation of our study is that we were unable to perform purposive sampling. In addition, there is some risk of selection bias due to our recruitment method and relatively small study sample. While there was sufficient diversity in our sample with regard to experience with SO involvement and most worker characteristics, low-educated workers were underrepresented. Prior research indicates that workers with a lower educational level may experience more difficulties in managing their disease than workers with a higher education [21]. In addition, lower educated workers are more likely to have low health literacy, which can negatively impact physician-patient interaction, chronic disease self-management and patient outcomes [35–37]. As lower educated workers may need more or different types of support from their SOs to effectively interact with physicians and manage their disease, their preferences with regard to involving them in the re-integration process may differ from those of workers with a higher educational level. The underrepresentation of workers with a low educational level might have been prevented by taking additional measures aimed at ensuring an even representation of workers across educational levels, which may in turn have resulted in additional themes. Another limitation of this study is that it is unknown for some participants whether they had any experience with involving significant others in occupational health care. This information could have provided more insight into the standpoint from which these participants spoke and whether views and considerations might differ depending on workers' personal experience with SO involvement. Finally, the third focus group consisted of only two participants, due to a last-minute drop out and difficulties in recruiting more participants for this session. Nevertheless, a benefit of the small size of this particular group was that it allowed us to go into more detail and discuss each participant's thoughts, experiences and opinions more extensively than in the other sessions.

Implications and recommendations for occupational health practice

This study provided valuable insight into workers' views on involving SOs in occupational health care, as well as a number of practical implications. First, most participating workers believed that their involvement in the re-integration process can facilitate a helpful role of

SOs, which in turn can help workers in their recovery and return to work. In this context, OHPs may inform SOs about the return to work plan, involve them in decision-making, and explicitly discuss with workers and SOs what the SO can do to support the worker. Furthermore, they may consider intervening on concerns, misperceptions and unhelpful behaviors of SOs in order to reduce a hindering role of SOs, either by providing information and advice or referring workers and SOs to other health care professionals. However, according to workers, potential drawbacks of SO involvement need to be taken into account, including risks of overburdening SOs and SOs interfering too much during consultations or providing unwanted support. In this context, it is important that OHPs, workers and SOs balance the potential benefits and drawbacks of involving SOs in the re-integration process. Moreover, OHPs and workers should take the worker’s self-management skills, preferences and needs and characteristics of SOs into account when deciding whether to involve SOs, as well as which SO to involve. Finally, as many workers had never considered the possibility of involving their SOs, they felt that OHPs have an important role in creating more awareness among workers of the possibility and potential benefits of involving SOs in occupational health care. These insights are helpful in developing guidelines and education for OHPs on how to manage involvement of SOs in occupational health care.

Recommendations for future research

This study and prior research have focused on the views of workers and OHPs regarding involving SOs in occupational health care. However, knowledge of the views of the SOs themselves on this topic is still lacking. Future research should therefore aim at gaining insight into how the SOs perceive their involvement in the re-integration process. Such research may result in additional considerations and recommendations that are important for successful implementation of SO involvement in occupational health care. In addition, future research should focus on gaining more fundamental insight into dyadic processes of workers and SOs (e.g., the ways they cope with stress together) that can influence the recovery and re-integration process of sick-listed workers. As our research indicates that workers have varying preferences regarding the role of SOs in consultations and the re-integration process, future studies could focus on exploring how workers and SOs can best negotiate this role. In addition, more research is needed to determine whether these dyadic processes and the benefits and drawbacks of SO involvement depend on which SO is involved and whether or not the worker and SO live together. Finally, future research is needed to determine the size of effects, both positive and negative, of involving SOs on recovery and successful return to work of workers with a chronic disease. In this context, it is important to also explore whether worker characteristics such as gender, illness severity and self-management skills influence the effects of SO involvement.

Conclusion

The workers participating in this study were generally positive about the possibility to involve SOs in occupational health care, believing that involving SOs can contribute to recovery and work re-integration of workers with a chronic disease. They felt that an important benefit of such involvement is that SOs can provide emotional and informational support before, during, and after consultations. However, they also indicated that the circumstances and preferences of the worker should be taken into account when deciding whether and how to involve SOs, and that care should be taken that SOs do not become overinvolved or overburdened.

Abbreviations

SO	Significant other
OHP	Occupational health physician

Acknowledgements: We would like to thank Margriet van Kampenhout for her contribution to the data collection. We would also like to thank the 15 occupational health physicians of HumanTotalCare and the Patient panel of the Netherlands Patients Federation for their contribution to the recruitment of participants. Finally, we would like to thank all workers who participated in this study.

References

1. European Chronic Disease Alliance. Joint Statement on "Improving the employment of people with chronic diseases in Europe". 2017.https://ec.europa.eu/health/sites/health/files/policies/docs/2017_chronic_framingdoc_en.pdf
2. OECD/EU (2016). Health at a Glance: Europe 2016 - State of Health in the EU Cycle. OECD Publishing 2016. doi:http://dx.doi.org/10.1787/9789264265592-en
3. Berg CA, Upchurch R. A developmental-contextual model of couples coping with chronic illness across the adult life span. *Psychol Bull* 2007;**133**:920–54. doi:10.1037/0033-2909.133.6.920
4. Snippen NC, Vries HJ de, Burg-Vermeulen SJ van der, *et al.* Influence of significant others on work participation of individuals with chronic diseases: a systematic review. *BMJ Open* 2019;**9**:1–13. doi:10.1136/BMJOPEN-2018-021742
5. Rosland A-MM, Heisler M, Piette JD. The impact of family behaviors and communication patterns on chronic illness outcomes: a systematic review. *J Behav Med* 2012;**35**:221–39. doi:10.1007/s10865-011-9354-4
6. Deek H, Hamilton S, Brown N, *et al.* Family-centred approaches to healthcare interventions in chronic diseases in adults: A quantitative systematic review. *J Adv Nurs* 2016;**72**:968–79. doi:10.1111/jan.12885
7. Islam T, Dahlui M, Majid HA, *et al.* Factors associated with return to work of breast cancer survivors: a systematic review. *BMC Public Health* 2014;**14**:S8. doi:10.1186/1471-2458-14-S3-S8
8. Brooks J, McCluskey S, King N, *et al.* Illness perceptions in the context of differing work participation outcomes: Exploring the influence of significant others in persistent back pain. *BMC Musculoskelet Disord* 2013;**14**. doi:10.1186/1471-2474-14-48
9. Martire LML, Schulz R, Helgeson VSVS, *et al.* Review and meta-analysis of couple-oriented interventions for chronic illness. *Ann Behav Med* 2010;**40**:325–42. doi:10.1007/s12160-010-9216-2
10. Hartmann M, Bäzner E, Wild B, *et al.* Effects of interventions involving the family in the treatment of adult patients with chronic physical diseases: A meta-analysis. *Psychother Psychosom* 2010;**79**:136–48. doi:10.1159/000286958
11. Kelly GR, Scott JE, Mamon J. Medication compliance and health education among outpatients with chronic mental disorders. *Med Care* 1990;**28**:1181–97.http://www.ncbi.nlm.nih.gov/pubmed/2250501
12. McCrady BS, Epstein EE, Cook S, *et al.* A randomized trial of individual and couple behavioral alcohol treatment for women. *J Consult Clin Psychol* 2009;**77**:243–56. doi:10.1037/a0014686
13. Vooijs M, van der Heide I, Leensen MCJ, *et al.* Richtlijn Chronisch Zieken en Werk [Guideline 'The chronically ill and work']. Amsterdam: 2016. https://www.psynip.nl/wp-content/uploads/2017/03/Richtlijn_chronisch_zieken_en_werk_2016.pdf
14. Scottish Intercollegiate Guidelines Network (SIGN). Management of chronic pain. A national clinical guideline. Sign. 2019.https://www.sign.ac.uk/media/1108/sign136_2019.pdf
15. Scottish Intercollegiate Guidelines Network (SIGN). Brain injury rehabilitation in adults. A national clinical guideline. 2013.http://www.sign.ac.uk/assets/sign130.pdf
16. National Institute for Health and Care Excellence (NICE). Stroke rehabilitation in adults. Clinical guideline [CG162]. 2013;:44.https://www.nice.org.uk/guidance/qs2/resources/stroke-in-adults-pdf-58292707525%0Ahttps://www.nice.org.uk/guidance/cg162

17. National Institute for Health and Clinical Excellence (NICE). Depression in Adults: recognition and Management. Clinical guideline [CG90]. 2009.https://www.nice.org.uk/guidance/cg90/resources/depression-in-adults-recognition-and-management-975742636741
18. National Institute for Health and Clinical Excellence (NICE). Rehabilitation after critical illness. Clinical guideline [CG83]. 2009.https://www.nice.org.uk/guidance/cg83/resources/rehabilitation-after-critical-illness-in-adults-pdf-975687209413
19. van Dijk JL, Bekedam MA, Brouwer W, *et al.* Richtlijn Ischemische Hartziekten [Guideline Ischemic Heart Disease]. Utrecht: 2007. www.nvab-online.nl (accessed 21 Feb 2019).
20. Lamore K, Montalescot L, Untas A. Treatment decision-making in chronic diseases: What are the family members' roles, needs and attitudes? A systematic review. *Patient Educ Couns* 2017;**100**:2172–81. doi:10.1016/j.pec.2017.08.003
21. Laidsaar-Powell RC, Butow PN, Bu S, *et al.* Physician-patient-companion communication and decision-making: A systematic review of triadic medical consultations. Patient Educ. Couns. 2013. doi:10.1016/j.pec.2012.11.007
22. Meis LA, Griffin JM, Greer N, *et al.* Couple and family involvement in adult mental health treatment: A systematic review. Clin. Psychol. Rev. 2013. doi:10.1016/j.cpr.2012.12.003
23. Snippen NC, de Vries HJ, de Wit M, *et al.* Assessing significant others' cognitions and behavioral responses in occupational health care for workers with a chronic disease. *Disabil Rehabil* 2020;**43**:1–14. doi:10.1080/09638288.2020.1711536
24. Yardley L, Morrison L, Bradbury K, *et al.* The person-based approach to intervention development: Application to digital health-related behavior change interventions. *J Med Internet Res* Published Online First: 2015. doi:10.2196/jmir.4055
25. Gupta K, Lee H. A practical guide to needs assessment. *Perform Improv* 2001;**40**:40–2. doi:10.1002/pfi.4140400810
26. Sharp RJ, Hobson J. Patient and physician views of accompanied consultations in occupational health. *Occup Med (Chic Ill)* 2016;**66**:643–8. doi:10.1093/occmed/kqw097
27. Tong A, Sainsbury P, Craig J. Consolidated criterio for reporting qualitative research (COREQ): a 32- item checklist for interviews and focus group. *Int J Qual Heal Care* 2007;**19**:349–57. doi:10.1093/intqhc/mzm042
28. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;**3**:77–101. doi:10.1191/1478088706qp063oa
29. Laidsaar-Powell R, Butow P, Bu S, *et al.* Attitudes and experiences of family involvement in cancer consultations: a qualitative exploration of patient and family member perspectives. *Support Care Cancer* Published Online First: 2016. doi:10.1007/s00520-016-3237-8
30. Wolff JL, Roter DL. Family presence in routine medical visits: A meta-analytical review. *Soc Sci Med* 2011;**72**:823–31. doi:10.1016/j.socscimed.2011.01.015
31. Hobson J, Hobson H, Sharp R. Accompanied consultations in occupational health. *Occup Med (Chic Ill)* Published Online First: 2016. doi:10.1093/occmed/kqv194
32. Manne S, Ostroff JS, Winkel G. Social-Cognitive Processes as Moderators of a Couple-Focused Group Intervention for Women With Early Stage Breast Cancer. *Heal Psychol* Published Online First: 2007. doi:10.1037/0278-6133.26.6.735
33. Porter LS, Keefe FJ, Baucom DH, *et al.* Partner-assisted emotional disclosure for patients with gastrointestinal cancer: Results from a randomized controlled trial. *Cancer* Published Online First: 2009. doi:10.1002/cncr.24578

34. Burdorf A, Elders L. Occupational medicine in The Netherlands. *Occup Med (Lond)* Published Online First: 2010. doi:10.1093/occmed/kqq083
35. Davey J, Holden CA, Smith BJ. The correlates of chronic disease-related health literacy and its components among men: A systematic review. BMC Public Health. 2015. doi:10.1186/s12889-015-1900-5
36. Sim D, Yuan SE, Yun JH. Health literacy and physician-patient communication : a review of the literature. *Int J Commun Heal* 2016;**10**:101–14.
37. Berkman ND, Sheridan SL, Donahue KE, *et al.* Low health literacy and health outcomes: An updated systematic review. Ann. Intern. Med. 2011. doi:10.7326/0003-4819-155-2-201107190-00005

Chapter 7

Training for occupational health physicians to involve significant others in the return-to-work process of workers with chronic diseases: a randomized controlled trial

Nicole Snippen, Haitze de Vries, Mariët Hagedoorn, Sandra Brouwer

Disability and Rehabilitation, 2022, DOI: 10.1080/09638288.2022.2107091

Abstract

Purpose: To determine the efficacy of the "*Training for Occupational health physicians To Involve Significant others*" (TOTIS) e-learning module for improving occupational health physicians' (OHPs) knowledge, attitudes, and self-efficacy regarding involving significant others in the return-to-work process.

Methods: A randomized controlled trial with 87 OHPs, involving an intervention group and a wait-listed control group. Between-group differences in knowledge, attitude, and self-efficacy outcomes, and retention of effects were assessed using ANOVA and paired t-tests. Reactions to the e-learning module were analyzed with descriptive statistics and thematic analysis.

Results: We found moderate to large effects on OHPs' knowledge ($p <.001$, $\eta_p^2 = .202$), attitudes ($p = .003$, $\eta_p^2 = .098$), and self-efficacy ($p <.001$, $\eta_p^2 = .237$), with retention of all changes at 10-week follow-up. OHPs graded the e-learning module with a mean score of 7.9 out of 10 (*SD* = 1.11) and indicated that the module increased their awareness of the role of significant others and encouraged them to address this more often.

Conclusions: The TOTIS e-learning module and accompanying materials are valuable resources for OHPs to learn how significant others influence work outcomes of workers with chronic diseases and to manage their involvement in the re-integration process.

Introduction

Significant others (such as partners, family members, or friends) can play an important role in how workers cope with the consequences of a chronic disease, thereby influencing their work and health outcomes [1–5]. Prior research suggests that significant others can meaningfully support workers with chronic diseases in work re-integration after sickness absence, both in daily life and during consultations with occupational health physicians (OHPs) [6–8]. For example, their involvement in occupational health care can be helpful in reducing anxiety in workers, recalling information, and providing extra information to the OHP. Moreover, involving significant others in decision-making and re-integration plans can enhance support and promote helpful behaviors from significant others, and facilitate effective communication and joint problem solving between workers and their significant others. These benefits of significant other involvement could in turn lead to better health, personal relationships, and work outcomes [1,9–11].

Despite the potential benefits of involving significant others in the return-to-work process of sick-listed workers with chronic diseases, it is currently not common practice for OHPs to do so [7]. This can in part be explained by a lack of self-efficacy on the part of OHPs to assess and respond to the cognitions (i.e., illness perceptions, work-related beliefs and expectations) and behaviors of significant others related to work outcomes, highlighting one barrier to successfully implementing significant other involvement in occupational health care [7]. Other studies have found that involving significant others in occupational health care can present additional challenges and that OHPs may find it difficult to involve significant others in care [6–8]. For example, the presence of a significant other could negatively affect the interaction between the worker and OHP or could lead to significant others being involved in ways that may threaten a worker's autonomy.

To effectively involve significant others in the work re-integration process of workers with chronic diseases, OHPs require the necessary knowledge and skills to (i) identify in which situations the involvement of significant others is called for and the best ways to involve them, (ii) assess how significant others affect the worker's recovery and return to work, and (iii) facilitate support, effective communication, and successful coping of workers and their significant others. While several clinical and multidisciplinary guidelines advise health professionals to involve significant others in treatments and care [12–21], guidance and training for OHPs on how to manage significant other involvement and what this should entail is generally lacking.

For this reason, we developed the e-learning module *"Training for Occupational Health Physicians to Involve Significant Others"* (TOTIS) to educate OHPs on how they can best address the role of significant others and manage their involvement in the return-to-work process of workers with chronic diseases. In this study, we focused on the evaluation of this newly developed e-learning module among a sample of Dutch OHPs who were involved in supporting sick-listed workers with chronic diseases to return to work. More specifically, we aimed to determine the efficacy of the TOTIS e-learning module in improving OHPs' knowledge, attitudes, and self-efficacy with regard to involving significant others in the return-to-work process. We hypothesized that the e-learning module would have positive effects on all three outcomes. In addition, we explored OHPs' responses to and satisfaction with the e-learning module.

Materials and methods

Design

This study was a non-blinded randomized controlled trial (RCT), with an intervention and a wait-listed control group. In this RCT, we aimed to determine the efficacy of the e-learning module in improving OHPs' knowledge, attitudes, and self-efficacy (i.e., confidence in their own knowledge and skills) with regard to addressing the role of significant others in the return-to-work process of sick-listed workers with chronic diseases. We were interested in the absolute effects of the e-learning module and therefore wanted to compare OHPs receiving access to the e-learning module with OHPs in an inactive control condition (i.e., not receiving access to the e-learning module). As gaining access to the e-learning module and receiving continuing education points were considered to be important incentives for OHPs to participate in this study, we decided upon a wait-list control group. While it would have been interesting to also determine the relative effects of the e-learning module using an active control condition, this was not feasible in this study because there was no suitable alternative intervention available. In addition to determining the efficacy of the e-learning module, we explored OHPs' responses to and satisfaction with the e-learning module.

Participants

To be eligible for participation in this study, OHPs had to be proficient in written Dutch and be a registered OHP. In the Netherlands, two types of OHPs are involved in occupational health care: occupational physicians and insurance physicians. Occupational physicians are generally involved in the first two years of sick leave, during which time they provide support and guidance to help employees retain or return to work. In the Netherlands, insurance physicians can work in either the public or private sector. Most work in the public sector and are mainly involved in claim disability assessment after two years of sick leave, although some are also involved in supporting employees to retain or return to work. Insurance physicians who work in the private sector (medical advisors) are involved in the return-to-work processes of self-employed workers. For this study, we included only OHPs whose work tasks included providing support and guidance to sick-listed workers with chronic diseases to help them return to work. Thus, OHPs who were only involved in claim disability assessment were excluded from participation. No other exclusion criteria were applied.

Participants were recruited through (1) the Netherlands School of Public and Occupational Health (NSPOH), (2) the Dutch Association of Occupational Medicine (NVAB), (3) the Dutch Association for Insurance Medicine (NVVG), (4) the Dutch Association of Medical Advisers in Private Insurance (GAV), (5) Arbo Unie (a nationally operating occupational health service), and (6) the Dutch Social Security Institute: the Institute for Employee Benefits Schemes (UWV). An invitation to participate was sent by email to all occupational and insurance physicians (working in either the public or private sector) in these databases. In this email, a short description was given about the study and eligibility criteria. In addition, a link was included to a webpage of the NSPOH with more detailed written information about the study and the registration form to sign up. In addition, the contact information of the researchers was provided to enable potential participants to ask questions or request additional information.

Procedure

All data was collected electronically without direct contact with or interference from the researchers. At the start of the RCT, all participants completed a baseline questionnaire (week 0). Using random sampling in SPSS, the main researcher (NS) allocated OHPs who had completed the baseline questionnaire to either the intervention group or the control group (1:1 ratio). We stratified randomization with regard to profession (i.e., occupational physician vs insurance physician) to ensure a well-balanced representation of the different professions between groups. To prepare for randomization, separate databases were created for respectively occupational physicians and insurance physicians. While the researcher performing the random sampling procedure did have access to the baseline data, the datasets used for randomization did not contain any data other than participants' name, contact information, and occupation.

After randomization, the NSPOH gave the intervention group access to the e-learning module through a dedicated website link, while the control group was wait-listed for four weeks (week 1-4). After the 4-week trial period, a follow-up questionnaire was disseminated to both the intervention and control group (week 5). Participants in the wait-listed control group were automatically given access to the e-learning module after they completed the follow-up questionnaire. To determine retention of the effects of the e-learning module, the intervention group was asked to complete the follow-up questionnaire for a second time ten weeks after the 4-week trial period. In addition to these questionnaires, participants in both groups were asked to fill out an evaluation form after completing the e-learning module.

To minimize attrition due to missing values, we checked the baseline and follow-up data for missing data. Two weeks after the first notification that participants could complete one of the questionnaires, reminders were sent to participants who had not yet responded. In addition, in cases where a questionnaire was only partially completed, a reminder was sent to the participant to complete the remaining items. In addition to these precautions, participants had to fully complete the baseline questionnaire, the follow-up questionnaire(s), and the evaluation form to qualify for accreditation for participating in this study.

This study was approved by the Central Ethics Review Committee (CTc) of the University Medical Center Groningen (CTc UMCG 202000077) and is registered in the Netherlands Trial Register (NL8744).

Intervention

The TOTIS e-learning module was developed to educate OHPs on how they can best address the role of significant others and manage their involvement in the return-to-work process of sick-listed workers with chronic diseases. The e-learning module aimed to improve OHPs' knowledge on: 1) how significant others can influence the work participation of workers with chronic diseases, 2) the role of coping of workers and their significant others in the recovery and work re-integration processes, 3) the concepts "illness perceptions" and "dyadic coping" and their relevance for re-integration, 4) how OHPs can assess illness perceptions and coping strategies in workers and significant others, and 5) how OHPs can facilitate helpful illness perceptions, adequate coping and communication among workers and significant others, and how OHPs can intervene on factors that may hinder recovery and re-integration.

The e-learning module consisted of five parts: 1) when and how to address the role of significant others; 2) coping and re-integration; 3) the role of dyadic coping; 4) the role of illness perceptions; and 5) summary of key messages and best-practice recommendations. Content within each part was focused on delivering essential knowledge and translating that knowledge into practical skills (i.e., the "know" and "do" for best-practice in involving significant others). The first four parts included interactive components, such as videos or vignettes in combination with multiple-choice questions. The content was in part based on the results of our previous studies which sought to gain insight into: the relevant cognitive-behavioral factors of significant others associated with work outcomes of workers with chronic diseases [1], OHPs' current practices [7], and stakeholders' views on involving significant others in occupational health care [6,7]. The content was additionally based on research of current practices with regard to involving significant others in related professional domains and available literature on the topics addressed within the e-learning module. The e-learning module was accompanied by a conversation tool, which included: 1) a reference book containing an overview of the key messages and practical advice from the e-learning module, 2) validated questionnaires with which OHPs could gain insight into illness perceptions and coping of workers and their significant others, 3) a conversation leaflet that was developed to facilitate communication between workers and significant others, and 4) ten leaflets about different chronic diseases that were developed to promote adequate illness perceptions. More detailed information about the development of the e-learning module is provided in Online Resource 1.

In a small pilot study, an independent group of evaluators (1 OHP and 3 public health researchers) was engaged to evaluate the e-learning module. Each evaluator was given online access to the e-learning module. While going through the module, evaluators could directly add free-text comments and recommendations. In addition, they completed a short evaluation survey with questions regarding the appropriateness of the content and the general appearance and functionality of the e-learning module. If one or more aspects were rated neutrally or negatively, evaluators were asked to provide additional information that could be used to improve these aspects. The evaluators were positive about the content, general appearance and functionality of the e-learning module and indicated that no major changes were needed. Based on the free-text comments and the responses to the evaluation survey, we made some minor textual changes to the e-learning module to improve the readability of certain sentences. The final version of the module was assessed for educational quality by the Dutch Social Medicine to Accreditation Bureau (ABSG) and accredited for 1.5 continuing education points for license re-registration of occupational health physicians.

Outcome measures

We measured *knowledge* with a knowledge test consisting of 20 multiple choice items based on the content and learning objectives of the e-learning module. More specifically, the knowledge test was designed to measure: 1) OHPs' knowledge of the cognitive and behavioral processes underlying the influence of significant others and considerations to make regarding the involvement of significant others in occupational health care and 2) the OHPs' ability to assess when and how they can best gain insight into the influence of significant others and involve them in the re-integration process. The knowledge test consisted of different types of questions (i.e., true-false, scenario based, and matching questions). For instance, several factual questions were included about the concepts "illness perceptions" and "dyadic coping". In other questions, OHPs had to choose the best course of action for an OHP in a specific scenario or match descriptions of illness perceptions or the coping mechanisms of workers and significant others with the corresponding illness perception domain or type of dyadic coping. Each correct answer was scored as '1' and each incorrect answer was scored as '0'. For each measurement, we calculated a sum score for each participant.

We measured *attitudes towards involving significant others* with 11 items measured on a 6-point Likert scale. Items were derived from a scale designed to identify healthcare providers' attitudes to family involvement during routine adult critical care [22]. Since the items from this scale were originally designed to measure attitudes about family involvement during routine adult critical care, we adapted the items to better reflect on significant other involvement in the occupational health care context. For instance, the item *"I support patient wishes for family members to be present during daily patient care"* was changed to *"I support wishes of a worker for a significant other to be present during consultations"*. For each measurement, we calculated a mean score for participants who had answered at least nine of the ten items, with a higher score representing a more positive attitude towards significant other involvement in occupational health care. The internal consistency of the construct was good, with a Cronbach's alpha ranging from 0.80 to 0.87 across measurements.

We measured *self-efficacy with regard to involving significant others* with 15 items measured on a 5-point Likert scale. Items were derived from the questions on self-reported knowledge and clinical skills used by Fary et al. [23]. Since these items were originally designed to measure physiotherapists' self-reported knowledge and clinical skills in managing people with rheumatoid arthritis, we adapted the items to reflect on the knowledge and skills targeted in the TOTIS e-learning module. For example, OHPs were asked to answer the question: "*How confident do you feel in your skills to explore dyadic coping processes of workers and significant others?"*. For each measurement, we calculated a mean score for participants who had answered at least 14 of the 15 items, with a higher score representing a higher degree of self-efficacy with regard to involving significant others in occupational health care. The internal consistency of the construct was good, with a Cronbach's alpha ranging from 0.86 to 0.96.

We measured *responses to and satisfaction with the e-learning module* with an evaluation form consisting of 13 items, which participants were asked to fill out after completing the e-learning module. Ten items were measured on a 5-point Likert scale, ranging from strongly agree to strongly disagree, including questions on participants' overall impressions of the content, the organization and structure of the e-learning module, and its perceived usefulness. In one item, participants were asked to grade the e-learning module on a 10-point rating scale. In two open questions, participants were asked to indicate what they appreciated most and what they appreciated least about the e-learning module.

Sociodemographic measures

At baseline, we collected descriptive information of the OHPs (age, gender, profession, employment status, years in practice, and organization size).

Sample size

A priori sample size calculations for a parallel, 2-arm RCT using G*Power software [24] determined that a sample size of 128 would be sufficient to detect an effect size of 0.5 with a power of 80% and a 2-tailed alpha of 0.05. An estimated effect size of 0.5 was considered reasonable based on established recommendations [25]. Estimating an attrition rate of approximately 25% based on prior studies among occupational and insurance physicians [26–31], we aimed to include 160 OHPs.

Data analysis

We analyzed the quantitative data using SPSS version 26 [32]. We used descriptive statistics (i.e., frequencies, percentages, means, standard deviations) to describe the study sample.

Differences in baseline characteristics were tested with t-tests for continuous variables and chi-square tests for categorical variables. Analyses were conducted per-protocol, excluding the OHPs for whom no outcome data was available. We also performed intention-to-treat analyses using the last observation carried forward approach, thereby including the OHPs lost to follow-up (17 in the intervention group, and 8 in the control group), but this had no influence on the results. Because this study was an efficacy trial, in which we were interested in the effects of the intervention on OHPs in a specific controlled setting, rather than an effectiveness study carried out in real practice, we chose to present the results of the per-protocol analyses only. We assessed between-group differences in knowledge, attitude, and self-efficacy outcomes using an analysis of variance (ANOVA), applying a significance level of 0.05. In addition, Partial Eta Squared effect sizes were calculated. Following the recommendations of Cohen [33], effects sizes of $\eta_p^2 = .01$, $\eta_p^2 = .06$, and $\eta_p^2 = .14$ were considered to be respectively small, medium and large in magnitudes. In these analyses, we used mean change scores of the three outcomes, which were calculated for each participant by subtracting the mean score of the baseline measurement from the mean score of the follow-up measurement after the 4-week trial period. We used paired t-tests to evaluate retention of changes in knowledge, attitude, and self-efficacy between the first and second follow-up measurements of participants in the intervention group. We used descriptive statistics and thematic analysis to analyze the OHPs' responses to and satisfaction with the TOTIS e-learning module.

Results

Figure 1 illustrates the participant flow through the RCT, consistent with the CONSORT criteria [34]. A total of 87 OHPs completed both the baseline questionnaire and the follow-up questionnaire after the 4-week trial period. At baseline, the intervention and control groups were similar with regard to demographic and work characteristics: the majority being occupational physicians working in paid employment and having at least 16 years of work experience. More detailed demographic information of the participants in both groups is provided in Table 1. There were no differences in baseline characteristics between participants remaining in the final study sample and participants who were lost to follow-up.

Representativeness of the sample

About seventy percent of participants in this study was occupational physician and indicated to have at least 16 years of work experience, which is comparable to the general population of OHPs (occupational physicians and insurance physicians) in the Netherlands [35]. The percentage of participants between the age of 55 and 64 years (38 and 62 percent for respectively female and male OHPs) is also comparable to the general OHP population (57 and 45 percent for female and male OHPs). However, a relatively high percentage of OHPs in our study was female (55.2% in our study vs. 37.7% in the general OHP population).

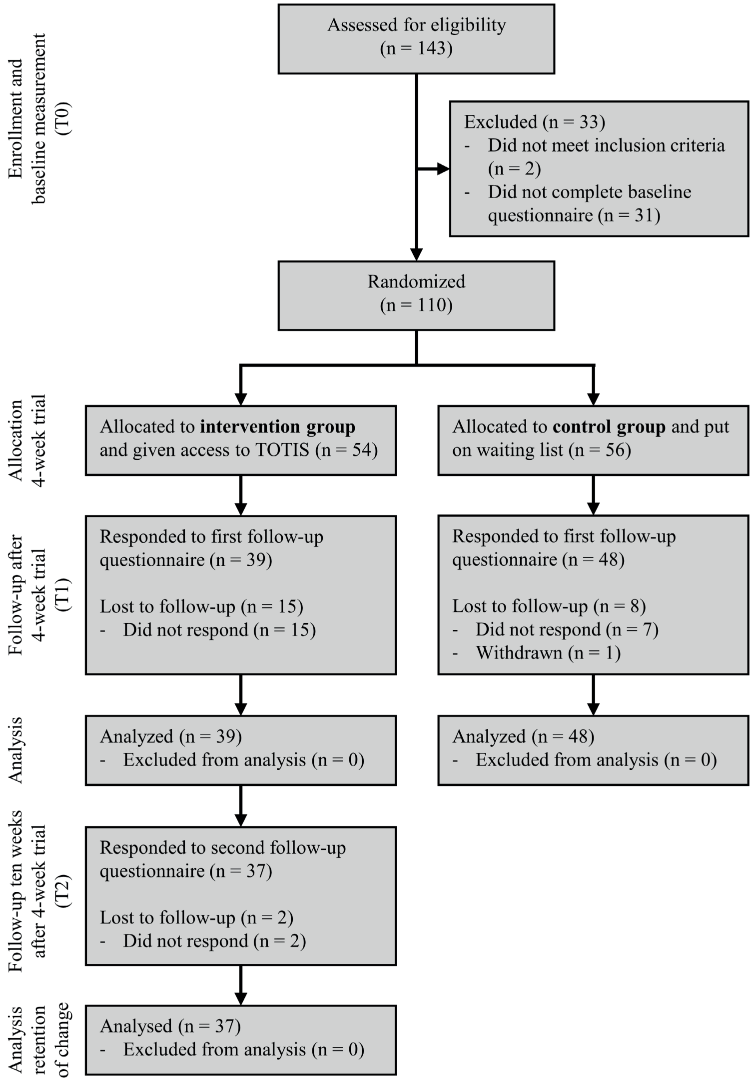


Figure 1. CONSORT flow chart of participants through randomized controlled trial. TOTIS = Training for Occupational Health Physicians to Involve Significant Others.

Table 1. Baseline characteristics of participating occupational health physicians.

Characteristics	**Intervention group** (*n* = 39)	**Control group** (*n* = 48)
Gender		
Male	15 (38.5)	24 (50.0)
Female	24 (61.5)	24 (50.0)
Age (mean, *SD*)	51 (8.2)	51 (11.0)
Profession		
Occupational physician	29 (74.4)	35 (72.9)
Insurance physician	10 (25.6)	13 (27.1)
Employment status		
Employed by a company	28 (71.8)	38 (79.2)
Self-employed	9 (23.1)	8 (16.7)
Both employed by a company and self-employed	2 (5.1)	1 (2.1)
Other		1 (2.1)
Number of working hours per week		
0–11	-	1 (2.1)
12–19	1 (2.6)	2 (4.2)
20–27	4 (10.3)	1 (2.1)
28–34	8 (20.5)	14 (29.2)
35–40	19 (48.7)	20 (41.7)
≥ 41	7 (17.9)	10 (20.8)
Work experience (years in practice)		
< 5	4 (10.3)	9 (18.8)
5–10	3 (7.7)	6 (12.5)
11–15	1 (2.6)	1 (2.1)
16–20	7 (17.9)	7 (14.6)
> 20	24 (61.5)	25 (52.1)
Size of organizations working at		
Very small (< 10 employees)	5 (12.8)	7 (14.6)
Small (10–49 employees)	7 (17.9)	18 (37.5)
Moderate (50–250 employees)	15 (38.5)	23 (47.9)
Large (> 250 employees)	34 (87.2)	43 (89.6)

RCT outcomes

We observed statistically significant between-group differences at the end of the 4-week trial (see Table 2). The magnitude of positive change in outcomes scores in the intervention group was significantly greater than in the control group for knowledge on topics addressed in TOTIS ($F(1, 85) = 21.51$, $p < .001$, $\eta_p^2 = .202$), attitudes towards involving significant others ($F(1, 85) = 9.25$, $p = .003$, $\eta_p^2 = .098$), and self-efficacy with regard to involving significant others ($F(1, 85) = 26.38$, $p < .001$, $\eta_p^2 = .237$). Partial Eta Squared effect sizes for these differences ranged from .098 to .237, representing moderate to large effects [33].

The assumption of normality was violated in the control group for both attitudes and self-efficacy with regard to involving significant others, due to two and one significant outliers respectively. As this could have biased the results, we performed additional analyses excluding these outliers. However, the results for both attitudes ($F(1, 83) = 9.18$, $p = .003$, $\eta_p^2 = .100$) and self-efficacy ($F(1, 84) = 26.48$, $p < .001$, $\eta_p^2 = .240$) remained similar to those of the primary analyses.

Thirty-seven participants of the intervention group (94.9%) completed the second follow-up questionnaire ten weeks after the 4-week trial period and were included in the retention of change analyses. Figure 2 illustrates the changes over time for the outcome variables. There were no statistically significant within-group differences between the follow-up after the 4-week trial period and the follow-up ten weeks after the 4-week trial period for knowledge ($t(36) = 1.33$, $p = .192$), attitudes ($t(36) = .39$, $p = .700$) or self-efficacy with regard to involving significant others ($t(36) = -.45$, $p = .653$).

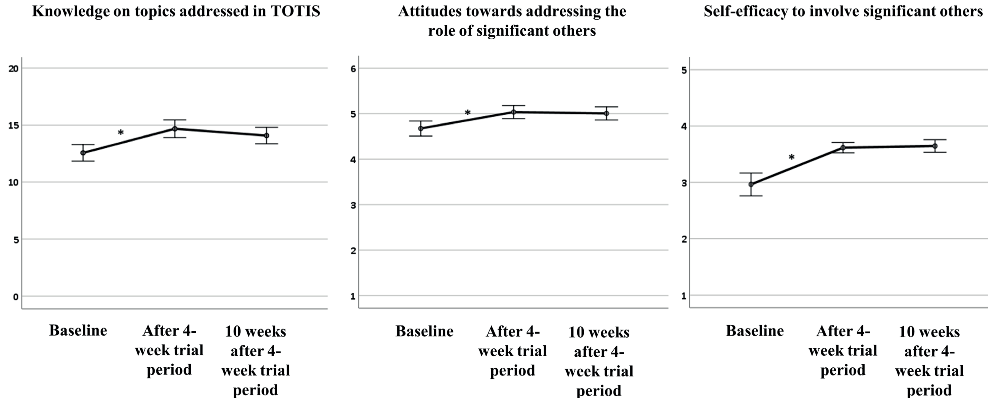


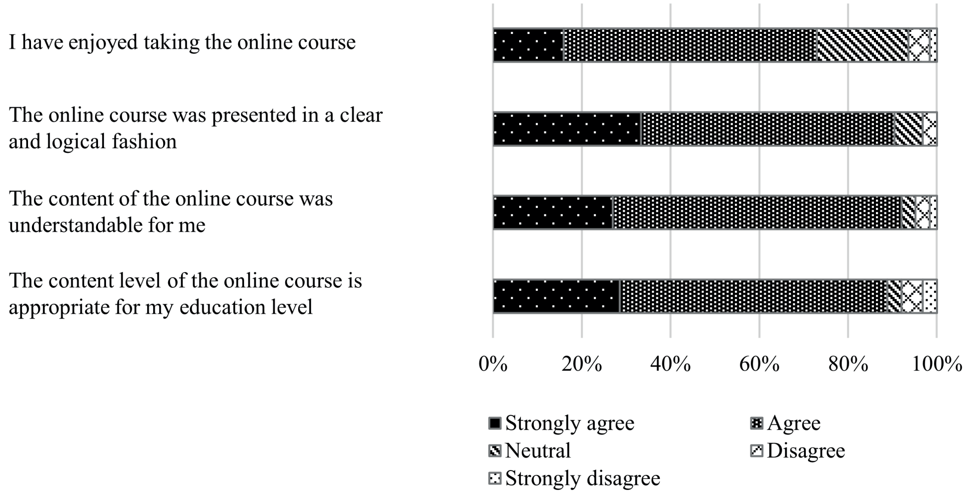
Figure 2. Changes over time for the outcome variables for participants in the intervention group (n = 37).

Responses to and satisfaction with the e-learning module

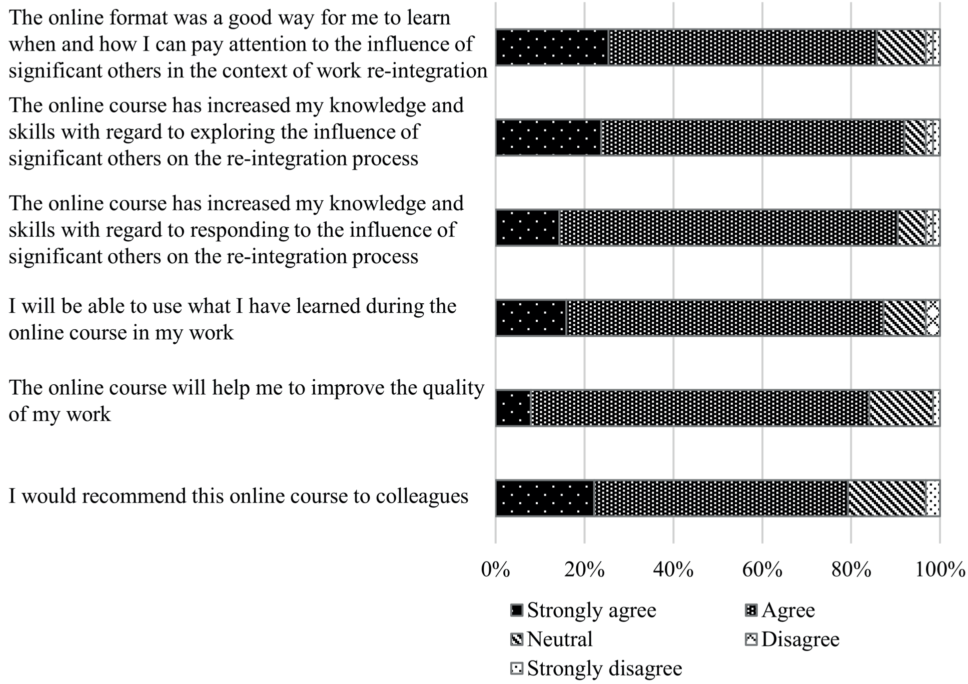
A total of 63 OHPs (72.4%) completed the evaluation form after finishing the TOTIS e-learning module. Satisfaction with the e-learning module was high (see Figure 3). OHPs graded the e-learning module with a mean score of 7.9 on a 10-point scale (*SD* = 1.11), with 60 participants (95.2%) giving a rating of seven or higher.

In an open response question, OHPs indicated appreciating various aspects of the TOTIS e-learning module. They considered the subject addressed in the e-learning module to be topical, interesting, and inspiring, and valued the theoretical information and knowledge they gained about the different topics addressed in the e-learning module (e.g., coping strategies, dyadic coping, illness perceptions, and assessment and intervention options). Many OHPs also appreciated the practical advice, tips, accompanying materials, and applicability for occupational health practice. They indicated that the e-learning module increased their awareness, helped them to gain new insights into the role of significant others and encouraged them to address this topic more often. OHPs also valued the different ways that the learning material was offered (e.g., text, videos, animations, examples, practice material, schematics). Finally, some OHPs indicated appreciating the convenience of being able to follow the e-learning module in their own preferred timing, location, and speed.

In a second open response question, OHPs reported what they found least valuable about the TOTIS e-learning module. Some OHPs indicated that they needed time to get used to the online format and that it was easy to miss information, for example due to clicking through the e-learning module too quickly or missing a hyperlink to additional information. Moreover, some OHPs experienced technical issues (e.g., having to repeat parts of the e-learning module due to their progress not being saved correctly or not being able to find the additional material in the learning portal). Furthermore, due to the online format, OHPs missed opportunities to practice with the accompanying materials (e.g., questionnaires), further develop new skills, have peer discussions, ask questions, and receive feedback. Furthermore, some OHPs felt that the e-learning module was too theoretical, indicated that the terminology used in the e-learning module (e.g., dyadic coping) was less useful, and expressed concerns about the applicability in occupational health practice.



A. Responses to the content of the TOTIS e-learning



B. Perceived usefulness of the TOTIS e-learning

Figure 3. Occupational health physicians' evaluation of the TOTIS e-learning module. TOTIS = Training for Occupational Health Physicians to Involve Significant Others.

Discussion

This study aimed to determine the efficacy of the TOTIS e-learning module with respect to improving knowledge, attitudes, and self-efficacy of OHPs with regard to involving significant others in the return-to-work process of sick-listed workers with chronic diseases. The results of this study show that the OHPs who completed the e-learning module significantly improved on all three outcome measures compared to OHPs who did not have access to the e-learning module, and that these effects remained significant at a 10-week follow-up. Moreover, the e-learning module was positively evaluated by OHPs. Participants indicated that the e-learning module increased their awareness about the role of significant others, helped them to gain new insights into this topic and encouraged them to address the topic more often. In addition, they appreciated the practical advice and tips given in the e-learning module and the accompanying materials. Some OHPs reported difficulties with navigating the e-learning module without inadvertently skipping parts and with technical issues in monitoring their progress. Some OHPs also indicated missing the opportunity to practice with the accompanying materials, to discuss the learning material with their peers, to receive feedback from a trainer, or to further develop new skills.

To the best of our knowledge, this is the first study to evaluate an e-learning module on involving significant others in health care, thereby limiting the possibilities to compare our findings with other studies. However, various prior studies on e-learning programs have shown that online learning can be an effective method to enhance knowledge, attitudes, and self-efficacy among health care professionals [28,36–39]. In many theoretical models, knowledge, attitudes, and self-efficacy are seen as powerful determinants of behavioral change [40,41], which is supported by prior research on determinants of various types of physician behaviors (i.e., communication behaviors, counselling practices, referrals to specialized services, and prescribing behaviors) [42–47]. In a survey study among OHPs, we found that a lack of self-efficacy of OHPs was significantly associated with their assessment of cognitions and behaviors of significant others related to work outcomes of workers with chronic diseases [7]. In addition, we found that negative attitudes towards significant other involvement could also partially explain why some OHPs often pay little attention to the influence of significant others and why OHPs decide to not involve significant others in the re-integration process [7]. Intervening on these behavioral determinants of OHPs by means of the TOTIS e-learning module may lead to them more often addressing the role of significant others in occupational health care. This is consistent with the OHPs' responses that the e-learning module encouraged them to address this topic more often.

The reported benefits and limitations of the e-learning module format are also found in other studies on internet-based resources for continuing medical education. Consistent with our findings, various studies have shown that e-learning programs can be an effective method for enhancing the knowledge, attitudes, and self-efficacy of health care professionals

[28,36–39]. Furthermore, similar to what the OHPs indicated in this study, other studies have highlighted that flexibility with regard to the location, time, and pace of learning is an important advantage of e-learning modules compared to face-to-face training programs [36,37,39]. Finally, prior studies confirm our findings that navigation issues, technical difficulties, lack of interaction with the trainer and peers, and need for a component of face-to-face teaching are potential disadvantages of an e-learning module [36,38,39,48,49].

Strengths and limitations

This study has several strengths. First, the randomized controlled design with follow-up is considered to be the gold standard in assessing intervention efficacy and minimizes confounding factors, as well as allocation and selection bias. Moreover, as all answers were electronically recorded, there was no risk of an outcome assessment bias. In addition, while no standardized instruments were available to measure attitudes and self-efficacy with regard to involving significant others, we derived our items from existing questionnaires and both constructs had good internal reliability across the three measurements.

A limitation of this study is that our final sample size was smaller than intended based on the sample size calculation. One explanation for the lower inclusion rate is the higher workload of Dutch OHPs during the COVID-19 pandemic [50], which may have limited their ability and willingness to participate in research. The COVID-19 pandemic and increased workload might also have resulted in more attrition during this study, especially among participants in the intervention group who had less incentive to complete the follow-up questionnaires as this was not a requirement for them to gain access to the e-learning module. On the other hand, many continuing education activities were cancelled due to the pandemic and opportunities to gain sufficient continuing education points were limited, which might have increased retention of participating OHPs in both the intervention and control group. While no data is available on whether the pandemic has otherwise influenced OHPs' responses to the e-learning module, we do not expect this to be the case. Although the sample size was sufficient to detect statistically significant effects, a larger study sample would have resulted in more precise estimates of the effects. Furthermore, it is possible that the use of a wait-list control group has resulted in artificially inflated estimates of the effects of the e-learning module, as this is a known issue with a wait-list control design in RCTs [51]. While participating OHPs in the control group were not instructed to refrain from seeking information about involving significant others, it is possible that knowing they would gain access to the e-learning module after the follow-up questionnaire decreased their natural information-seeking behavior [51]. However, we do not expect that a control condition in which OHPs did not gain access to the e-learning after the trial period would have resulted in smaller effects, as lack of time can be an important barrier for OHPs to seek evidence-based information [52,53] and not much information on this topic is easily available for OHPs. Another limitation of this study is that differential retention occurred across conditions, with the control group having better retention than the intervention group. The larger retention in the control group may have been due to the promise that they would receive access to the e-learning module and accompanying tools at the end of the trial, whereas the intervention group already had access during the trial period. Furthermore, as mentioned before, the higher workload of OHPs during the COVID-19 pandemic might have caused higher attrition rates, especially in the intervention group as they had less incentive to complete the follow-up questionnaires since they had already received access to the e-learning module during the 4-week trial period. However, we do not expect that this biased the findings as we found no differences in baseline characteristics between the participants remaining in the final study sample and those who dropped out. Another limitation is that some selection bias seems to have occurred, possibly limiting the generalizability of our study findings. More specifically, compared to the total population of OHPs in the Netherlands, a relatively high percentage of OHPs was female (55.2% in our study vs. 37.7% in the general OHP population). In addition, it is possible that OHPs who already perceived the inclusion of significant others in the return-to-work process to be of value and who were therefore more likely to actually include significant others were more inclined to participate in this study. While it is uncertain whether such a selection has occurred and whether this has biased the results, it is possible that OHPs with less positive perceptions about the inclusion of significant others in the return-to-work process would benefit more from the e-learning module than OHPs who already have positive perceptions about this to start with.

Implications for occupational health practice and future research

The current study shows that the TOTIS e-learning module and the accompanying tools are an effective resource to educate OHPs on how they can best address the role of significant others and manage their involvement in the return-to-work process of sick-listed workers with chronic diseases. Making the e-learning module readily available, for example through educational institutes offering continuing medical education for OHPs, is an important next step. Considering the moderate to large effects of the e-learning module on the three behavioral determinants and the ease and low cost with which it can be implemented, we believe that it would be worthwhile to broadly implement the e-learning module as continued medical education for OHPs. It might also be beneficial to expand on the e-learning module with a face-to-face training program involving group interaction, peer discussion, and skills development (for example, through role-playing exercises).

This study was a first step in evaluating the TOTIS e-learning module by focusing on changes in the three behavioral determinants *knowledge*, *attitude*, and *self-efficacy* of OHPs. Future research is needed to investigate whether these changes actually affected the behavior of OHPs in identifying cases in which the involvement of significant others could be helpful and managing this involvement over the course of the re-integration process. Whether such behavioral changes among OHPs lead to better recovery and sustained return to work for workers with chronic diseases should likewise be examined. Furthermore, in addition to OHPs, other professionals involved in work re-integration might also be able play an important role in the context of significant other involvement in occupational health care. For instance, OHPs might be able to delegate or reallocate tasks surrounding the assessment of the influence of significant others and their involvement in the re-integration process to a job coach, case manager, labor expert, occupational psychologist, or occupational health nurse. The topics addressed in the module are therefore also relevant to other professionals who provide support and guidance to help workers retain or return to work. Therefore, further research is needed to examine the generalizability of the e-learning training module beyond OHPs. A first step in this will be taken in a project that has recently started, in which we will further develop and evaluate the e-learning module for labor experts. Furthermore, future research could focus on translation and validation of the e-learning module and accompanying materials in different countries and settings. An English version of the e-learning module is currently being developed. However, differences in context should be taken into account in translation and implementation of the e-learning module and accompanying materials in different countries and settings.

Conclusion

Our findings indicate that the TOTIS e-learning module and accompanying materials are valuable resources for OHPs to learn about how significant others influence return to work of workers with chronic diseases and to manage their involvement in the re-integration process. Moreover, the e-learning module can increase OHPs' awareness about the influence of significant others on workers' coping, recovery, and work outcomes, and encourage them to address this topic more often in their daily practice. Future research should determine whether the e-learning module affects actual significant other involvement by OHPs and whether this in turn leads to better worker outcomes.

Abbreviations

OHP	Occupational health physician
TOTIS	Training for Occupational Health Physicians to Involve Significant Others
RCT	Randomized controlled trial
NSPOH	Netherlands School of Public and Occupational Health
NVAB	Dutch Association of Occupational Medicine
NVVG	Dutch Association for Insurance Medicine
GAV	Dutch Association of Medical Advisers in Private Insurance
UWV	Dutch Social Security Institute: the Institute for Employee Benefits Schemes

Acknowledgements: We thank Puck Winnubst for her contribution to the development of the TOTIS e-learning module. We would also like to thank the Netherlands School of Public and Occupational Health for their contribution to the recruitment of participants and data collection. Furthermore, we would like to thank dr. Tialda Hoekstra for her methodological advice. Finally, we thank all occupational health physicians who participated in this study.

References

1. Snippen NC, Vries HJ de, Burg-Vermeulen SJ van der, *et al.* Influence of significant others on work participation of individuals with chronic diseases: a systematic review. *BMJ Open* 2019;**9**:1–13. doi:10.1136/BMJOPEN-2018-021742
2. Rosland A-MM, Heisler M, Piette JD. The impact of family behaviors and communication patterns on chronic illness outcomes: a systematic review. *J Behav Med* 2012;**35**:221–39. doi:10.1007/s10865-011-9354-4
3. Deek H, Hamilton S, Brown N, *et al.* Family-centred approaches to healthcare interventions in chronic diseases in adults: A quantitative systematic review. *J Adv Nurs* 2016;**72**:968–79. doi:10.1111/jan.12885
4. Badr H, Acitelli LK. Re-thinking dyadic coping in the context of chronic illness. *Curr Opin Psychol* 2017;**13**:44–8. doi:10.1016/j.copsyc.2016.03.001
5. Checton MG, Magsamen-Conrad K, Venetis MK, *et al.* A Dyadic Approach: Applying a Developmental-Conceptual Model to Couples Coping With Chronic Illness. *Heal Educ Behav* 2015;**42**:257–67. doi:10.1177/1090198114557121
6. Snippen NC, de Vries HJ, Bosma A, *et al.* Workers' views on involving significant others in occupational health services. A focus group study. *Disabil Rehabil* 2021;:1–12. doi:10.1080/09638288.2021.2011435
7. Snippen NC, de Vries HJ, de Wit M, *et al.* Assessing significant others' cognitions and behavioral responses in occupational health care for workers with a chronic disease. *Disabil Rehabil* 2020;**43**:1–14. doi:10.1080/09638288.2020.1711536
8. Sharp RJ, Hobson J. Patient and physician views of accompanied consultations in occupational health. *Occup Med (Chic Ill)* 2016;**66**:643–8. doi:10.1093/occmed/kqw097
9. Lamore K, Montalescot L, Untas A. Treatment decision-making in chronic diseases: What are the family members' roles, needs and attitudes? A systematic review. *Patient Educ Couns* 2017;**100**:2172–81. doi:10.1016/j.pec.2017.08.003
10. Wolff JL, Roter DL. Family presence in routine medical visits: A meta-analytical review. *Soc Sci Med* 2011;**72**:823–31. doi:10.1016/j.socscimed.2011.01.015
11. Baucom DH, Porter LS, Kirby JS, *et al.* Psychosocial issues confronting young women with breast cancer. *Breast Dis* 2005;**23**:103–13. doi:10.1097/SPC.0000000000000162
12. Vooijs M, van der Heide I, Leensen MCJ, *et al.* Richtlijn Chronisch Zieken en Werk [Guideline 'The chronically ill and work']. Amsterdam: 2016. https://www.psynip.nl/wp-content/uploads/2017/03/Richtlijn_chronisch_zieken_en_werk_2016.pdf
13. Scottish Intercollegiate Guidelines Network (SIGN). Management of chronic pain. A national clinical guideline. Sign. 2019.https://www.sign.ac.uk/media/1108/sign136_2019.pdf
14. Scottish Intercollegiate Guidelines Network (SIGN). Brain injury rehabilitation in adults. A national clinical guideline. 2013.http://www.sign.ac.uk/assets/sign130.pdf
15. National Institute for Health and Care Excellence (NICE). Stroke rehabilitation in adults. Clinical guideline [CG162]. 2013;:44.https://www.nice.org.uk/guidance/qs2/resources/stroke-in-adults-pdf-58292707525%0Ahttps://www.nice.org.uk/guidance/cg162
16. National Institute for Health and Clinical Excellence (NICE). Depression in Adults: recognition and Management. Clinical guideline [CG90]. 2009.https://www.nice.org.uk/guidance/cg90/resources/depression-in-adults-recognition-and-management-975742636741

17. National Institute for Health and Clinical Excellence (NICE). Rehabilitation after critical illness. Clinical guideline [CG83]. 2009.https://www.nice.org.uk/guidance/cg83/resources/rehabilitation-after-critical-illness-in-adults-pdf-975687209413
18. van Dijk JL, Bekedam MA, Brouwer W, *et al.* Richtlijn Ischemische Hartziekten [Guideline Ischemic Heart Disease]. Utrecht: 2007. www.nvab-online.nl (accessed 21 Feb 2019).
19. National Institute for Health and Care Excellence. *Workplace health: long-term sickness absence and capability to work. NICE guideline [NG146].* 2019. https://www.nice.org.uk/guidance/ng146
20. Scottish Intercollegiate Guidelines Network (SIGN). Cardiac rehabilitation. A national clinical guideline. 2017.sign.ac.uk/media/1047/sign150.pdf
21. Scottish Intercollegiate Guidelines Network (SIGN). Management of epithelial ovarian cancer. A national clinical guideline. 2018.https://www.sign.ac.uk/media/1073/sign135_oct2018
22. Al Mutair A, Plummer V, Paul O'Brien A, *et al.* Attitudes of healthcare providers towards family involvement and presence in adult critical care units in Saudi Arabia: A quantitative study. *J Clin Nurs* 2014;**23**:744–55. doi:10.1111/jocn.12520
23. Fary RE, Slater H, Chua J, *et al.* Policy-into-practice for rheumatoid arthritis: Randomized controlled trial and cohort study of E-learning targeting improved physiotherapy management. *Arthritis Care Res* 2015;**67**:913–22. doi:10.1002/acr.22535
24. Erdfelder E, FAul F, Buchner A, *et al.* Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behav Res Methods* 2009;**41**:1149–60. doi:10.3758/BRM.41.4.1149
25. Field A. *Discovering statistics using SPSS (2nd ed.).* London: : SAGE Publications 2005.
26. Zwerver F, Schellart AJM, Knol DL, *et al.* An implementation strategy to improve the guideline adherence of insurance physicians: An experiment in a controlled setting. *Implement Sci* 2011;**6**:131. doi:10.1186/1748-5908-6-131
27. Zwerver F, Schellart AJM, Anema JR, *et al.* Changes in Insurance Physicians' Attitudes, Self-Efficacy, Intention, and Knowledge and Skills Regarding the Guidelines for Depression, Following an Implementation Strategy. *J Occup Rehabil* 2013;**23**:148–56. doi:10.1007/s10926-012-9378-9
28. Hugenholtz NIR, De Croon EM, Smits PB, *et al.* Effectiveness of e-learning in continuing medical education for occupational physicians. *Occup Med (Chic Ill)* 2008;**58**:370–2. doi:10.1093/occmed/kqn053
29. Kok R, Hoving JL, Smits PBA, *et al.* A Clinically Integrated Post-Graduate Training Programme in Evidence-Based Medicine versus 'No Intervention' for Improving Disability Evaluations: A Cluster Randomised Clinical Trial. *PLoS One* 2013;**8**. doi:10.1371/journal.pone.0057256
30. van Beurden KM, Brouwers EPM, Joosen MCW, *et al.* Effectiveness of an Intervention to Enhance Occupational Physicians' Guideline Adherence on Sickness Absence Duration in Workers with Common Mental Disorders: A Cluster-Randomized Controlled Trial. *J Occup Rehabil* 2017;**27**:559–67. doi:10.1007/s10926-016-9682-x
31. Heselmans A, Donceel P, Aertgeerts B, *et al.* The attitude of Flemish occupational health physicians toward evidence-based occupational health and clinical practice guidelines. *Int Arch Occup Environ Health* 2010;**83**:201–8. doi:10.1007/s00420-009-0449-y
32. IBM Corp. IBM SPSS Statistics for Windows, Version 26.0. 2019.
33. Richardson JTE. Eta squared and partial eta squared as measures of effect size in educational research. *Educ Res Rev* 2011;**6**:135–47. doi:10.1016/j.edurev.2010.12.001

34. Schulz KF, Altman DG, Moher D. CONSORT 2010 Statement: Updated guidelines for reporting parallel group randomised trials. *BMJ* 2010;**11**:1–8. doi:10.1136/bmj.c332
35. Capaciteitsorgaan. Capaciteitsplan 2021-2024. Deelrapport 4. Sociaal Geneeskundigen. Utrecht: 2019. https://capaciteitsorgaan.nl/app/uploads/2019/12/Capacitietsplan-2021-2024-Deelrapport-4-SG.pdf
36. Rouleau G, Gagnon MP, Côté J, *et al.* Effects of e-learning in a continuing education context on nursing care: Systematic review of systematic qualitative, quantitative, and mixed-studies reviews. *J Med Internet Res* 2019;**21**. doi:10.2196/15118
37. Nesterowicz K, Librowski T, Edelbring S. Validating e-learning in continuing pharmacy education: User acceptance and knowledge change. *BMC Med Educ* 2014;**14**:1–7. doi:10.1186/1472-6920-14-33
38. Vaona A, Banzi R, Kh K, *et al.* E-learning for health professionals. *Cochrane Databse Syst Rev* 2018;**1**:1–79. doi:10.1002/14651858.CD011736.pub2
39. Regmi K, Jones L. A systematic review of the factors - Enablers and barriers - Affecting e-learning in health sciences education. *BMC Med Educ* 2020;**20**:1–18. doi:10.1186/s12909-020-02007-6
40. Perkins MB, Jensen PS, Jaccard J, *et al.* Applying theory-driven approaches to understanding and modifying clinicians' behavior: What do we know? *Psychiatr Serv* Published Online First: 2007. doi:10.1176/ps.2007.58.3.342
41. Godin G, Bélanger-Gravel A, Eccles M, *et al.* Healthcare professionals' intentions and behaviours: A systematic review of studies based on social cognitive theories. Implement. Sci. 2008. doi:10.1186/1748-5908-3-36
42. Burglehaus MJ, Smith LA, Sheps SB, *et al.* Physicians and breastfeeding: Beliefs, knowledge, self-efficacy and counselling practices. *Can J Public Heal* 1997;**88**:383–7. doi:10.1007/bf03403911
43. Spagnolo J, Vasiliadis H-M, Berbiche D, *et al.* The influence of primary care physicians' mental health knowledge, attitudes and self-efficacy on referrals to specialised services: findings from a longitudinal pilot trial. *BJPsych Open* 2020;**6**:1–8. doi:10.1192/bjo.2020.115
44. Schellart AJM, Zwerver F, Anema JR, *et al.* Relationships between the intention to use guidelines, behaviour of insurance physicians and their determinants. *BMC Health Serv Res* 2013;**13**. doi:10.1186/1472-6963-13-400
45. Ponnet K, Wouters E, Van Hal G, *et al.* Determinants of physicians prescribing behaviour of methylphenidate for cognitive enhancement. *Psychol Heal Med* 2014;**19**:286–95. doi:10.1080/13548506.2013.802361
46. Ghaffarifar S, Ghofranipour F, Ahmadi F, *et al.* The Causal Relationship between Interns' Knowledge and Self-Efficacy and Their Value in Predicting the Interns' Communication Behavior with Patients. *Int J community based Nurs midwifery* 2015;**3**:263–71.
47. Pittet D, Simon A, Hugonnet S, *et al.* Hand hygiene among physicians: Performance, beliefs, and perceptions. *Ann Intern Med* 2004;**141**:1–8. doi:10.7326/0003-4819-141-1-200407060-00008
48. Childs S, Blenkinsopp E, Hall A, *et al.* Effective e-learning for health professionals and students--barriers and their solutions. A systematic review of the literature--findings from the HeXL project. *Health Info Libr J* 2005;**22**:20–32. doi:10.1111/j.1470-3327.2005.00614.x
49. Noesgaard SS, Ørngreen R. The effectiveness of e-learning: An explorative and integrative review of the definitions, methodologies and factors that promote e-Learning effectiveness. *Electron J e-Learning* 2015;**13**:278–90.

50. Steenbeek R. LAD Vragenlijstonderzoek Gezond en Veilig Werken tijdens en na de COVID-19 uitbraak [LAD Questionnaire Working Healthy and Safely during and after the COVID-19 outbreak]. Utrecht: Landelijke Vereniging van Artsen in Dienstverband (LAD): 2020. https://www.lad.nl/wp-content/uploads/2020/10/Rapportage-LAD-vragenlijstonderzoek-Gezond-en-Veilig-werken-tijdens-en-na-COVID-19-DEF.pdf
51. Mohr DC, Spring B, Freedland KE, *et al.* The Selection and Design of Control Conditions for Randomized Controlled Trials of Psychological Interventions. *Psychother Psychosom* 2009;**78**:275–84. doi:10.1159/000228248
52. Schaafsma F, Hulshof C, Van Dijk F, *et al.* Information demands of occupational health physicians and their attitude towards evidence-based medicine. *Scand J Work* 2004;**30**:327–30.
53. Upton D, Stephens D, Williams B, *et al.* Critical review Introduction Occupational therapists' attitudes, knowledge, and implementation of evidence-based practice: a systematic review of published research. *Br J Occup Ther* 2014;**77**:24–38. doi:10.4276/030802214X13887685335544

Supplementary material

Online Resource 1. Description of the e-learning module development
The development of the TOTIS e-learning module consisted of three phases, which are described below. In the second and third phase, we collaborated closely with an educational expert of the Netherlands School of Public and Occupational Health (NSPOH) and an experienced e-learning developer of Chris Dorna e-Learning.

Phase 1: Preparation
The first step in the development of the e-learning module was to conduct research and gather information about (1) the influence of significant others on work participation of workers with chronic diseases, (2) stakeholder experiences, views and considerations with regard to the involvement of significant others in occupational health care, and (3) how occupational health physicians can address the influence of significant others in the re-integration process.

In this context, a systematic review was conducted to explore what was known in the literature about the influence of significant others on work outcomes of workers with chronic diseases [1]. The findings of this review indicated that cognitions and behaviors of significant others, as well as interactions between workers and their significant others can facilitate or hinder work participation of workers with chronic diseases. For instance, it was found that positive attitudes of significant others regarding work participation and open communication between workers and significant others can facilitate positive work outcomes, while negative perceptions about the worker’s disease and pressure from significant others to refrain from work can hinder work participation.

Next, we explored experiences, views and considerations of workers and occupational health physicians with regard to involving significant others in occupational health care [2,3]. It was found that both workers and occupational health physicians feel that significant other involvement can benefit or hinder the return-to-work process. For instance, while significant others are better able to support the worker’s re-integration when they are informed about the re-integration plans, their involvement can also have drawbacks, such as interference during consultations or significant others providing unwanted support. While these studies indicated that workers and occupational health physicians recognized that involving significant others in occupational health care could be beneficial, they also provided insight into barriers for significant other involvement, including lack of time, privacy concerns and low self-efficacy of occupational health physicians to address the influence of significant others. Furthermore, the findings suggest that involvement of a significant other in the re-integration process needs to be tailored to the specific situation of the individual worker, taking into account the circumstances, characteristics and preferences of the worker and significant other. Finally, we identified a need to educate occupational health physicians on how to address the role of significant others and manage their involvement in the return-to-work process of sick-listed workers.

Based on the findings of these studies, we determined that education on involving significant others in occupational health care should aim to improve OHPs' knowledge on:

1. how significant others can influence the work participation of workers with chronic diseases
2. the role of coping of workers and their significant others in the recovery and work re-integration processes
3. the concepts "illness perceptions" and "dyadic coping" and their relevance for work re-integration
4. how OHPs can assess illness perceptions and coping strategies in workers and significant others
5. how OHPs can facilitate helpful illness perceptions, adequate coping and communication among workers and significant others and intervene on factors that may hinder recovery and re-integration

Following the recommendations of an advisory committee consisting of five OHPs, we decided to develop an e-learning module as this would be a suitable format for OHPs to learn about these topics and result in a higher accessibility than a traditional face-to-face training. It was decided to sequence the e-learning module according to the zoom principle, first providing a general overview of the topic and introducing the concepts "dyadic coping" and "illness perceptions", then focusing on respectively the role of dyadic coping and the role of illness perceptions in the return-to-work process, and finally providing an overview of the key messages and best-practice recommendations.

Phase 2: Defining the learning objectives and choosing content delivery methods

In the second development phase, learning objectives were defined for each of the topics addressed in the e-learning module, focusing on delivering essential knowledge and translating that knowledge into practical skills. Next, content delivery methods were chosen for each of the learning objectives and the content was specified. Table S1 provides illustrative examples of the learning objectives and the corresponding content delivery methods and content specification for the different parts of the e-learning module.

Phase 3: Module development

Based on the learning objectives, content delivery methods and content specifications, a storyboard with the content of the e-learning module was developed in PowerPoint. This storyboard formed a detailed representation of the final product and was developed in preparation for the development of the functional version of the e-learning module in Storyline 360 by an experienced e-learning developer.

The content of the e-learning consisted of written information, graphics, video's, animations, supportive illustrations and exercises in which OHPs had to apply knowledge and principles addressed. For instance, throughout the e-learning module, OHPs were presented with various practice-based scenarios requiring them to make decisions by choosing among different options, after which they would receive feedback detailing which answer was correct and why.

The e-learning module consisted of five parts: 1) when and how to address the role of significant others; 2) coping and re-integration; 3) the role of dyadic coping; 4) the role of illness perceptions; and 5) summary of key messages and best-practice recommendations. The first four parts included interactive components, such as videos or vignettes in combination with multiple-choice questions. The content was derived from the findings of our previous studies [1–3], research of current practices with regard to involving significant others in related professional domains (e.g., rehabilitation and mental health care), and available literature on the topics addressed within the e-learning module (e.g., regarding dyadic coping [4–8] and illness perceptions [9–13]). Furthermore, we made use of information in occupational health guidelines and information gathered during meetings with OHPs.

In a small pilot study, an independent group of evaluators (1 OHP and 3 public health researchers) was engaged to evaluate the e-learning module. Each evaluator was given online access to the e-learning module. While going through the module, evaluators could directly add free-text comments and recommendations. In addition, they completed a short evaluation survey with questions regarding the appropriateness of the content and the general appearance and functionality of the e-learning module. If one or more aspects were rated neutrally or negatively, evaluators were asked to provide additional information that could be used to improve these aspects. The evaluators were positive about the content, general appearance and functionality of the e-learning module and indicated that no major changes were needed. Based on the free-text comments and the responses to the evaluation survey, we made some minor textual changes to the e-learning module to improve the readability of certain sentences.

Table S1. Examples of learning objectives, content delivery methods and content specification for the first four parts of the TOTIS e-learning module.

E-learning module	Examples of learning objectives	Content delivery methods	Content specification
Part 1: "Attention for the influence of significant others on re-integration"	The professional knows that it can be useful to involve significant others in re-integration when there is ineffective coping and/or stagnation of recovery and re-integration.	1. Written information	- Quotes of an occupational physician, insurance physician and a worker sharing their experiences and views with regard to significant other involvement. - Recommendations from occupational health guidelines with regard to paying attention to the influence of significant others and involving them in occupational health care. - Definition of (ineffective) coping with examples derived from occupational health guidelines and protocols.
Part 2: "Coping and re-integration"	The professional is aware that, in addition to individual coping processes, dyadic coping processes can play a role in outcomes of workers with chronic diseases, such as recovery and re-integration.	1. Video 2. Figure 3. Written information	- Animation video introducing the Cognitive Transactional Model of couples' adaptation to chronic illness of Badr and Acitelli. - Figure of the Cognitive Transactional Model of couples' adaptation to chronic illness. - Written information linking the Cognitive Transactional Model of couples' adaptation to chronic illness to what is known in the literature on the influence of significant others on work outcomes of workers with chronic diseases.
Part 3: "The role of dyadic coping"	The professional knows how he or she can gain more insight into dyadic coping, support and communication of workers and their significant others.	1. Written information 2. Accompanying materials	- Written information about three methods that can be used to gain insight into dyadic coping, support and communication of workers and significant others. - Dutch version of the Dyadic Coping Inventory with a document including more information about this questionnaire and its use in the context of occupational health care. - Document with additional information on how OHPs can use short example situations to gain insight into dyadic coping, support and communication of workers and significant others, including an overview of several example situations that OHPs can use to gain insight into specific problems that workers and significant other might experience with regard to their dyadic coping, support and communication.

Table S1. Examples of learning objectives, content delivery methods and content specification for the first four parts of the TOTIS e-learning module (continued).

E-learning module	**Examples of learning objectives**	**Content delivery methods**	**Content specification**
Part 4: "The role of illness perceptions"	The professional is familiar with the definition and the five domains of illness perceptions.	1. Written information 2. Video 3. Figure in combination with written information 4. Case based exercises	- Written information introducing the concept and definition of illness perceptions. - Video introducing the Common Sense Model of Self-Regulation of Leventhal. - Figure displaying the five dimensions of illness perceptions in combination with written information on each dimension with examples of possible perceptions within the specific dimension. - Multiple choice exercises in which professionals need to recognize and select the illness perception dimension corresponding to the illness perception described in a short written case.

References Online Resource 1

1. Snippen NC, Vries HJ de, Burg-Vermeulen SJ van der, et al. Influence of significant others on work participation of individuals with chronic diseases: a systematic review. BMJ Open 2019;9:1–13. doi:10.1136/BMJOPEN-2018-021742
2. Snippen NC, de Vries HJ, de Wit M, et al. Assessing significant others' cognitions and behavioral responses in occupational health care for workers with a chronic disease. Disabil Rehabil 2020;:1–14. doi:10.1080/09638288.2020.1711536
3. Snippen NC, de Vries HJ, Bosma A, et al. Workers' views on involving significant others in occupational health services. A focus group study. Disabil Rehabil 2021;:1–12. doi:10.1080/09638288.2021.2011435
4. Badr H, Acitelli LK. Re-thinking dyadic coping in the context of chronic illness. Curr Opin Psychol 2017;13:44–8. doi:10.1016/j.copsyc.2016.03.001
5. Falconier MK, Jackson JB, Hilpert P, et al. Dyadic coping and relationship satisfaction: A meta-analysis. Clin Psychol Rev 2015;42:28–46. doi:10.1016/j.cpr.2015.07.002
6. Cutrona C, Bodenmann G, Randall AK, et al. Stress, dyadic coping, and social support: Moving toward integration. Cambridge Handb Pers relationships, 2nd ed Published Online First: 2018. doi:10.1017/9781316417867.027
7. Revenson TA, DeLongis A. Couples Coping with Chronic Illness. In: The Oxford Handbook of Stress, Health, and Coping. 2012. doi:10.1093/oxfordhb/9780195375343.013.0006
8. Ponnet K. The Dutch version of Bodenmann's Dyadic Coping Inventory. 2012.
9. Broadbent E. Illness Perceptions and Health: Innovations and Clinical Applications. Soc Personal Psychol Compass Published Online First: 2010. doi:10.1111/j.1751-9004.2010.00260.x
10. Leventhal H, Phillips LA, Burns E. The Common-Sense Model of Self-Regulation (CSM): a dynamic framework for understanding illness self-management. J Behav Med Published Online First: 2016. doi:10.1007/s10865-016-9782-2
11. Benyamini Y, Medalion B, Garfinkel D. Patient and spouse perceptions of the patient's heart disease and their associations with received and provided social support and undermining. Psychol Heal 2007;22:765–85. doi:10.1080/14768320601070639
12. Hoving JL, van der Meer M, Volkova AY, et al. Illness perceptions and work participation: a systematic review. Int Arch Occup Environ Health 2010;83:595–605. doi:10.1007/s00420-010-0506-6
13. de Raaij EJ, Schröder C, Maissan FJ, et al. Cross-cultural adaptation and measurement properties of the Brief Illness Perception Questionnaire-Dutch Language Version. Man Ther 2012;17:330–5. doi:10.1016/j.math.2012.03.001

Chapter 8

General discussion

General discussion

This thesis had two main aims. The first aim of this thesis was to gain more knowledge about the influence of significant others on work outcomes of workers with chronic diseases. The second aim was to gain insight into perspectives of workers and occupational health physicians on significant other involvement in occupational health care, and to strengthen the supportive role of occupational health physicians through the development and evaluation of education on involving significant others in the re-integration process. This chapter summarizes and reflects on the main findings of this thesis and presents methodological considerations. Moreover, recommendations for occupational health care and further research are provided.

Main findings

The influence of significant others on work outcomes of workers with chronic diseases

The first part of this thesis provided an overview of empirical evidence on individual and interpersonal factors of workers and their significant others that may influence work outcomes and can be targeted to better support workers in their work re-integration process.

In the literature review described in *Chapter 2*, evidence was found that cognitions and behaviors of significant others can facilitate or hinder work participation of workers with chronic diseases. For instance, it was found that positive attitudes of significant others regarding work participation can facilitate positive work outcomes, while negative perceptions about the worker's disease and pressure from significant others to refrain from work can be barriers to work participation. Most studies included in this review were qualitative, and therefore it was concluded that more quantitative studies on this topic are needed to provide a higher level of evidence on the influence of cognitions and behaviors of significant others on work outcomes.

The research described in *Chapter 3* and *Chapter 4* built upon the findings of the literature review and provided more quantitative evidence on the role of illness perceptions and return to work expectations of workers and their significant others in the context of return to work. In *Chapter 3*, the associations between illness perceptions and expectations about full return to work in dyads of workers and their significant others were examined. The findings showed that illness perceptions and expectations about the worker's return to work of workers and their significant others are interdependent, and that more negative illness perceptions of one member of the dyad are associated with more negative return to work expectations in both dyad members. The study described in *Chapter 4* examined whether return to work expectations, illness perceptions, and perceptions about the significant other's engagement, buffering and overprotection within dyads are associated with the duration of sick leave of workers. It was found that return to work expectations and illness perceptions of both workers and significant others are associated with the duration of sick leave. Perceptions about the significant other's engagement, buffering and overprotection were not associated with the sick leave duration of workers. Taken together, the findings of both studies suggest that a dyadic approach targeting both workers and their significant others might be more effective than an individualistic approach when trying to improve illness perceptions and return to work expectations to support return to work.

Involving significant others in occupational health care

In the second part of this thesis, insight was gained into perspectives of workers and occupational health physicians on involving significant others in occupational health care and how the supportive role of occupational health physicians in this context can be strengthened.

In a survey study among occupational health physicians (*Chapter 5*) and a focus group study among workers with chronic diseases (*Chapter 6*), it was found that both stakeholders felt that it is not always necessary to involve significant others in occupational health care. Rather, the findings of these studies suggest that involvement of a significant other in the re-integration process needs to be tailored to the specific situation of the individual worker, taking into account the circumstances, characteristics and preferences of the worker and significant other. For instance, while significant others are better able to support the worker's re-integration when they are informed about the re-integration plans, their involvement can also have drawbacks such as interference during consultations or the provision of unwanted support. While these studies indicate that workers and occupational health physicians recognize that involving significant others in occupational health care could be beneficial, they also provided insight into barriers for significant other involvement, including lack of time, privacy concerns and low self-efficacy of occupational health physicians to address the influence of significant others.

Development and evaluation of education for occupational health physicians

The knowledge that was acquired in the first five studies in this thesis was integrated in the e-learning module "*Training for Occupational Health Physicians to Involve Significant Others*" (TOTIS). This e-learning module was developed to educate occupational health physicians on how they can best address the role of significant others and manage their involvement in the return-to-work process of workers with chronic diseases. In addition, accompanying materials were developed that occupational health physicians can use in their daily practice. The development and evaluation of the e-learning module in a randomized controlled trial were described in Chapter 7. This study showed that the TOTIS e-learning module was effective in improving knowledge, attitudes, and self-efficacy of occupational health physicians with regard to involving significant others in the return-to-work process of sick-listed workers. Moreover, occupational health physicians evaluated the e-learning module positively. They suggested that the TOTIS e-learning module and accompanying materials can be valuable resources to increase occupational health physicians' awareness about the role of significant others and to stimulate them to address this topic more often in the re-integration process.

Reflection on main findings

It is widely recognized that environmental factors play an important role in whether an individual is able to work despite his or her disease [1–5]. While the role of work environmental factors has been frequently investigated [3,4,6–11], little attention has been paid to factors in the personal environment that can influence work participation of workers with chronic diseases. This thesis addressed this knowledge gap by focusing on the role of significant others in the return-to-work process of sick-listed workers.

The studies in this thesis contribute to the further development of the field of occupational health care by considering work re-integration from a *dyadic perspective*. While the role of interpersonal and dyadic processes in coping and adaptation to chronic illness is well-established [12–19], this thesis provides novel insights into the role of interpersonal and dyadic processes between workers and significant others in the context of return to work. In *Chapter 3* and *Chapter 4,* we introduced *dyadic research methods*, which use is unique in occupational health research. The findings of these studies provide evidence that illness perceptions and return to work expectations of workers and their significant others are interdependent and associated with the worker's sick leave duration. These findings provide some support for the assumption of dyadic models [20,21] that dyad members influence each other's cognitions, coping responses and outcomes, and that coping and adaptation to chronic disease should therefore be viewed from a dyadic perspective. However, the findings of this thesis only partially support theoretical models and prior research findings concerning the influence of behaviors of significant others on coping and adaptation to chronic illness. More specifically, while we found some evidence in *Chapter 2* that behaviors of significant others can facilitate or hinder work participation of workers with chronic diseases, in *Chapter 4* we did not find evidence that active engagement, protective buffering and overprotection of significant others are associated with sick leave duration of workers. A possible explanation for that is that we used generic measures of significant other responses rather than specific measures on work-related responses of significant others. Context specific measures have been found to be more sensitive for the detection of associations and effects than generic measures [22,23].

The research in this thesis was an important first step to further develop the field of occupational health care and to strengthen the supportive role of occupational health physicians with respect to helping workers with chronic diseases to use their own social resources in the work re-integration process. The findings of *Chapter 5* and *Chapter 6* confirm prior research indicating that while involving significant others in the re-integration process can be valuable, occupational health consultations in which the worker is accompanied by a significant other are not without challenges [24,25]. With the development of the TOTIS e-learning module, we provided further guidance and training for occupational health physicians on involving significant others in the work re- integration process. The e-learning module makes knowledge on interpersonal processes that play a role in work outcomes and how this can be taken into account in occupational health care to better support workers in their recovery and return to work available and accessible to occupational health physicians. Moreover, the e-learning module is accompanied by materials that occupational health physicians can use to assess the influence of significant others and manage their involvement in the re-integration process. Our findings in *Chapter 7* indicate that the e-learning module and accompanying materials can not only improve occupational health physicians' knowledge, attitudes and self-efficacy with regard to significant other involvement, but also increase their awareness about the role of significant others and stimulate them to address this topic more often in their daily practice. The TOTIS e-learning module can therefore be an important means of enabling occupational health physicians to obtain new knowledge, increase their self-efficacy concerning involving significant others, and to promote behavioral change among occupational health physicians. As such, the e-learning module and the accompanying materials can play an important role in the implementation of research findings on the role of significant others in work re-integration and how to address this in occupational health practice [26–30]. However, as will be further discussed below, additional research is needed to determine whether the e-learning module affects the behavior of occupational health physicians and whether such behavioral changes result in improved outcomes among workers and their significant others.

Methodological considerations

The results of this thesis should be evaluated in light of some methodological considerations. In this section methodological issues concerning the research methods and the quality of the data used in this thesis are discussed.

A mixed-method approach was applied to answer the research questions in this thesis, with quantitative and qualitative research complementing each other. The combination of quantitative and qualitative research methods enriched our understanding of the role of cognitions, behaviors and interactions of workers and their significant others in work re-integration and how this can be taken into account in occupational health care. More specifically, the quantitative research methods (*Chapter 3, 4 and 5*) enabled us to test for associations between variables, whereas the qualitative research methods (*Chapter 5 and 6*) enabled us to gain a deeper and broader understanding of considerations with respect to significant other involvement in the work re-integration process.

Previous research has emphasized the importance of stakeholder experiences and perspectives in the context of translating scientific knowledge into practice [31–34]. In this thesis, we explored the perspectives of both occupational health physicians (*Chapter 5*) and workers with chronic diseases (*Chapter 6*) to gain a comprehensive understanding of stakeholder experiences, views and considerations with regard to significant other involvement in occupational health care. However, we did not explore the perspectives of significant others on this topic. As a result, we might have missed considerations that are important for successful implementation of significant other involvement in occupational health care.

Furthermore, we introduced the use of dyadic analyses in two studies (*Chapter 3* and *Chapter 4*), which allowed us to study both individual and interpersonal associations while taking the interdependence between two individuals in a dyad into account [35]. However, the findings indicated the presence of nonresponse bias in these studies, which resulted in an overrepresentation of workers and significant others who were highly satisfied with their relationship in the study samples. Nonresponse bias is not uncommon and it is a known phenomenon in dyadic research that couples who are more satisfied with their relationship are often overrepresented in dyadic study samples [36–38]. In the presence of nonresponse bias in dyadic research, it is important to be cautious in the generalization of study findings because the interpersonal associations might differ depending on the dyads members' relationship satisfaction and other relationship factors [36]. With respect to the studies in *Chapter 3* and *Chapter 4*, it is important to recognize that while the findings apply to dyads who are highly satisfied with their relationship, they may not generalize to dyads who are less satisfied with their relationship.

Finally, we performed a well-designed randomized controlled trial (RCT) to study the effects of the TOTIS e-learning module on occupational health physicians' knowledge, attitudes and self-efficacy, allowing causal inferences (*Chapter 7*). RCTs are often considered to be the gold standard in determining the impact of an intervention as this design is known to minimize confounding factors, as well as allocation and selection bias [39]. However, our findings are limited to effects of the e-learning module on the behavioral determinants knowledge, attitudes and self-efficacy. As we did not measure the actual behavior of occupational health physicians and whether such behavioral changes result in better recovery and return to work outcomes of workers, the effects of the TOTIS e-learning module in the real-world setting are unknown.

Implications and recommendations for policy and practice

Based on the findings of this thesis and the topics discussed in this chapter, several recommendations can be made for workers and their significant others, occupational health physicians and other stakeholders involved in the occupational health care system.

Implications and recommendations for workers and their significant others

An important finding in this thesis is that significant others may influence return to work of workers with chronic diseases. Workers can use this knowledge and act on it to make better use of their own personal resources. Workers should be aware of the possibility to involve a significant other in occupational health care and of the potential benefits and drawbacks of such involvement. When workers would like to include a significant other in the re-integration process, they should discuss with the occupational health physician whether and how a significant other could be involved. Furthermore, it is important that workers and significant others talk with each other about the disease, work and how to cope with the situation. In this context, workers and their significant others can discuss questions such as: What are the consequences of the disease? How can we cope with the situation together? What are our expectations about return to work? How can the significant other support the worker in recovery and work re-integration? Is additional help or support needed and from whom (e.g., other family members, friends, health care professionals)?

Implications and recommendations for occupational health physicians

The findings of this thesis confirm that it is important that occupational health physicians take into account that significant others can play an important role in how workers cope with their disease, thereby influencing work and health outcomes. In order to better support workers to use their own resources, occupational health physicians should inform workers of the possibility to involve significant others in the re-integration process. Especially in the case of stagnation of re-integration or ineffective coping of workers, occupational health physicians should ask about the worker's preferences and discuss possibilities to involve significant others in the re-integration process in order to tailor any significant other involvement to a worker's specific situation and needs.

Similarly, it might be particularly beneficial to pay attention to illness perceptions and return to work expectations of workers and their significant others in the case of coping issues or stagnation of recovery or re-integration. Assessing these factors can not only help occupational health physicians to identify workers at higher risk of long-term sickness absence, but can also provide insight into inadequate or maladaptive perceptions and expectations that may be modified to facilitate return to work [40]. Occupational health physicians can for instance explore return to work expectations by asking workers and significant others about their thoughts about the worker's ability to return to work and when they expect the worker to be back at work. Concerning illness perceptions, occupational health physicians could use the revised or brief version of the Illness Perception Questionnaire (IPQ) to explore the perceptions of workers and significant others [41,42]. In situations in which there is no significant other present during consultations, occupational health physicians can ask the worker about how his or her significant other thinks about the worker's illness and return to work to gain some insight into the significant other's illness perceptions and return to work expectations.

Considering the interdependence within dyads, involving significant others when trying to facilitate adaptive illness perceptions and return to work expectations may be more effective than an individualistic approach in which only the worker's perceptions and expectations are targeted. Therefore, occupational health physicians should consider using a dyadic approach to modify illness perceptions and return to work expectations that hinder recovery and sustainable return to work. In this context, occupational health physicians can facilitate accurate and adaptive illness perceptions and return to work expectations of workers and their significant others by providing information about the worker's disease and the return-to-work process [41–45]. Moreover, informing significant others about the re-integration plans and actively involving them in decision-making could help to better manage their expectations about recovery and return to work and help workers and significant others to apply adaptive coping strategies. When additional intervention is needed to change maladaptive illness perceptions, coping strategies and interactions between workers and significant others, we advise occupational health physicians to refer workers and significant others to other health care providers such as a psychologist, social worker, or medical specialist [41–45].

Finally, we recommend occupational health physicians involved in the work re-integration process to complete the TOTIS e-learning module when it becomes broadly available, as this can help them to gain more knowledge on how significant others can influence work outcomes and how they can involve significant others to better support workers in their recovery and re-integration. In addition, the accompanying materials can provide occupational health physicians with practical tools that they can use to assess the influence of significant others and facilitate adaptive illness perceptions, return to work expectations and coping of workers and their significant others.

Implications and recommendations for employers

While this thesis focused on strengthening the supportive role of occupational health physicians, employers have a key role in creating the right conditions for occupational health physicians to pay attention to and address the influence of significant others. In the Netherlands, the employer is ultimately responsible for the proper guidance and re-integration of sick-listed workers. The possibility for occupational health physicians to pay attention to the influence of significant others and involve them in the re-integration process largely depends on the number of hours and the tasks for which the occupational health physician is contracted by the employer. Employers should therefore invest in creating the right conditions for significant other involvement in the re-integration process, for example by financing additional consultation time when it is necessary to pay attention to the role of significant others in a worker's re-integration. While this would initially be a higher financial investment for employers, it may result in faster and more sustainable return to work of workers and could therefore save costs in the long-term.

Implications and recommendations for policy makers, professional associations and educational institutes

The findings of this thesis suggest that it could be beneficial to create more awareness about the influence of significant others on work participation of workers with chronic diseases and provide more guidance on how occupational health physicians can take the influence of significant others into account in the re-integration process. One way to achieve this would be to pay more attention to this topic in guidelines and education for occupational health physicians. Therefore, we advise professional associations like the Dutch Association of Occupational Medicine (NVAB), the Dutch Association for Insurance Medicine (NVVG), and the Dutch Association of Medical Advisers in Private Insurance (GAV) to convey to occupational health physicians as well as employers that this is a topic that needs attention, especially in the case of stagnation of re-integration or ineffective coping of workers. Furthermore, occupational health guidelines could specify situations in which further exploration of illness perceptions, return to work expectations and coping of workers and their significant others is recommended, and possibly point occupational health physicians to questionnaires or other tools that they can use in this context. For instance, based on the current findings, guidelines might advise occupational health physicians to target both workers and their significant others in case of maladaptive illness perceptions and when return to work expectations are markedly different from the expectations of the occupational health physician. Furthermore, we recommend the inclusion of the TOTIS e-learning module in continued education for occupational health physicians. Offering the TOTIS e-learning module to occupational health physicians can contribute to improving their knowledge, attitudes and self-efficacy with regard to involving significant others in the re-integration process and provide them with tools that they can use in this context. Considering the ease and low cost with which the e-learning module can be implemented, we believe that it would be worthwhile to broadly implement the e-learning module as continued medical education for occupational health physicians.

Recommendations for further research

This section provides several recommendations for further research on the subject of the influence of significant others on work outcomes of workers with chronic diseases and their involvement in the re-integration process.

The role of individual and interpersonal processes in work outcomes

Future research should further investigate which individual and interpersonal processes in dyads of workers and significant others play a role in work outcomes of workers with chronic diseases. There is a need for more longitudinal studies on this topic as this could result in additional knowledge on which cognitive behavioral factors of workers and their significant others can be targeted to facilitate sustainable return to work. For that purpose, it is important that future studies include measures specifically on work-related support from significant others, for instance with respect to helping the worker to execute re-integration plans (e.g. dyadic planning) and encouraging or discouraging return to work. As to the best of our knowledge no instruments are currently available to measure work-related support from significant others, another important direction for future research is the development and validation of such instruments. Finally, more research using dyadic designs is needed as this can provide unique insights into the role of interpersonal processes in the context of return to work. When studying concepts in which interpersonal processes within dyads likely play an important role (e.g., cognitions, coping responses), collecting data from both individuals creates a more comprehensive view of the situation as both perspectives are taken into account. Dyadic designs and analyses explicitly acknowledge that such cognitions and responses do not occur in a vacuum, but within a dyadic context in which dyad members reciprocally influence each other [20,21]. An important advantage of using dyadic designs and analyses is that it allows researchers to study both individual and interpersonal associations while taking the interdependence between two individuals in a dyad into account [35]. However, researchers should take into account that recruiting dyads is more difficult and time consuming than recruiting individuals, and that there is an increased risk of nonresponse bias in dyadic research compared to research among individuals [46].

The effects of the e-learning module on occupational health physician behavior and worker outcomes

While we took an important first step in evaluating the TOTIS e-learning module in this thesis, our findings are limited to occupational health physicians' reactions to the e-learning module and the effects on their knowledge, attitudes and self-efficacy with regard to involving significant others. According to the evaluation framework outlined by Kirkpatrick, training programs can be evaluated at four levels: (i) reaction, (ii) learning, (iii) behavior, and (iv) results [47]. An important venue for future research is to evaluate the effects of the TOTIS e-learning module on the other two levels of this framework. More specifically, future research should determine whether the TOTIS e-learning module affects the behavior of occupational health physicians with respect to assessing the influence of significant others and involving them in the re-integration process. Likewise, future studies should investigate whether such behavioral changes among occupational health physicians result in improved outcomes among workers and their significant others. For instance, studies could investigate the effects of significant other involvement on the worker's recovery and re-integration outcomes as well as on satisfaction of workers and their significant others about the provided care, their illness perceptions, return to work expectations and coping behaviors.

Implementation of significant other involvement in occupational health care

In the current situation, decisions on whether to assess the influence of significant others and involve them in the re-integration process are probably strongly dependent upon the individual occupational health physician. Occupational health physicians in the Netherlands generally have a high workload due to a national shortage of occupational and insurance physicians, which can be an important barrier for them to assess the influence of significant others and involve them in the re-integration process. Especially when multiple factors seem to hinder return to work, time constraints may cause occupational health physicians to primarily focus on personal or work-related factors and pay no attention to factors in the worker's personal environment, including the role of significant others. Future research should further explore opportunities for occupational health physicians to refer workers and their significant others to other professionals (e.g. labor experts, job coaches, case managers, occupational psychologists, or occupational health nurses) providing support and guidance to help workers retain or return to work. For these professionals, the developed e-learning module could also be beneficial to gain more knowledge and further develop their skills with regard to involving significant others in occupational health care. Additional research is needed to determine whether adaptations in the e-learning module are needed to better align the content of the e-learning module with the specific roles of these professionals in the re-integration process and to better reflect their daily practice. A first step in this is taken in a recently funded project that aims to further develop and evaluate the e-learning module for labor experts.

General conclusion

The findings of this thesis potentially contribute to improvement of occupational health care aimed at supporting workers with chronic diseases in their return to work. This thesis adds an overview of evidence on individual and interpersonal factors of workers and their significant others that can influence work outcomes and identifies several factors that can be targeted to better support workers in their work re-integration process. An important finding is that occupational health physicians and workers indicate that significant others can play an important role in recovery and return to work. Occupational health physicians and workers recognize the potential benefits of involving significant others and pointed out challenges, risks and barriers. Furthermore, we found that not many occupational health physicians pay attention to the influence of significant others, and gained insight into the reasons for this. The TOTIS e-learning module, proven to be effective in improving knowledge, attitudes and self-efficacy of occupational health physicians, needs to be further evaluated to determine whether it affects the behavior of occupational health physicians with respect to assessing the influence of significant others and involving them in the re-integration process. Likewise, future studies should investigate whether such behavioral changes among occupational health physicians result in improved work outcomes among long-term sick-listed workers.

References

1. Nielsen K, Yarker J, Munir F, et al. IGLOO: An integrated framework for sustainable return to work in workers with common mental disorders. Work Stress 2018;32:400–17. doi:10.1080/02678373.2018.1438536
2. Brooks J, McCluskey S, King N, et al. Illness perceptions in the context of differing work participation outcomes: Exploring the influence of significant others in persistent back pain. BMC Musculoskelet Disord 2013;14:1–11. doi:10.1186/1471-2474-14-48
3. Islam T, Dahlui M, Majid HA, et al. Factors associated with return to work of breast cancer survivors: a systematic review. BMC Public Health 2014;14:S8. doi:10.1186/1471-2458-14-S3-S8
4. Dorland HF, Abma FI, Roelen CAM, et al. Factors influencing work functioning after cancer diagnosis: a focus group study with cancer survivors and occupational health professionals. Support Care Cancer 2016;24:261–6. doi:10.1007/s00520-015-2764-z
5. McCluskey S, de Vries H, Reneman M, et al. ‘I think positivity breeds positivity’: a qualitative exploration of the role of family members in supporting those with chronic musculoskeletal pain to stay at work. BMC Fam Pract 2015;16:1–7. doi:10.1186/s12875-015-0302-1
6. Jansen J, van Ooijen R, Koning PWC, et al. The Role of the Employer in Supporting Work Participation of Workers with Disabilities: A Systematic Literature Review Using an Interdisciplinary Approach. J Occup Rehabil 2021;31:916–49. doi:10.1007/s10926-021-09978-3
7. Nieuwenhuijsen K, Verbeek JHAM, De Boer AGEM, et al. Supervisory behaviour as a predictor of return to work in employees absent from work due to mental health problems. Occup Environ Med 2004;61:817–23. doi:10.1136/oem.2003.009688
8. Boot CRL, Hogg-Johnson S, Bültmann U, et al. Differences in predictors for return to work following musculoskeletal injury between workers with and without somatic comorbidities. Int Arch Occup Environ Health 2014;87:871–9. doi:10.1007/s00420-014-0928-7
9. Netterstrøm B, Eller NH, Borritz M. Prognostic Factors of Returning to Work after Sick Leave due to Work-Related Common Mental Disorders: A One-And Three-Year Follow-Up Study. Biomed Res Int 2015;:1–7. doi:10.1155/2015/596572
10. Haveraaen LA, Skarpaas LS, Berg JE, et al. Do psychological job demands, decision control and social support predictreturn to work three months after a return-to-work (RTW) programme? the rapid-RTW cohort study. Work 2016;53:61–71. doi:10.3233/WOR-152216
11. Post M, Krol B, Groothoff JW. Work-related determinants of return to work of employees on long-term sickness absence. Disabil Rehabil 2005;27:481–8. doi:10.1080/09638280400018601
12. Rosland A-MM, Heisler M, Piette JD. The impact of family behaviors and communication patterns on chronic illness outcomes: a systematic review. J Behav Med 2012;35:221–39. doi:10.1007/s10865-011-9354-4
13. Maly RC, Umezawa Y, Leake B, et al. Mental health outcomes in older women with breast cancer: impact of perceived family support and adjustment. Psycho-Oncology J Psychol Soc Behav Dimens Cancer 2005;14:535–45.
14. Strom JL, Egede LE. The Impact of social support on outcomes in adult patients with type 2 diabetes: A systematic review. Curr Diab Rep 2012;12:769–81. doi:10.1007/s11892-012-0317-0
15. Applebaum AJ, Stein EM, Lord-Bessen J, et al. Optimism, social support, and mental health outcomes in patients with advanced cancer. Psycho-oncology 2014;23:299–306.
16. Karnell LH, Christensen AJ, Rosenthal EL, et al. Influence of social support on health-related quality of life outcomes in head and neck cancer. Head Neck J Sci Spec Head Neck 2007;29:143–6.

17. Leifheit-Limson EC, Reid KJ, Kasl S V, et al. Changes in social support within the early recovery period and outcomes after acute myocardial infarction. J Psychosom Res 2012;73:35–41.
18. Cano A, Leong L. Significant Others in the Chronicity of Pain and Disability. In: Hasenbring M, Rusu A, Turk D, eds. From Acute to Chronic Back Pain: Risk Factors, Mechanisms, and Clinical Implications. Oxford, England: : Oxford University Press 2012. 339–54.http://replace-me/ebraryid=10581482
19. Moser DK, Dracup K. Role of spousal anxiety and depression in patients' psychosocial recovery after a cardiac event. Psychosom Med 2004;66:527–32.
20. Badr H, Acitelli LK. Re-thinking dyadic coping in the context of chronic illness. Curr Opin Psychol 2017;13:44–8. doi:10.1016/j.copsyc.2016.03.001
21. Berg CA, Upchurch R. A developmental-contextual model of couples coping with chronic illness across the adult life span. Psychol Bull 2007;133:920–54. doi:10.1037/0033-2909.133.6.920
22. Patrick DL, Deyo RA. Generic and disease-specific measures in assessing health status and quality of life. Med Care 1989;27:S217-232. doi:10.1097/00005650-198903001-00018
23. Churruca K, Pomare C, Ellis LA, et al. Patient-reported outcome measures (PROMs): A review of generic and condition-specific measures and a discussion of trends and issues. Heal Expect 2021;24:1015–24. doi:10.1111/hex.13254
24. Sharp RJ, Hobson J. Patient and physician views of accompanied consultations in occupational health. Occup Med (Chic Ill) 2016;66:643–8. doi:10.1093/occmed/kqw097
25. Hobson J, Hobson H, Sharp R. Accompanied consultations in occupational health. Occup Med (Chic Ill) Published Online First: 2016. doi:10.1093/occmed/kqv194
26. Kok R, Hoving JL, Smits PBA, et al. A Clinically Integrated Post-Graduate Training Programme in Evidence-Based Medicine versus 'No Intervention' for Improving Disability Evaluations: A Cluster Randomised Clinical Trial. PLoS One 2013;8. doi:10.1371/journal.pone.0057256
27. Grol R, Grimshaw J. From best evidence to best practice: Effective implementation of change in patients' care. Lancet. 2003. doi:10.1016/S0140-6736(03)14546-1
28. Michie S, van Stralen MM, West R. The behaviour change wheel: A new method for characterising and designing behaviour change interventions. Implement Sci Published Online First: 2011. doi:10.1186/1748-5908-6-42
29. Bero LA, Grilli R, Grimshaw JM, et al. Getting research findings into practice. Closing the gap between research and practice: An overview of systematic reviews of interventions to promote the implementation of research findings. Br Med J 1998;317. doi:10.1136/bmj.317.7156.465
30. Zwerver F, Schellart AJM, Anema JR, et al. Changes in Insurance Physicians' Attitudes, Self-Efficacy, Intention, and Knowledge and Skills Regarding the Guidelines for Depression, Following an Implementation Strategy. J Occup Rehabil 2013;23:148–56. doi:10.1007/s10926-012-9378-9
31. Green J, Britten N. Qualitative research and evidence based medicine. Br. Med. J. 1998. doi:10.1136/bmj.316.7139.1230
32. Malterud K. The art and science of clinical knowledge: Evidence beyond measures and numbers. Lancet. 2001. doi:10.1016/S0140-6736(01)05548-9
33. Grypdonck MHF. Qualitative health research in the era of evidence-based practice. Qual Health Res Published Online First: 2006. doi:10.1177/1049732306294089
34. Leeman J, Sandelowski M. Practice-Based Evidence and Qualitative Inquiry. J Nurs Scholarsh Published Online First: 2012. doi:10.1111/j.1547-5069.2012.01449.x
35. Kenny DA, Kashy DA, Cook WL. Dyadic Data Analysis. Guilford Press 2006.

36. Hagedoorn M, Hein FL, Schulz T, et al. Are patient and relationship variables associated with participation of intimate partners in couples research? Heal Psychol 2015;34:270–3. doi:10.1037/hea0000141
37. Barton AW, Lavner JA, Stanley SM, et al. 'Will You Complete This Survey Too?' Differences Between Individual Versus Dyadic Samples in Relationship Research. J Fam Psychol 2019;34:196–203. doi:10.1037/fam0000583
38. Wittenborn AK, Dolbin-Macnab ML, Keiley MK. Dyadic Research in Marriage and Family Therapy: Methodological Considerations. J Marital Fam Ther Published Online First: 2013. doi:10.1111/j.1752-0606.2012.00306.x
39. Salmond SS. Randomized controlled trials: Methodological concepts and critique. Orthop Nurs Published Online First: 2008. doi:10.1097/01.NOR.0000315626.44137.94
40. Sampere M, Gimeno D, Serra C, et al. Return to work expectations of workers on long-term non-work-related sick leave. J Occup Rehabil 2012;22:15–26. doi:10.1007/s10926-011-9313-5
41. Siemonsma PC, Stuive I, Roorda LD, et al. Cognitive Treatment of Illness Perceptions in Patients With Chronic Low Back Pain: A Randomized Controlled Trial. Phys Ther 2013;93:435–48. doi:10.2522/ptj.20110150
42. Broadbent E, Ellis CJ, Thomas J, et al. Can an illness perception intervention reduce illness anxiety in spouses of myocardial infarction patients? A randomized controlled trial. J Psychosom Res 2009;67:11–5. doi:10.1016/j.jpsychores.2008.11.006
43. Snippen NC, de Vries HJ, Bosma A, et al. Workers' views on involving significant others in occupational health services. A focus group study. Disabil Rehabil 2021;:1–12. doi:10.1080/09638288.2021.2011435
44. Broadbent E, Leggat A, McLachlan A, et al. Providing cardiovascular risk management information to acute coronary syndrome patients: A randomized trial. Br J Health Psychol 2013;18:83–94. doi:10.1111/j.2044-8287.2012.02081.x
45. Keogh KM, Smith SM, White P, et al. Psychological family intervention for poorly controlled type 2 diabetes. Am J Manag Care 2011;17:105–13.
46. Wittenborn AK, Dolbin-Macnab ML, Keiley MK. Dyadic Research in Marriage and Family Therapy: Methodological Considerations. J Marital Fam Ther 2013;39:5–16. doi:10.1111/J.1752-0606.2012.00306.X
47. Kirkpatrick JD, Kirpatrick WK. Kirkpatrick's Four Levels of Training Evaluation. 2016.

Appendix

Summary

Summary

Many workers with chronic diseases experience difficulties in staying at work or returning to work after sickness absence. It is widely recognized that environmental factors play an important role in whether an individual is able to work despite his or her disease. Disability and adaptation to chronic disease do not occur in a social vacuum but are influenced by the environment in which the worker lives and works. Occupational health physicians may be better able to support sick-listed workers in the re-integration process by taking the influence of significant others like partners, family members and friends into consideration and involving them in the return-to-work process.

The first aim of this thesis was to gain more knowledge about the influence of significant others on work outcomes of workers with chronic diseases. The second aim was to gain insight into perspectives of workers and occupational health physicians on significant other involvement in occupational health care, and to strengthen the supportive role of occupational health physicians through the development and evaluation of education on involving significant others in the re-integration process. These aims led to the following research questions, which were answered in this thesis:

1. What is known in the literature about the influence of significant others on work outcomes of workers with chronic diseases? (Chapter 2)
2. Which individual and interpersonal factors of workers and their significant others can be targeted to facilitate positive work outcomes? (Chapter 2, 3 and 4)
3. What are the experiences, views and considerations of workers and occupational health physicians with regard to involving significant others in occupational health care? (Chapter 5 and 6)
4. What is the efficacy of the e-learning module *"Training for Occupational Health Physicians to Involve Significant Others"* (TOTIS) for improving occupational health physicians' knowledge, attitudes, and self-efficacy with regard to involving significant others in the return-to-work process? (Chapter 7)

Chapter 2 presents a systematic literature review on cognitions and behaviors of significant others that are related to work participation of individuals with a chronic disease. We conducted a search in PubMed, Embase, PsycINFO, SocINDEX and Web of Science (inception of databases until 28 March 2017). Four key concepts were central to the search: (i) chronic illness, (ii) work participation, (iii) significant others, and (iv) significant others' cognitions and behaviors. Out of 5,168 articles, 18 articles (15 qualitative and 3 quantitative) of moderate to high quality were included. After thematic synthesis, 27 factors could be distinguished. Consistent evidence was found that significant others' positive and encouraging attitudes regarding work participation, encouragement and motivating behavior, and open

communication with patients are facilitators for work participation. Consistently reported barriers were significant others' positive attitudes towards sickness absence and advice, encouragement or pressure to refrain from work. The findings indicated that practical support and expressions of understanding and empathy from significant others could both facilitate and hinder work participation, possibly depending on the situation and underlying individual and interpersonal processes.

Chapter 3 presents a cross-sectional study that examined the associations between illness perceptions and expectations about full return to work of sick-listed workers and their significant others. This study used survey data of 94 dyads consisting of workers with chronic diseases and their significant others. We performed dyadic analyses based on the Actor-Partner Interdependence Model (APIM), estimating associations of illness perceptions of each of the two dyad members with their own expectations about the worker's full return to work within six months (actor effect) as well as with the other dyad member's expectations about the worker's return to work (partner effect). The findings showed that workers' and their significant others' illness perceptions and expectations about the worker's return to work are interdependent, and that more negative illness perceptions of one member of the dyad are associated with more negative return to work expectations in both dyad members (i.e., actor and partner effects).

In the study described in *Chapter 4*, we aimed to examine whether illness perceptions, return to work expectations and significant other responses (active engagement, protective buffering and overprotection) within dyads of sick-listed workers and their significant others are associated with sick leave duration of workers with chronic diseases. This study used survey data linked with sick leave registry data of 90 dyads of workers with chronic diseases and their significant others. Multiple linear regression analyses with the dyad as the unit of analysis were conducted. It was found that negative illness perceptions and negative return to work expectations of both workers and significant others are associated with a longer sick leave duration. Their perceptions about the significant other's engagement, buffering and overprotection were not associated with sick leave duration of workers.

Chapter 5 presents the findings of a mixed-method survey study among 192 occupational health physicians (i.e., occupational physicians and insurance physicians) that aimed to examine current practices in assessing significant others' cognitions and behavioral responses that may influence work outcomes of workers with chronic diseases. Our findings indicated that most occupational health physicians do not commonly ask about significant others' illness perceptions, work-related beliefs and expectations, and behavioral responses. Organizational norms and occupational health physicians' self-efficacy were related to reported assessment practices. Furthermore, in this study, occupational health physicians reported multiple reasons for asking or not asking about these significant others' cognitions and behavioral responses. Their answers to open-ended questions indicate that they do not always find it necessary to ask about these factors, either because recovery and re-integration are going well or because they see no indication that significant others have a strong influence. In addition, several occupational health physicians indicated that lack of time was an important barrier to assess the influence of significant others. However, in the presence of mental health problems, severe complaints, coping issues and stagnation of the re-integration process, occupational health physicians do seem more inclined to inquire about significant others' cognitions and behavioral responses. In this context, occupational health physicians indicated that potential benefits of involving significant others include gaining more insight into the worker's complaints, functioning and coping, and being able to mobilize support of significant others or intervene when significant others seem to hinder the worker's return-to-work process.

Chapter 6 describes a focus group study that aimed to explore views and considerations of workers with chronic diseases regarding involvement of their significant others in occupational health care. Four focus group interviews were conducted, with 21 workers who had visited an occupational health physician due to work absence caused by a chronic disease. Data was analyzed using thematic analysis. After analysis, we distinguished four main themes: (i) attitudes towards involving significant others, (ii) preferences on how to involve significant others, (iii) benefits of involving significant others, and (iv) concerns with regard to involving significant others. Workers expressed both positive and critical opinions about involving significant others in occupational health care. Potential benefits mentioned by workers include that significant others can provide emotional and informational support before, during and after consultations. Moreover, according to workers, significant others are better able to support the worker's re-integration when they are involved in decision-making and informed about the re-integration plans. Furthermore, workers expressed concerns about overburdening significant others, and that overinvolved or overprotective significant others could negatively affect consultations with the occupational health physician and hinder the worker's re-integration.

Chapter 7 describes the development and evaluation of the e-learning module "*Training for Occupational Health Physicians to Involve Significant Others"* (TOTIS). This e-learning module was developed to educate occupational health physicians on how they can best address the role of significant others and manage their involvement in the return-to-work process of workers with chronic diseases. In addition, accompanying materials were developed that occupational health physicians can use in their daily practice. A randomized controlled trial was conducted with 87 occupational health physicians, involving an intervention group and a wait-listed control group. Between-group differences in knowledge, attitude, and self-efficacy outcomes, and retention of effects were assessed using ANOVA and paired t-tests. Reactions to the e-learning module were analyzed with descriptive statistics and thematic analysis. We found moderate to large effects on occupational health physicians' knowledge, attitudes, and self-efficacy, with retention of all changes at 10-week follow-up. The e-learning module was positively evaluated by occupational health physicians and graded with a mean score of 7.9 out of 10 (*SD* = 1.11). Occupational health physicians indicated that the e-learning module increased their awareness about the role of significant others, helped them to gain new insights into this topic and encouraged them to address the topic more often. Some occupational health physicians indicated missing the opportunity to practice with the accompanying materials, to discuss the learning material with their peers, to receive feedback from a trainer, or to further develop new skills.

The general discussion in C*hapter 8* summarizes and reflects on the main findings, discusses methodological considerations, and provides recommendations for policy, practice, and further research. Overall, the findings of this thesis offer new insights into the influence of significant others on work outcomes of workers with chronic diseases, and how occupational health physicians can take this into account to better support these workers in their re-integration process. The studies in this thesis contribute to the further development of the field of occupational health care by considering work re-integration from a dyadic perspective. The first part of this thesis indicates that illness perceptions and return to work expectations of both dyad members are associated with sick leave duration of workers with chronic diseases and demonstrates the interdependence within dyads of workers and their significant others. The studies in the second part of this thesis indicate that while involving significant others in the re-integration process can be valuable, occupational health consultations in which the worker is accompanied by a significant other are not without challenges. With the development of the TOTIS e-learning module, we provided further guidance and training for occupational health physicians with regard to involving significant others in the work re-integration process.

The findings of this thesis have important implications for policy and practice. Particularly in the case of coping issues or stagnation of recovery or re-integration, assessing illness perceptions and return to work expectations of both workers and their significant others can help occupational health physicians to identify workers at higher risk of long-term sickness absence, and provide insight into inadequate or maladaptive perceptions and expectations that may be modified to facilitate return to work. Moreover, occupational health physicians should consider using a dyadic approach to modify illness perceptions and return to work expectations of workers and their significant others that hinder recovery and sustainable return to work. Finally, we recommend the inclusion of the TOTIS e-learning module in continued education for occupational health physicians and potentially other professionals involved in work re-integration. Offering the TOTIS e-learning module to occupational health physicians can improve their knowledge, attitudes and self-efficacy with regard to involving significant others in the re-integration process and provide them with tools that they can use in this context. An important venue of future research would be to determine whether the TOTIS e-learning module affects the behavior of occupational health physicians with respect to assessing the influence of significant others and involving them in the re-integration process. Moreover, future studies should investigate whether such behavioral changes among occupational health physicians result in improved work outcomes among long-term sick-listed workers.

Appendix

Samenvatting

Samenvatting

Veel werkenden met een chronische ziekte ervaren belemmeringen op het gebied van arbeidsparticipatie. Uit onderzoek is bekend dat omgevingsfactoren een belangrijke rol spelen bij het vermogen van een persoon om te werken ondanks zijn of haar ziekte. Beperkingen en aanpassing aan chronische gezondheidsklachten vinden niet plaats in een sociaal vacuüm, maar worden beïnvloed door de sociale omgeving waarin de werkende leeft en werkt. Veel onderzoek is in de afgelopen jaren verricht naar de rol van de werkomgeving in het blijven werken dan wel terugkeer naar werk na verzuim. De invloed van naasten in de thuisomgeving (partners, familieleden en vrienden) op arbeidsparticipatie en hoe hier rekening mee kan worden gehouden bij verzuim- en re-integratiebegeleiding is nauwelijks onderzocht.

Het eerste doel van dit proefschrift was meer kennis te verkrijgen over de invloed van naasten op de werkuitkomsten van werkenden met een chronische ziekte. Het tweede doel was inzicht te verkrijgen in de perspectieven van werkenden en sociaal geneeskundigen (bedrijfs- en verzekeringsartsen) ten aanzien van het betrekken van naasten bij verzuim- en re-integratiebegeleiding en de ondersteunende rol van sociaal geneeskundigen te versterken door het ontwikkelen en evalueren van scholing over het betrekken van naasten bij het re-integratieproces. Deze doelstellingen hebben geleid tot de volgende onderzoeksvragen die in dit proefschrift zijn beantwoord:

1. Wat is er in de literatuur bekend over de invloed van naasten op de werkuitkomsten van werkenden met chronische ziekten? (Hoofdstuk 2)
2. Aan welke individuele en interpersoonlijke factoren van werkenden en hun naasten kan aandacht worden besteed om positieve werkuitkomsten te faciliteren? (Hoofdstuk 2, 3 en 4)
3. Wat zijn de ervaringen, opvattingen en overwegingen van werkenden en sociaal geneeskundigen ten aanzien van het betrekken van naasten bij verzuim- en re-integratiebegeleiding? (Hoofdstuk 5 en 6)
4. Wat is de effectiviteit van de e-learning module "*Training for Occupational Health Physicians to Involve Significant Others*" (TOTIS) in het verbeteren van de kennis, attitude en eigen-effectiviteit van sociaal geneeskundigen ten aanzien van het betrekken van naasten bij het re-integratieproces? (Hoofdstuk 7)

Hoofdstuk 2 beschrijft een systematisch literatuuronderzoek naar cognities en gedragingen van naasten die gerelateerd zijn aan arbeidsparticipatie van werkenden met een chronische ziekte. De databanken PubMed, Embase, PsycINFO, SocINDEX and Web of Science zijn doorzocht tot 28 maart 2017. We includeerden alle studies die rapporteerden over cognities of gedragingen van naasten gerelateerd aan arbeidsparticipatie van mensen met verschillende chronische aandoeningen. Van de 5.168 gevonden artikelen werden 18 artikelen (15 kwalitatief en 3 kwantitatief) van matige tot hoge kwaliteit geïncludeerd. Na thematische synthese werden 27 factoren onderscheiden ten aanzien van cognities en gedragingen van naasten die arbeidsparticipatie van werkenden kunnen faciliteren dan wel belemmeren. Er werd consistent bewijs gevonden dat een positieve en bemoedigende houding van naasten met betrekking tot arbeidsparticipatie, aanmoediging en motiverend gedrag en open communicatie met zieke werkenden de kans op arbeidsparticipatie vergroot. Ook was er consistent bewijs dat naasten arbeidsparticipatie kunnen belemmeren wanneer zij een positieve houding hebben ten aanzien van ziekteverzuim en zieke werkenden adviseren of onder druk zetten om niet te werken. Op basis van de bevindingen werd geconcludeerd dat praktische steun en uitingen van begrip en empathie van naasten zowel faciliterend als belemmerend kunnen werken voor arbeidsparticipatie, mogelijk afhankelijk van de situatie en onderliggende individuele en interpersoonlijke processen.

In *hoofdstuk 3* wordt een vragenlijststudie beschreven waarin de associaties tussen ziektepercepties en verwachtingen over volledige terugkeer naar werk van verzuimende werkenden en hun naasten zijn onderzocht. In deze studie hebben 94 koppels van werkenden met chronische ziekten en hun naasten een vragenlijst ingevuld over onder andere hun percepties over de ziekte, verwachtingen over terugkeer naar werk en de manier waarop de werkende en naasten omgaan met de ziekte. We hebben dyadische analyses uitgevoerd gebaseerd op het Actor-Partner Interdependence Model (APIM) om te onderzoeken of de ziektepercepties van beide personen in een koppel gerelateerd zijn aan zijn of haar eigen verwachtingen over de volledige terugkeer naar werk van de werkende binnen zes maanden (actor effect) en aan de verwachtingen van de andere persoon over de terugkeer van de werkende (partner effect). De bevindingen toonden aan dat de ziektepercepties en verwachtingen van de werkenden en hun naasten over de terugkeer naar werk van de werkende onderling afhankelijk zijn, en dat meer negatieve ziektepercepties van één persoon binnen het koppel gerelateerd zijn aan meer negatieve verwachtingen over de terugkeer naar werk bij beide personen binnen het koppel (i.e., actor- en partner effecten).

In de studie beschreven in *hoofdstuk 4* hebben we vervolgens onderzocht of ziektepercepties, verwachtingen over terugkeer naar werk en reacties van naasten (actieve betrokkenheid, beschermende buffering en overbescherming) binnen koppels van verzuimende werkenden en hun naasten geassocieerd zijn met de verzuimduur van werkenden met chronische ziekten. Deze studie gebruikte vragenlijstdata van 90 koppels van werkenden met chronische ziekten en hun naasten, gekoppeld aan registerdata over het ziekteverzuim van de werkenden. Er werden meervoudige lineaire regressieanalyses uitgevoerd met het koppel als de analyse-eenheid. Er werd gevonden dat negatieve ziektepercepties en negatieve verwachtingen over terugkeer naar werk van zowel werkenden als naasten geassocieerd zijn met een langere verzuimduur. Hun percepties over de betrokkenheid, buffering en overbescherming van de naaste waren niet geassocieerd met de verzuimduur van werkenden.

Hoofdstuk 5 beschrijft de bevindingen van een mixed-method vragenlijstonderzoek onder 192 sociaal geneeskundigen (zowel bedrijfsartsen en verzekeringsartsen). Het doel van deze studie was inzicht krijgen in hoeverre zij in hun dagelijks professionele handelen oog hebben voor de invloed van naasten. Uit onze bevindingen blijkt dat de meeste sociaal geneeskundigen niet vaak vragen naar de ziektepercepties, overtuigingen en verwachtingen ten aanzien van werk van naasten. Ook vragen zij niet vaak naar gedragingen van naasten. De aanwezigheid van een sociale norm binnen de organisatie om de invloed van naasten uit te vragen en ervaren eigen-effectiviteit waren gerelateerd aan het gerapporteerde handelen. In deze studie rapporteerden sociaal geneeskundigen verschillende redenen om al dan niet te vragen naar de cognities en gedragingen van naasten. Uit hun antwoorden op open vragen blijkt dat ze het niet altijd nodig vinden om naar deze factoren te vragen. Hetzij omdat herstel en re-integratie goed gaan, hetzij omdat ze geen aanwijzingen zien dat naasten een sterke invloed hebben. Daarnaast gaven meerdere sociaal geneeskundigen aan dat tijdgebrek een belangrijke barrière is om de invloed van naasten in kaart te brengen. Bij psychische problemen, ernstige of complexe problematiek, coping problemen en stagnatie van het re-integratieproces lijken sociaal geneeskundigen echter meer geneigd te vragen naar de cognities en gedragingen van naasten. Sociaal geneeskundigen gaven aan dat mogelijke voordelen van het betrekken van naasten het verkrijgen van meer inzicht in de klachten, het functioneren en de coping van de werkende zijn. Een ander mogelijk voordeel dat door hen werd genoemd is het kunnen mobiliseren van steun van naasten of interveniëren wanneer naasten het werkhervattingsproces van de werkende lijken te belemmeren.

Hoofdstuk 6 geeft een beschrijving van een focusgroepstudie die tot doel had de opvattingen en overwegingen van werkenden met chronische ziekten te onderzoeken ten aanzien van het betrekken van naasten bij verzuim- en re-integratiebegeleiding. Er zijn vier focusgroep-interviews gehouden met 21 werkenden die een bedrijfsarts hadden bezocht vanwege werkverzuim door een chronische ziekte. De verzamelde data is geanalyseerd met behulp van thematische analyse. Vier hoofdthema's werden hierin onderscheiden: (i) attitudes ten aanzien van het betrekken van naasten, (ii) voorkeuren ten aanzien van hoe naasten betrokken worden, (iii) voordelen van het betrekken van naasten, en (iv) zorgen omtrent het betrekken van naasten. Werkenden uitten zowel positieve als kritische meningen ten aanzien van het betrekken van naasten bij verzuim- en re-integratiebegeleiding. Mogelijke voordelen die door werkenden zijn genoemd zijn onder meer dat naasten voor, tijdens en na consulten met de sociaal geneeskundige emotionele en informationele steun kunnen bieden. Bovendien zijn naasten mogelijk beter in staat om de re-integratie van de werkende te ondersteunen wanneer ze betrokken zijn bij de besluitvorming en op de hoogte zijn van de re-integratieplannen. Daarnaast uitten werkenden zorgen ten aanzien van het overbelasten van naasten en dat overbetrokken of overbezorgde naasten een negatieve invloed zouden kunnen hebben op het gesprek met de sociaal geneeskundige, hetgeen de re-integratie van de werkende zou kunnen belemmeren.

Hoofdstuk 7 beschrijft de ontwikkeling en evaluatie van de TOTIS e-learning module (*Training for Occupational Health Physicians to Involve Significant Others*). Deze e-learning module heeft als doel om de kennis en vaardigheden van sociaal geneeskundigen te vergroten ten aanzien van het betrekken van naasten bij het werkhervattingsproces van werkenden met chronische ziekten. Naast de TOTIS e-learning module met daarin informatie en opdrachten ontvingen de sociaal geneeskundigen ook bijbehorende materialen, namelijk een naslagwerk met een overzicht van de kernboodschappen en adviezen voor de praktijk, gevalideerde vragenlijsten met toelichtingen over het gebruik hiervan, een gesprekskaart die ingezet kan worden om communicatie tussen werkenden en naasten te bevorderen en folders over verschillende chronische aandoeningen die ingezet kunnen worden om adequate ziektepercepties te bevorderen. Het evaluatieonderzoek bestond uit een gerandomiseerd gecontroleerd experiment met 87 sociaal geneeskundigen, met een interventiegroep ($n = 39$) en een wachtlijst controlegroep ($n = 48$). Verschillen tussen de groepen in kennis, attitude en eigen-effectiviteit en het behoud van effecten werden onderzocht met behulp van ANOVA en gepaarde t-testen. De antwoorden op de evaluatievragen over de e-learning module werden geanalyseerd met beschrijvende statistiek en thematische analyse. We vonden middelmatige tot grote positieve effecten op de uitkomstmaten kennis, attitudes en eigen-effectiviteit. Deze effecten bleken ook na 10 weken follow-up nog te bestaan. De e-learning module werd positief beoordeeld door sociaal geneeskundigen (gemiddeld cijfer 7.9). Verder gaven de deelnemers aan dat de e-learning module hun bewustzijn van de invloed van naasten heeft vergroot, hen hielp nieuwe inzichten te verwerven over dit onderwerp en hen motiveerde om hier vaker aandacht aan te besteden in hun dagelijkse praktijk. Sommige sociaal geneeskundigen gaven aan de mogelijkheid te missen om te oefenen met de bijbehorende materialen, de leerstof te bespreken met collega's, feedback te krijgen van een trainer of nieuwe vaardigheden verder te ontwikkelen.

De algemene discussie in *hoofdstuk 8* begint met een samenvatting van de belangrijkste bevindingen in het proefschrift en reflectie op deze bevindingen, gevolgd door methodologische overwegingen en tenslotte worden aanbevelingen gegeven voor beleid, praktijk en verder onderzoek. Het eerste deel van dit proefschrift toont aan dat de ziektepercepties en verwachtingen over terugkeer naar werk van zowel werkenden en hun naasten gerelateerd zijn aan de duur van het ziekteverzuim van werkenden met chronische ziekten en demonstreert de onderlinge afhankelijkheid binnen koppels. De studies in het tweede deel van dit proefschrift tonen aan dat hoewel het betrekken van naasten bij het re-integratieproces waardevol kan zijn, consulten waarbij de werkende wordt vergezeld door een naaste niet zonder uitdagingen zijn. Met de ontwikkeling van de TOTIS e-learning module hebben we advies en scholing over het betrekken van naasten in het re-integratieproces toegankelijk gemaakt voor sociaal geneeskundigen. De bevindingen in dit proefschrift bieden nieuwe inzichten over de invloed van naasten op arbeidsparticipatie van werkenden met chronische ziekten en in het bijzonder over de wijze waarop sociaal geneeskundigen hierop in kunnen spelen om deze werkenden beter te ondersteunen in hun re-integratieproces. De studies in dit proefschrift dragen bij aan de verdere ontwikkeling van de sociaal geneeskundige zorg door re-integratie vanuit een dyadisch perspectief te bekijken.

De bevindingen van dit proefschrift hebben een aantal belangrijke implicaties voor beleid en praktijk. Met name wanneer er sprake is van coping problemen of stagnatie van herstel of re-integratie, kan het verkennen van ziektepercepties en verwachtingen over terugkeer naar werk van werkenden en hun naasten sociaal geneeskundigen helpen om werkenden te identificeren met verhoogd risico op langdurig ziekteverzuim. Ook kan dit inzicht bieden in inadequate of maladaptieve percepties en verwachtingen waarop kan worden geïntervenieerd om terugkeer naar werk te faciliteren. Bovendien zouden sociaal geneeskundigen moeten overwegen een dyadische benadering toe te passen om ziektepercepties en verwachtingen over terugkeer naar werk van werkenden en hun naasten die herstel en duurzame werkhervatting in de weg staan bij te sturen. Ten slotte raden we aan om de TOTIS e-learning module op te nemen in het nascholingsaanbod voor sociaal geneeskundigen en mogelijk andere professionals die betrokken zijn bij verzuim- en re-integratiebegeleiding. Het aanbieden van de TOTIS e-learning module aan sociaal geneeskundigen kan hun kennis, attitudes en eigen-effectiviteit ten aanzien van het betrekken van naasten bij het re-integratieproces verbeteren en handvatten bieden die zij in deze context kunnen gebruiken. Een belangrijke richting voor toekomstig onderzoek is om vast te stellen of de TOTIS e-learning module het gedrag van sociaal geneeskundigen inzake het betrekken van naasten beïnvloedt. Bovendien zouden toekomstige studies moeten onderzoeken of dergelijke gedragsveranderingen bij sociaal geneeskundigen resulteren in verbeterde werkuitkomsten bij langdurig verzuimende werkenden.

Appendix

Dankwoord

Dankwoord

Het is gelukt: mijn proefschrift is nu écht klaar! Ik kijk terug op een mooie tijd waarin ik veel heb geleerd en gedaan. Tijdens mijn promotieonderzoek heb ik veel steun en hulp ervaren van mensen in mijn omgeving. Ik wil dan ook graag van de gelegenheid gebruik maken om iedereen te bedanken die direct of indirect heeft bijgedragen aan de totstandkoming van dit proefschrift. Een aantal van hen wil ik hier in het bijzonder bedanken.

Allereerst natuurlijk mijn promotieteam: *Haitze, Sandra en Mariët*. Ik heb erg veel geluk gehad met jullie als begeleiders en ben blij dat we onze samenwerking nog wat langer kunnen voortzetten in ons AKC project. *Haitze,* ik was jouw eerste promovendi en kon altijd bij je terecht om even ergens over te sparren of jouw input te krijgen. Je was als mijn dagelijks begeleider altijd heel benaderbaar, stond open voor mijn mening en ideeën en moedigde me wanneer dat nodig was aan om mijn grenzen aan te geven. Bedankt voor al je begeleiding, adviezen en de fijne samenwerking. *Sandra,* jouw enthousiasme over ons project heeft ervoor gezorgd dat ik ook vanaf het begin enthousiast was over mijn promotieonderzoek. Bedankt dat je mij volop de ruimte hebt gegeven om mijn eigen ideeën in te brengen en zo mijn promotieonderzoek echt van mij te maken. Ook wil ik je bedanken dat je me altijd hebt uitgedaagd om net dat stapje extra te zetten om ons onderzoek zo goed mogelijk te maken en me zo steeds verder te ontwikkelen als onderzoeker. *Mariët*, jouw expertise op het gebied van interpersoonlijke processen zorgde voor extra verdieping in ons onderzoek en heeft ertoe geleid dat we re-integratie vanuit een dyadisch perspectief zijn gaan bekijken (wat ik erg leuk vond in mijn promotieonderzoek). Ik vond het erg fijn om iemand met een psychologische achtergrond in mijn team te hebben en ik wil je bedanken voor jouw prettige manier van begeleiden en waardevolle input.

Ook wil ik alle professionals, werkenden en naasten die hebben deelgenomen aan ons onderzoek bedanken voor hun betrokkenheid en het delen van hun ervaringen. Zonder jullie was dit proefschrift niet mogelijk geweest. In het bijzonder wil ik de leden van onze werkgroep bedanken voor hun betrokkenheid en waardevolle adviezen gedurende de looptijd van mijn promotieonderzoek: *Marion van Beek-Bloemendal, Arjen Ras, Jan Timmer, Cora Westland en Jan Zwagemakers*. Ook wil ik *Bas Sorgdrager en Peter Flach* bedanken dat ik in mijn eerste jaar een kijkje in hun 'keuken' mocht nemen en voor hun hulp tijdens verschillende deelstudies.

Daarnaast wil ik mijn co-auteurs bedanken voor de waardevolle input en fijne samenwerking tijdens de verschillende studies: *Sylvia van der Burg-Vermeulen, Corné Roelen, Astrid Bosma en Mariska de Wit*. Hierbij wil ik in het bijzonder *Sylvia en Corné* bedanken voor het meedenken over de implicaties van onze bevindingen voor de praktijk vanuit hun rol als sociaal geneeskundige. Ook wil ik mijn collega's *Tialda Hoekstra en Truus van Ittersum* bedanken voor de methodologische ondersteuning en *Lotte Kors, Joyce van Meel en Bo Krause* voor de praktische ondersteuning. Graag wil ik ook *Puck Winnubst en Chris Dorna* bedanken voor de prettige samenwerking bij de ontwikkeling van de e-learning module over het betrekken van naasten en *Margriet van Kampenhout* voor haar hulp bij de focusgroepen.

Graag wil ik Instituut Gak bedanken voor het financieren van het landelijke onderzoeksprogramma "De chronisch zieke werkende centraal" en het mogelijk maken van mijn promotieonderzoek. Daarnaast wil ik iedereen uit ons consortium bedanken voor de prettige samenwerking. In het bijzonder wil ik mijn collega promovendi *Astrid Bosma en Mariska de Wit* bedanken. In de afgelopen jaren hebben we op verschillende plekken in het land gezellige meetings gehad om successen te vieren, knelpunten te bespreken en natuurlijk taart te eten. *Mariska*, ik kijk met veel plezier terug op ons eerste internationale congres in Dublin en natuurlijk de BG-dagen en de onderzoeksdagen waar we samen zijn geweest. *Astrid*, ik vind het erg leuk dat we de afgelopen jaren zo veel contact met elkaar hebben gehad en dat we dit avontuur samen hebben kunnen delen. Met als één van de hoogtepunten natuurlijk ons 'uitje' naar Otterlo.

Ook wil ik graag mijn waardering uiten voor de leden van de beoordelingscommissie: *Prof. dr. Adelita Ranchor, Prof. dr. Frederieke Schaafsma en Prof. dr. Willem van Rhenen*. Bedankt voor de tijd en aandacht die jullie hebben besteed aan het lezen en beoordelen van dit proefschrift en dat jullie hierover met mij van gedachten willen wisselen tijdens mijn verdediging.

Ik had het geluk om mijn promotieonderzoek uit te mogen voeren op de afdeling Gezondheidswetenschappen van het UMCG, waar ik enorm heb genoten van de prettige sfeer en het leuke contact met mijn fantastische collega's. Ik heb te veel leuke collega's om ze hier allemaal persoonlijk te benoemen, maar ik wil er wel een aantal uitlichten. Ten eerste natuurlijk mijn fantastische kamergenootjes met wie ik alle ups en downs tijdens mijn promotieonderzoek heb kunnen delen: *Joke en Alex*. *Joke*, in de afgelopen jaren hebben we ontzettend veel gelachen, hebben we lief en leed met elkaar gedeeld en zijn we goede vriendinnen geworden. Bedankt voor alle goede gesprekken, gezelligheid en leuke momenten. Ik ben heel blij dat jij bij mijn verdediging als paranimf aan mijn zijde wilt staan. *Alex*, I could not have wished for a better roommate and friend than you. Thank you for your generosity, good stories, countless laughs, great dinners and overall just helping me survive my PhD. *Henk-Jan en Kor*, het spande er even om maar uiteindelijk heb ik jullie toch nog weten in te halen ;-). Bedankt dat ik gedurende mijn promotieonderzoek altijd bij jullie terecht kon voor informatie of advies vanuit jullie rol als verzekeringsarts dan wel arbeidsdeskundige. Ik kijk met plezier terug op de afgelopen maanden waarin we geregeld even spraken over "de laatste fase van onze promotieonderzoeken". *Marco, Yuwei, Matheus, Jitske, Lotte, Bo,* *Patricia, Lindy, Bibi, Guilherme en alle collega's die ik nog niet heb genoemd*, bedankt voor de vele lunchwandelingen, koffiemomentjes, gesprekken, etentjes, uitjes en alle andere leuke momenten. In het bijzonder wil ik hier ook mijn collega's van *CHEW* bedanken voor alle manieren waarop ze het werken op de afdelinggezonder en plezieriger maken.

Graag wil ik ook een aantal vrienden bedanken voor de hoognodige ontspanning, gezelligheid en steun tijdens mijn promotieonderzoek. *Shefali*, we hebben samen al heel wat avonturen beleefd waaronder onze reizen naar IJsland en Jordanië. We hebben altijd ontzettend veel lol met elkaar en het gesprek valt bij ons nooit stil. Bedankt voor alle gezelligheid, gekkigheid, goede gesprekken en steun. *Imre, Evelien, Rick, Wopkelien en Michelle*, wij kennen elkaar al vanaf de middelbare school en zijn inmiddels al ruim vijftien jaar een vriendengroep. Ik kijk met veel plezier terug op onze weekendjes weg, sinterklaasvieringen, verjaardagen, etentjes, spelletjesavonden en nog veel meer. Ik hoop dat er nog veel leuke en mooie momenten zullen volgen! In het bijzonder wil ik *Imre* bedanken voor de vele mooie wandelingen, goede gesprekken, etentjes en andere leuke en bijzondere momenten. Ik vind het heel leuk dat wij in de afgelopen jaren zulke goede vriendinnen zijn geworden. Ook wil ik *Evelien* bedanken voor de gezelligheid, het luisterend oor en haar hulp om dingen soms wat meer te relativeren. *Simone*, bedankt voor de hoognodige pauzemomentjes in het UMCG in de eerste jaren van mijn promotieonderzoek en natuurlijk voor de gezellige etentjes buiten werk. Ook wil ik iedereen van ons badmintongroepje bedanken voor alle leuke partijtjes en natuurlijk de lekkere biertjes en bitterballen na het sporten.

Mijn dankwoord is natuurlijk niet compleet zonder mijn ouders, broers en schoonzus te benoemen. Lieve *pap, mam, Pascal, Linda en Matthieu*, ik weet niet wat ik zonder jullie zou moeten. Bedankt voor jullie betrokkenheid, steun en alle leuke, mooie en gezellige momenten. *Pap en mam,* heel erg bedankt voor jullie onvoorwaardelijke liefde en dat jullie er altijd voor me zijn. Ik vind het heel fijn dat ik in de afgelopen jaren altijd bij jullie terecht kon, of het nou voor een lach of een traan was. *Mam,* bedankt voor je zorgzaamheid, de ontelbare gezellige en lekkere maaltijden en de leuke uitjes naar bijvoorbeeld Scheveningen. *Pap,* bedankt voor je interesse, de vele fijne gesprekken en grappige momenten tijdens onze wandelingen en gitaaravonden. *Pascal en Matthieu*, ik ben ontzettend blij met jullie als mijn grote broers. We vinden het heerlijk om elkaar een beetje te plagen en hebben vaak veel lol samen. Bedankt voor alle gezelligheid en dat ik altijd op jullie kan rekenen. *Linda*, jij bent de leukste en liefste schoonzus die ik me had kunnen wensen. Dank je wel dat je bij mijn verdediging als paranimf aan mijn zijde wilt staan. En dan zijn *Bram en Daan* er natuurlijk nog: wat heb ik een geluk met zulke vrolijke, leuke en lieve neefjes. Lekker knuffelen, springen op de trampoline, koekjes bakken, boekjes lezen of andere leuke dingen doen: wat wil je als tante nog meer? En tot slot *Tante Fini*: ik denk dat er bijna niemand zo trots op mij is als u, dank u wel voor al uw liefde.

Appendix

About the author

About the author

Nicole Snippen was born on November 24th 1989 in Groningen, the Netherlands. After completing secondary education at the Augustinus College in Groningen in 2007, she studied Applied Psychology at the Hanze University of Applied Sciences in Groningen. She obtained her Bachelor's degree with a specialization in child and youth psychology in 2012. After completing a premaster, she obtained her master's degree in Psychology in 2015 at the University of Groningen, with a specialization in clinical psychology. In 2016, Nicole obtained a work experience position at Accare, an organization providing specialized child and youth mental health care. This position came to an end after five months when she obtained a PhD position. In 2017, she started her PhD project at the Department of Health Sciences of the University Medical Center Groningen in the Netherlands. The focus of her PhD research was on the role of significant others like partners, family members and friends in work re-integration of workers with chronic diseases. She conducted empirical and practice-oriented research, in which she gained experience in both quantitative and qualitative research methods. Furthermore, she developed the TOTIS e-learning training for occupational health physicians on how to involve significant others in the re-integration process of workers with chronic diseases, and an accompanying conversation tool.

Aside from research, during her PhD she was engaged in teaching activities for both medical students and occupational health professionals. Furthermore, she was a board member of Aletta's Talent Network of the Aletta Jacobs School of Public Health for two years. In addition, she was a member of the Committee for Healthy and Enjoyable Working (CHEW) at the Department of Health Sciences of the University Medical Center Groningen for five years.

Currently, Nicole is continuing her academic career as a post doc researcher at the Department of Health Sciences of the University Medical Center Groningen. She is currently involved in three projects with a focus on work and health.

Appendix

Publications not included in this thesis

Publications not included in this thesis

International publications

Bosma, A.R., Boot, C.R.L., **Snippen, N.C.**, Schaafsma, F.G., & Anema, J.R. Supporting employees with chronic conditions to stay at work: perspectives of occupational health professionals and organizational representatives. *BMC public health* 2021;21(1):1-13. doi:10.1186/s12889-021-10633-y

de Wit, M., Wind, H., **Snippen, N.C.**, Sluiter, J.K., Hulshof, C.T., & Frings-Dresen, M.H. Physicians' Perspectives on Person-Related Factors Associated With Work Participation and Methods Used to Obtain Information About These Factors. *Journal of occupational and environmental medicine* 2019;61(6):499-504. doi:10.1097/JOM.0000000000001596

Jansen J., **Snippen N.C.**, Koning P.W.C., Boot, C.R.L., van Ooijen, R., & Brouwer, S. Discrepancies between workers with disabilities and their supervisors in reported work accommodations and associations with Return to Work. *BMC Public Health (in press)*.

Zipfel, N., de Wit, M., **Snippen, N.C.**, Bosma, A.R., Hulshof, C.T.J., de Boer, A .G.E.M., van der Burg-Vermeulen, S.J. Improving person-centered occupational health care for workers with chronic health conditions: a feasibility study. *Submitted* 2023.

National publications

Snippen N., de Vries H., de Wit M., van der Burg-Vermeulen S., Brouwer S., Hagedoorn M. Aandacht voor cognities en gedragingen van naasten. *TBV–Tijdschrift voor Bedrijfs-en Verzekeringsgeneeskunde* 2021;29(1):54-8. doi:10.1007/s12498-020-1286-x

de Wit M., Wind H., Frings-Dresen M., **Snippen N.**, Hulshof C., de Boer A. Cognities en percepties van chronisch zieke werkenden. *TBV–Tijdschrift voor Bedrijfs-en Verzekeringsgeneeskunde* 2020;28(5):30-7. doi:10.1007/s12498-020-0763-6

Snippen N., de Vries H., van der Burg-Vermeulen S., Hagedoorn M., Brouwer S. De invloed van naasten op arbeidsparticipatie van werkenden met een chronische aandoening. *TBV–Tijdschrift voor Bedrijfs-en Verzekeringsgeneeskunde* 2019;27(9):28-30. doi:10.1007/s12498-019-0083-x

Appendix

Previous dissertations of Research Institute SHARE

Previous dissertations of Research Institute SHARE

This thesis is published within the **Research Institute SHARE** (Science in Healthy Ageing and healthcaRE) of the University Medical Center Groningen / University of Groningen.

Further information regarding the institute and its research can be obtained from our internet site: https://umcgresearch.org/w/share

More recent theses can be found in the list below.
(supervisors are between brackets)

2022

Rietveld T
Wheeling performance in wheelchair tennis: Understanding and improving a complex skill.
(prof LHV van der Woude, dr S de Groot, dr RJK Vegter)

Dijk SDM van
Older adults with character: towards treatment in later life.
(prof RC Oude Voshaar, Prof SPJ van Alphen, Dr RHS van den Brink)

Hoveling LA
Unravelling socioeconomic health inequalities: Targets for preventing metabolic syndrome and major depressive disorder.
(Dr N Smidt, Prof AC Liefboer, Prof U Bultmann)

Medić G
Health Technology Assessments of Devices Drawn on Experiences from Orphan Medicines.
(prof MJ Postma, dr MP Conolly)

Bardi F
Genetics meets ultrasound: Early prenatal screening for congenital anomalies.
(prof CM Bilardo, dr MK Bakker, dr A Elvan)

Kraaijenbrink C
Biophysical perspective on submaximal handcycling propulsion in able-bodied men: Biomechanics and physiology of different gear, mode and steering settings.
(prof LHV van der Woude, Prof H Wagner, dr RJK Vegter, dr C Bohn)

Veenstra GL
Clinical governance and health care professionals' motivation to provide care: A balancing Act.
(prof E Heineman, prof HBM Molleman, dr GA Welker)

Pol S van der
Making Informed Decisions: The value of testing strategies in healthcare.
(prof MJ Postma, prof AW Friedrich, dr DEMC Jansen, dr ADI van Asselt)

Sbarigia U
The quest for a cure for chronic hepatitis B from an HTA perspective. Lessons learned from hepatitis C.
(prof MJ Postma, prof JC Wilschut)

Broekema S
Family Nursing Conversations in Home Health Care. Supporting family functioning and preventing caregiver burden in long-term care situations.
(prof PF Roodbol, dr MLA Luttik, dr W Paans)

Misgina KH
Undernutrition in early life: using windows of opportunity to break the vicious cycle
(dr E Corpeleijn, prof EM van der Beek, prof HM Boezen †, dr H Groen, dr AM Bezabih)

Grünwald O
Social engagement during the retirement transition: insights into volunteering, caregiving, and grandparenting
(prof CJIM Henkens, dr M Damman)

Visscher L
Elements that determine the effectiveness of interventions for families with multiple problems: Towards more tailored care
(prof SA Reijneveld, prof RHJ Scholte, dr DEMC Jansen, dr KE Evenboer)

For earlier theses please visit our website.

Research Institute
SHARE